VISUALS IN LEARNING DESIGN

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An Introductory Guidebook with Learning Activities

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Learning designers constantly use visuals to convey meaning and to shape learner experiences. Yet, designers often have little training or guidance on what makes for effective visual experiences and also regularly lack the technical and artistic skills necessary to create and modify their own designs. This book was written to accompany a graduate-level course in learning design that helps new designers to understand why visuals are important, how to make effective visuals, and how to use industry-standard tools (like Adobe Illustrator) to bring their visual designs to life.

Design   Graphic Design   Learning Design   UX Design   Visuals

2022   English

Dashboard

Website

Mobile Application

I

What is visual learning design?

Color Theory　Design　Graphic Design　Instructional Design

Interview　Job Interview　Layout　Learning Management

Pedagogy　Typography　Venn Diagram

Visual Learning Design

"Design is thinking made visual."

Saul Bass

Years ago I gave a lecture during a job interview. I chose a topic, either out of bravery or foolishness, that I had never talked about before—color theory—and I delivered it to a room of aspiring learning designers. They were courteous and engaged, but at the end, one listener raised his hand and asked the all-important question: "So what? What does any of this mean for learning designers?"

Like a poor designer, I had assumed that the answer was obvious and self-evident, but since that time I have come to realize more clearly just how rare it is for learning designers to think deeply about the visual aspects of their designs and what these decisions mean for learners. The result is that we train students, hire professionals, and lead teams in creating learning experiences without considering the choices we make with our visuals, such as layout, typography, color, etc., or if we do think about these issues as part of our design, we struggle to talk about our choices intelligently and rely instead on gut feelings of what seems good.

I have written this book for learning designers who find themselves in the position of creating visuals for learners, whether that be to help a student learn a concept, to guide an instructor in teaching a course, or to assist a website user in making a decision.

Many of us involved in learning design must draw upon various skillsets developed in different communities of professionals to do what is best for our learners. If I'm building a module in a learning management system, for instance, I'll need to know how to structure and deliver content in a manner that is pedagogically sound, while also using images and graphics in a manner supportive of my learning goals and also ensuring that each student's experience in the module is seamless from start to finish.

Figure 1

Venn Diagram of Visual Learning Design
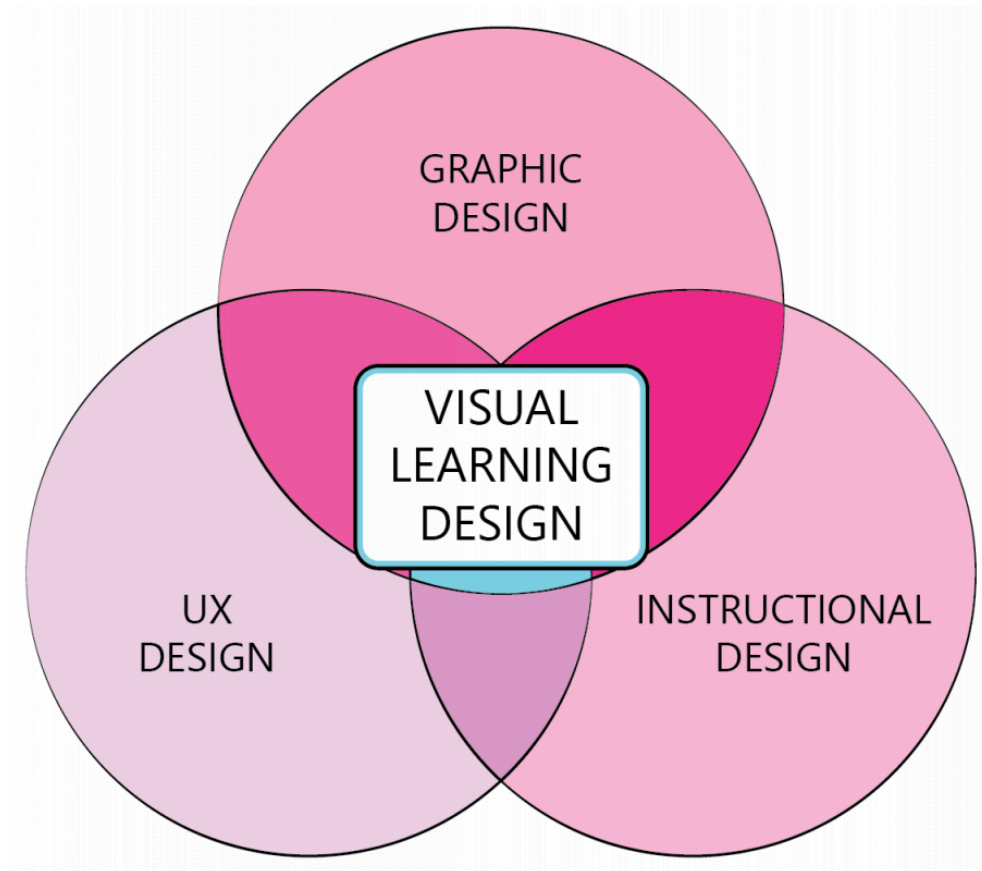
Visual learning design draws from many fields, including graphic design, UX design, instructional design, and others

This means that to be an effective learning designer, we must straddle various professions, each with their own skills, knowledge, dispositions, and norms.

This also means that we are not only engineers or artists, but a combination of the two wherein we must mix programming, aesthetics, pedagogy, and evaluation together to form good learning experiences (Maina et al., 2015).

Thus, the good learning designer understands how people learn and how to teach them but also understands how to speak to them on a visual, emotional, technological, and behavioral level, guiding them toward learning experiences that are meaningful and rich.

In these endeavors, we are both analytic and synthetic—tearing our designs apart and creating new ones from the pieces—and the complexity of such work means that there is no comprehensive guidebook that can show us every step we should take or what works in every situation.

However, there are some overarching dispositions we should espouse, some general principles that we should follow, and some useful patterns of activity that will help us to be successful learning designers, and this book will attempt to draw your attention to some of these.

For instance, because we are focused on learning, and because learning occurs in the bodies and minds of our learners, this means that we care very deeply about our learners. We are empathetic to them, learner-centered in our approaches, and considerate of them as holistic beings (not just brains-in-vats or robots to be programmed). Because human learning is cognitive, social, and emotional, we employ design strategies and engage in practices that honor our learners as agentic and complex individuals that matter (see Anderson, 2003; Wilson, 2015). We also interact with them through our designs and data practices in ways that are ethical, inclusive, and charitable, eschewing approaches that are dehumanizing or reductionistic.

In short, we as learning designers should be obsessed with and passionate about our learners. We should love them, care about them, and want them to succeed—and we should design with their best interests at heart. This means that *what we create* pales in comparison to *who we create it for* and what their experiences with our creations will be.

Underlying principles of empathy (Tracey & Hutchinson, 2019), love (Isenbarger & Zembylas, 2006), and charity should shape our practices in important ways, such as designing to our diversity of learners (Gronseth et al., 2020, Perez, 2000), constantly evaluating our designs, responding humbly to critique, iteratively improving our designs, and so forth, and these core dispositions influence the visual aspects of our designs simply because how our learners interact with the world visually actually matters. Learner behaviors, attitudes, and emotions are shaped by what they see, and our visuals can inspire, encourage, and clarify or (alternatively) depress, frustrate, and obfuscate.

This book will attempt to highlight some of the core practices and dispositions of visual learning design while also providing resources for learners to dig more deeply into related topics. Chapters are organized into three sections: Principles, which will address theoretical issues related to visual design; Practices, which will provide concrete guidance on what to do; and Projects, which will walk the learner through scaffolded activities for improving design skills.

Chapters will also provide suggested learning activities, which may be used by students in formal classes to have meaningful learning experiences around each topic or may also be used in less-formal ways to help self-directed learners gain more from the text.

Throughout this work, my goal for you as the reader will be to grapple with what good learning design looks like—visually—and to make a plan for how you will move forward in your life and career, ever designing better and better experiences for your learners.

Additional Readings

- "The 3 Stages of Empathy" by Kate Dowler
- "How Visual Design Makes for Great UX" by Marli Mesibov

Learning Activity

After reading the additional readings, reflect on the following questions in a personal journal or class discussion forum:

- What does visual learning design mean to you?
- How will this shape what you create and how you create it?

Then, share your reflection with a peer and ask them to give you feedback on the following:

- What are some of the benefits of your proposed approach to visual learning design?
- What might be some problems, pitfalls, or limitations of such an approach?

Finally, respond to this feedback by reflecting on the following:

- How might you need to adjust or enact your approach to visual learning design in a way that addresses potential concerns?

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Gronseth, S. L., Michela, E., & Ugwu, L. O. (2020). Designing for diverse learners. In J. K. McDonald & R. E. West (Eds.), *Design for Learning: Principles, Processes, and Praxis.* EdTech Books. Retrieved from https://edtechbooks.org/id/designing_for_diverse_learners

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What principles should guide me while using visuals as a learning designer?

Learners

This section explores some basic principles that should guide designers as they create experiences for learners.

Beauty
Visual Aesthetics
Art + Science

What is beauty, and how does it apply to learning design?

Attitudes   Consciousness   Emotional Response

Intersubjective Standards

This chapter explores the concept of beauty in learning design, discussing its subjective and objective aspects. The author argues that while beauty is often considered a personal experience, it can be developed through practice, inquiry, and experience with human learners. The chapter also highlights the importance of considering beauty in learning design, as it can encourage ongoing, pleasurable interactions with other social beings. Finally, the author introduces the visual designer's ARC (appeal, retention, and comprehension) framework, which helps designers make intentional choices about their designs based on their goals and purposes.

"Beauty is everywhere—you only have to look to see it."

Bob Ross

Though only one aspect of our aesthetic experiences, beauty has historically been one of the most important and contested ([Shelley, 2017](#)), and it is often the first characteristic people think of when they hear words like "design," "art," and "visual." Despite its ubiquitous use in our language and understanding, actually defining beauty and explaining what makes something beautiful can be quite difficult. We all use words like "beauty" and "beautiful" on a daily basis, but we often have difficulty articulating what they mean. Furthermore, two people might disagree on whether something is beautiful, and even if they both think the same thing is beautiful, they may not agree on why it is beautiful. Just as we might say that something is "salty" but not be able to explain what "saltiness" is, beauty is easily recognized on an implicit level but is poorly articulated in an explicit manner.

At a basic level, if something is beautiful, then this implies that we have a positive or pleasing emotional response to it. Beautiful music might make us feel peaceful, a beautiful movie might make tears of joy well up in our eyes, and a beautiful painting might inspire a sense of euphoria or enlightenment in us. Thus, beauty relies on a stimulus-response relationship between an object and our consciousness, and if a stimulating object leads to a positive emotional response, then we ascribe beauty to the object.

However, because stimuli do not always impact people in the exact same way, philosophers have long debated whether beauty has any reality in objects themselves (e.g., by conforming to certain metaphysical realities, such as Plato, Aristotle, and others believed) or is "merely in the mind which contemplates them" with "each mind perceiv[ing] a different beauty" (Hume, 1757). This latter subjective stance is relativistic in the sense that it relies upon the personal, cultural, and perspectival experience of the observer; but many have nonetheless argued that intersubjective standards of beauty can develop over time as "the long-run consensus of people who are in a good position to judge functions analogously to an objective standard" (Sartwell, 2016). That is, even if things are not beautiful in-and-of themselves, over time people develop consensual attitudes about their beauty that can be accepted as semi-certain (and not purely subjective).

Furthermore, the concept of beauty is philosophically interesting because unlike other perception-inducing experiences in the world, we ascribe beauty to the object itself. For instance, though a fast-food sign might make us feel hungry, we do not say that the sign itself is hungry; yet, if an image invokes pleasure within us, we say that it (the object) is beautiful. For these and other reasons, modern philosophers argue that beauty is an outward-facing celebration of the world wherein "subject and object are juxtaposed and connected," also inviting us to enjoy further experiences, to share, and to connect with others on a social level (Sartwell, 2016).

Applying these ideas to visuals in learning design, we should recognize a few helpful principles.

First, though the perception of beauty will always have some subjectivity associated with it, objects can be considered beautiful as they elicit positive reactions in more and more people over time, meaning that as we study how people react to our designs, we can confidently come to say whether they are beautiful or not based on how people are reacting to them.

Consider the screenshots of two websites below, and ask yourself "Which is more beautiful?"

Figure 1

Two Example Websites of Differing Beauty

Example Website A

Example Website B

My guess is that you answered Example Website A, which provides a nice combination of blues and purples on a white background with adequate spacing between elements along with an elegant font. In the years that I have done this experiment with students, I have never had any student say that they believe Example Website B to be more beautiful. This is because though humans are unique, we are often far more alike than we are different. Though you and I might be of different races, genders, or cultures, and though we might have very different life experiences, and our DNA may have millions of differences if compared, that same DNA is nonetheless about 99.9% identical (National Human Genome Research Institute, 2018). We both know what it feels like to be happy, sad, alone, included, joyous, depressed, encouraged, or frustrated. We are not identical, but we have more in common than we typically realize. So, as designers we can conclude that though beauty will always be

somewhat subjective, we can nonetheless develop some certainty about what is and is not beautiful in our designs through practice, inquiry, and experience with human learners.

Second, designers should seek to make beautiful products as a means for inviting ongoing, pleasurable interactions with other social beings. When applied to learners, an ugly design is one that discourages learning by causing disconnection, isolation, or discomfort, while a beautiful design encourages learning by promoting connection, pleasure, and belonging.

If a designer claims that considerations of beauty have no place in learning design, then they are implicitly suggesting that pleasure, connectedness, and belonging also have no place in learning. And yet, though these aims are central to some learning theories, such as constructivism and connectivism, even the staunchest behaviorist or cognitivist must operate on the expectation that learners will use their designs and that making these designs pleasurable will encourage greater, more engaged use and (therefore) result in improved learning.

Thus, no matter what learning theory a designer happens to operate from, beauty must be a central consideration as they are designing learning objects and experiences for people who will have immediate physiological reactions to them.

And third, designers should recognize that beauty is not something that learners are convinced of; it is simply something that they experience (or don't). This may seem like an odd (and obvious) thing to say, but it often happens that after a designer has poured countless hours and thought into a product, they can be frustrated with how it is received by the learner and defensively seek to convince the learner of its beauty. I have also noticed a similar occurrence with educational games, where designers sometimes feel like they need to explain to learners why a game they have made is fun rather than relying upon the learner's word that it is not. Just as a game is fun to a learner or is not, a design is either beautiful to a learner or is not, and no amount of persuasion or explanation after the learner has engaged with the design will change their experience of it being fun or beautiful.

So, when you present a design to a learner or a client, there is never a need to attempt to tell them that it is beautiful. They will make that determination automatically, without any guidance, and without any training. As Kant argued, "I must immediately feel the pleasure in the representation of the object, and of that I can be persuaded by no grounds of proof whatever" (Kant, 1790). This means that any talk of what makes something beautiful must occur in the design of the product and not its implementation or delivery because though our design considerations to make something beautiful might be laboriously intentional, the evaluation of our efforts must always ever be instant and unsolicited.

Depending on their purpose and context, visual designers generally have three potential purposes behind their designs. They are either (a) appealing to the viewer's aesthetic sensibilities of beauty (e.g., via a work of art), (b) influencing the viewer to remember something they are seeing (e.g., via an advertisement, sign, or notification), or (c) guiding the viewer to comprehend something (e.g., via a table, chart, or graph). These three purposes—

appeal, retention, and comprehension—comprise the visual designer's ARC, and the choices a designer makes will depend upon the aspects of ARC that are most important for the current product.

For instance, if you were designing a dashboard with an element to tell a teacher that students were 90% satisfied with their course, you might either (a) make a simple but bold checkmark graphic that subtly shows the percentage in a circular graph without any words, (b) emphasize the actual numeric percentage with a smaller reminder of its meaning with the word "satisfied," or (c) spatially represent the percentage via a bar chart with the descriptive text "90% satisfaction rating" (see Figure 1). In each case, representing elements in different ways (e.g., simple shapes vs. numbers, charts vs. words) will emphasize particular aspects of ARC over others, with the checkmark perhaps being the most appealing but least comprehensible or the large 90% being the easiest to remember but the least appealing.

Figure 2

Example of Emphasizing Different Aspects of ARC to Adjust a Visual Design
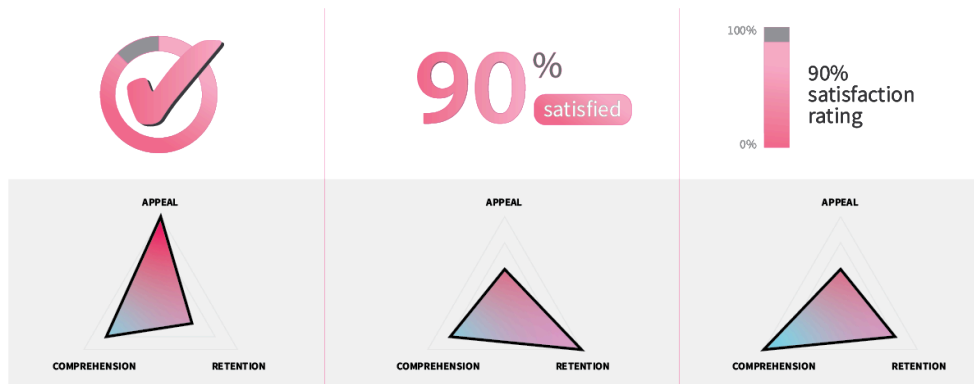
Concrete design questions such as "which colors should I use," "should I use labels," or "how large should I make each element" will be shaped by your design goals, with some products requiring greater emphasis on simplicity or beauty and others requiring greater emphasis on complexity or clarity. We will reference the visual designer's ARC in subsequent chapters (especially the project chapters) because different types of designs will have different goals, and how you design will depend upon those goals, meaning that the same principles and guidelines you use to create a course splash page might not apply to a website, mobile app, infographic, icon, or book cover.

Recognizing these goals also helps the visual designer to realize that though beauty is important, it is not the only consideration guiding what is done, and sometimes decisions about how to make a design beautiful should be tempered with other visual aspects of the design that will also have direct impacts on the learner's experience and ability to learn.

Additional Readings

- ["Why Aesthetics Matter to Learning" by Connie Malamed](#)
- ["Color Theory in Experience Design" by Royce Kimmons](#)
- ["Aesthetic Principles for Instructional Design" by Patrick E. Parrish](#)
- ["Visual Aesthetics: The Art of Learning" by Dennis West et al.](#)

Learning Activity

After reading "Aesthetic Principles for Instructional Design" ([Parrish, 2009](#)) and "Visual Aesthetics" ([West et al., 2018](#)), choose a website, mobile app, video game, e-book, or online course to analyze (e.g., Facebook, Twitter, Apple.com, DuoLingo, a Canvas course). Then, in a reflective journal or class discussion forum, address the following questions:

- How does the product's design reveal differential attention to the three elements of ARC?
- How does the design exhibit attention to Parrish's 4 principles of artful instruction (or not)?
- How does the design exhibit attention to West's six foundational aspects of visual design (or not)?
- Does beauty play an appropriate role in the product's design? How could the product be improved in this regard?

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What is the interplay between art and science in visual learning design?

Art Classes   Classes   Creative Work   Learning

Learning App   Math Problem   Science   Social Media

Social Studies Classes

This chapter discusses the tension between art and science in learning design. The chapter argues that designers must balance their creative pursuits with a scientific approach to problem-solving. The chapter highlights the importance of objectivity, critique, and experimentation in designing effective learning experiences. It also emphasizes the need for designers to distance themselves from their designs and be open to feedback and criticism. The author concludes that good design makes us think, feel, or act as intended, and good learning designers lead learners to learn what is intended.

"Science and art tend to coalesce. ...
The greatest scientists are always artists as well."

Albert Einstein

From an early age, many of us are taught that mistakes are bad and that failure has severe consequences. If we answer a math problem wrong (or simply find our own solution without following the provided formula), then we might be met with a failing grade. If we persist in such errors, then we might fail classes, be held back, or fall below the GPA we think we need to enter the college of our choice. Failure to perform in a specified manner is treated as a character flaw or developmental defect of the learner that must be met with swift (and sometimes far-reaching) punishment. This leads us to believe that failure is unacceptable and that mistakes should be treated as shameful anomalies on an otherwise (hopefully) pristine track-record of success.

On top of this, when it comes to creative work, we are also often taught that we should treat our creations as outgrowths of ourselves. In social studies classes, for instance, we may

have been encouraged to write about our passionate beliefs, to debate them, and to persuade others. In art classes, we may have been taught that our art should provide a window to our souls, allowing us to reveal the deepest recesses of our innermost selves. And daily evidence on social media teaches us that a person's identity in our culture is ostensibly reflected and (therefore) judged by a limited number of creative artifacts, even if these artifacts are pithy statements posted at 3 a.m. That is, we are often taught to identify with our creations and to identify others by their creations—making our writing, art, and any other creative work a reflection of the true, albeit incomplete, self (Kimmons & Veletsianos, 2014).

Each of these beliefs is problematic in its own right, but when put together, they make creative design work very difficult, because they can lead designers (a) to avoid, hide, or ignore failures associated with their work and (b) to either refuse to evaluate their work or to defensively uphold poor work as an inviolate extension of the self, because acknowledging a reflection of the self as bad is akin to acknowledging that the self is bad. If you pour your heart into creating a learning app, and then I (kindly) tell you it's no good, you can interpret this to be a critique of you.

Designers in creative fields must always grapple with this tension, because, on the one hand, we are not merely technicians employing a color-by-numbers approach to design that relies on rigid conformity to an established recipe, but on the other hand, we also are not engaged in free-spirited, self-actualizing exploration through our work. Our goal in designing is to do something specific, our goal in learning design is to guide someone in learning, and though we can creatively apply our whole selves to this enterprise, at the end of the day, if we fail our goal, then we need to acknowledge that, change, and improve.

Good design makes us think, feel, or act as the designer intends. Good learning designers lead us to learn what is intended, through our thoughts, emotions, and actions.

Another way of framing this is that though many creative pursuits have the creator as the emphasis (e.g., an artist trying to bring their vision to life), learning designers have the learner as the emphasis, which means that all of our creative efforts revolve around their learning, not our expression or efforts, and if our learner fails to see, learn, or become what we want them to see, learn, or become, then our design needs to change. But, this often takes a lot of failure, a lot of reflection, and a lot of painful work. Thus, if there is any aspect of art to our work as designers, it is an outward-facing rather than an inward-facing art. Whereas much art merely exists to help the artist to understand and express oneself, our work must help learners to grow by understanding themselves.

Thus, learning design is both an art and a science, because it requires "critical and reflective inquiry informed by theory" coupled with "skilled craftsmanship and creative practice" (Maina et al., 2015). As an art, we must bring our whole selves to the creative pursuit of helping our learners, but as a science, we must also lose ourselves in the iterative problem-solving process of making errors, testing hypotheses, fixing mistakes, and continuously learning and growing.

To achieve this, the best learning designers are both artists and scientists, and they solve any apparent tensions between art and science by relying upon three principles: objectivity,

critique, and experimentation.

Though "art" has various definitions, the famous artist Edgar Degas once explained that "art is not what you see but what you make others see." In part, I interpret this to mean that we as learning designers should approach visuals in an objective manner, wherein we separate ourselves from our design enough to analyze it as an objective outsider or to see it as others see it.

From this perspective, if your design doesn't work, it doesn't matter what your intent, reasoning, or justification was for creating your design the way you did. It has simply failed as an object.

This also means that any failure is not located in you as the designer but in the design itself; meaning that we as designers need to engage in practices that allow us to distance ourselves from our designs enough that we can evaluate them without becoming defensive. In practice, this means that any efforts we take to evaluate our products should be uncoupled as much as possible from our intents, feelings, and persuasive efforts.

Have you ever asked someone to give you feedback on something and they gave you criticism that you felt was undeserved? What was your reaction in that situation?

Most of us would rush to defend our creation, saying things like "well, this is why I did that" or "this is what I meant when I did that," but doing so undermines the entire purpose of receiving feedback because you as the designer are now trying to influence the user not through your design but through your explanation of your design. The problem with this, though, is that you will not be able to explain your design to every user who will ever use it. So, you convince yourself (and maybe the person giving the criticism) that changes don't need to be made when they are actually needed, and your end users are not benefited from the feedback simply because you felt it was necessary to defend the product rather than to change it.

To help in this regard, one practice I use in my classes is to have students quietly sit and listen to what others are saying about their designs, without interrupting, defending, or explaining why they did what they did. The other students might ask questions, make suggestions, or comment on things that they find confusing about the design, but through it all, the designer must just bite their tongue and try to understand what others are experiencing through their designs without muddying the water with their personality or persuasiveness. In some cases, I might allow the designer a chance to explain some things that were unclear after the feedback session is over, but this generally should only be done to clarify matters of scope or constraints or to clarify feedback rather than to minimize or delegitimize issues brought up by other students.

Another practice I use in my classes is to encourage students to nurture some distance to their projects, to take breaks, and to come back with fresh eyes regularly.

Have you ever entered a room with a terrible smell, like that of a baby's diaper that needs changing? Even if it's terrible, if you stay in the room long enough, you gradually begin to not notice the smell at all. This is called olfactory overload or fatigue, and it is a physiological response our bodies have to smells that presumably helps us to identify potential dangers but to also acclimate to non-dangerous environments that initially seem bad.

When applied to design, as you labor over a product for hours, something that you initially would think is ugly, painful, or confusing gradually becomes nice, comfortable, and clear in your own mind. As you make an ugly website, by the end of the process you'll probably think it's not so ugly after all, like the dirty diaper that you no longer notice, because you know all of the blood, sweat, and tears that went into creating it.

The problem with this is that any new learner who views your product will instantly smell the diaper. Yes, if they stick with it long enough they'll eventually probably stop noticing it, too, but they will likely not have the same incentive as you do as the designer to do so, and do we really want to subject our learners to such experiences?

By taking a break and coming back with fresh eyes, you reset your sensors and can more closely experience your design as your end learners will. This also allows you to create some distance with your design and to take feedback more openly, recognizing that the design you have created and the process you went through to do so are two different things.

To successfully merge the art and science of learning design, we need to be able to both give and receive criticism well. *Critique* comes from ancient Greek and refers to the faculty of discernment or judgment, which involves reflective examination of the object of one's critique. In design, critique is commonly used as a way to guide designers forward and should be employed as "a formative, conversational method of interaction and assessment" (Hokanson, 2020).

To be clear, critique isn't merely sharing our opinion about how a design makes us feel but is rather a "systematic and objective examination of an idea, phenomenon, or artifact" (Hokanson, 2020). Thus, it involves collecting and sharing evidences, analyzing specific design elements, and iteratively improving designs to better achieve their aims. This can require us to develop functional vocabularies to meaningfully communicate with others about our designs and also requires us to solicit (and act upon) feedback about our work from learners, other designers, and various stakeholders.

Because critique is an objective activity, it is focused on the object of the critique (i.e., the design) and not the designer or the critic. This means that critical comments should be framed and understood as wholly involving deficits in the object and not the designer, such as "this design is deficient in this way" and not as "you have deficiencies as a designer in this way." This distinction may seem subtle, but it makes a huge difference as designers attempt to figure out how to move forward amidst criticism, especially if the critique is severe. In educational settings where faculty and peers are trying to help designers improve their design skills, this is especially important to help novice designers to keep improving and

moving forward rather than becoming defensive or disheartened when their designs are poorly received.

As the iconic Bob Ross would say, "We don't make mistakes, just happy little accidents." In this same spirit, as designers unmask design deficiencies via critique, any such deficiencies should be viewed as encouraging and formative opportunities for improvement and adjustment rather than discouraging and summative judgments of what has been done.

Though this may be easy to say, in reality, critiques can often involve deep emotions, both on the part of the designer and the critic. Though attempting to be objective, the critic is nonetheless a human with biases, assumptions, feelings, and attitudes. Rather than being a weakness, these characteristics are actually necessary for the critic to provide feedback to the designer that is actually authentic to the goal of the design, which has as its target learners who are themselves emotional beings. Though the varied emotional responses of a critic are not of much benefit to the designer on their own, they can be useful as insight into learner emotional responses more broadly and should be framed, limited, and shaped toward that purpose. Thus, if a critic has either a positive or negative reaction to an aspect of a design, it behooves the critic to ask themself "Would others react similarly to this or is this just me." If it is a "just me" emotion, then it is probably of little use to the designer for improving the product, but if it is indicative of an emotional reaction that might be shared by the target learners, then it merits the designer's attention.

In the designer's case, however, emotion should be as compartmentalized and distanced as possible, allowing the designer to thoughtfully consider and evaluate critique, alternatively accepting or rejecting suggestions for improvement on objective merits rather than attachment or emotional investment.

What is UI vs. UX Design? A Practical Example in Under 6 Minu

Watch on YouTube

Additional Readings

- ["Design Critique" by Brad Hokanson](#)

Learning Activity

Pick a popular website. What does it do well?

What does it do poorly?

Hokanson, B. (2020). Design Critique. In J. K. McDonald & R. E. West (Eds.), *Design for Learning: Principles, Processes, and Praxis*. EdTech Books. Retrieved from https://edtechbooks.org/id/design_critique

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Maina, M., Craft, B., & Mor, Y. (2015). *The art & science of learning design*. Springer.

III
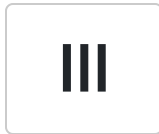
What technical knowledge and practices should I know and follow?

Design Blogs
Design Guides
Image File Formats
Color Use
User Interface Design Kits
Copyright
Free & Open Resources

How can I stay current on what's happening with visual learning design?

Learning Guild

"We cannot solve our problems with the same thinking we used when we created them."

Albert Einstein

Modern design is dynamic, and practices are always evolving. For this reason, blogs tend to be the best place to find current guidance and suggestions on how to make products that look good and operate well.

The best way to stay abreast of what's happening in UX and LX design is to find blogs that highlight professionals' activities that relate to you. The list below is a non-exhaustive list to get you started.

Table 1

A List of Popular Design Blogs Relevant to Learning Design

Name	Location
52 Weeks of UX	https://52weeksofux.com/
A List Apart	https://alistapart.com/
Boxes and Arrows	https://boxesandarrows.com/
Learning Guild TWIST	http://twist.learningguild.net/
SHIFT eLearning	https://edtechbooks.org/-olb
Simply Secure	https://simplysecure.org
Smashing Magazine	https://edtechbooks.org/-WLia
Usability Geek	https://usabilitygeek.com/
UX Booth	https://www.uxbooth.com/
UX Collective	https://uxdesign.cc/
UX Matters	https://www.uxmatters.com/
UX Movement	https://uxmovement.com/
UX Myths	https://uxmyths.com/
UX Planet	https://uxplanet.org/

Learning Activity

Read at least one new blog post each week. Then, in a reflective journal or class discussion forum, address the following questions:

- What was the name and topic of the post you read?

- What valuable information or perspective did the post provide that may help a reader improve their design?
- What was missing, or how might the post have been improved?
- What are your takeaways?

Where can I go for specific guidance on individual design elements?

App Store　　Apple　　Apple Human Interface Design

Design Guides　　Google Material　　Human Interface Design

Mobile Applications　　Quality Assurance Measures　　Store

UX Design

*"If I have seen further it is by standing on the shoulders of Giants."*

Sir Isaac Newton

Many large companies have the difficult task of organizing UI, UX, graphic, and instructional designers around common projects, spanning lengthy timeframes, different departments, and varying project goals. This is further complicated in the cases of companies that provide products that external designers work on as well, such as the case of software and mobile applications created for Microsoft, Apple, or Google-based devices. For instance, Apple's success as a company has largely been determined by their ability to make highly-usable devices and software, but as they open up the design process to third parties via their app store, they must also maintain some standard tonal and quality assurance measures so that whenever someone uses an iPhone app they are getting a quality "Apple-like" experience, no matter who the developer of the app happens to be.

To maintain some semblance of uniformity and commonality, these companies often create design guides, which provide specific instructions on the "Dos" and "Don'ts" of design in their environments. These design guides are very helpful for designers in a variety of settings and are not wholly unique to the company. That is, a design guide created by Google might be similar in many ways to a design guide created by Apple, and designers can either choose to explicitly follow one of these guides or look deeper and seek to understand the common elements of these design guides that constitute quality design across platforms and environments.

Design guides are also useful for designers because they are very explicit in practical elements of design, such as how much padding to put in a button element, when and how to use shadows, when and how to use colors, and so forth. This can make life easier for designers who find themselves having to make hundreds of decisions that they may not have explicitly thought through previously, such as how large to make fonts and why. They can also provide explanatory support for designers when they must explain their decisions to clients.

Below I will provide links to some of the best free design guides available so that you can explore them to determine how you can use them in your designs and also search for common principles and practices across each.

Apple's Human Interface Design is provided primarily to software and app developers to help ensure that their products match the tone, style, and quality of Apple's own products.
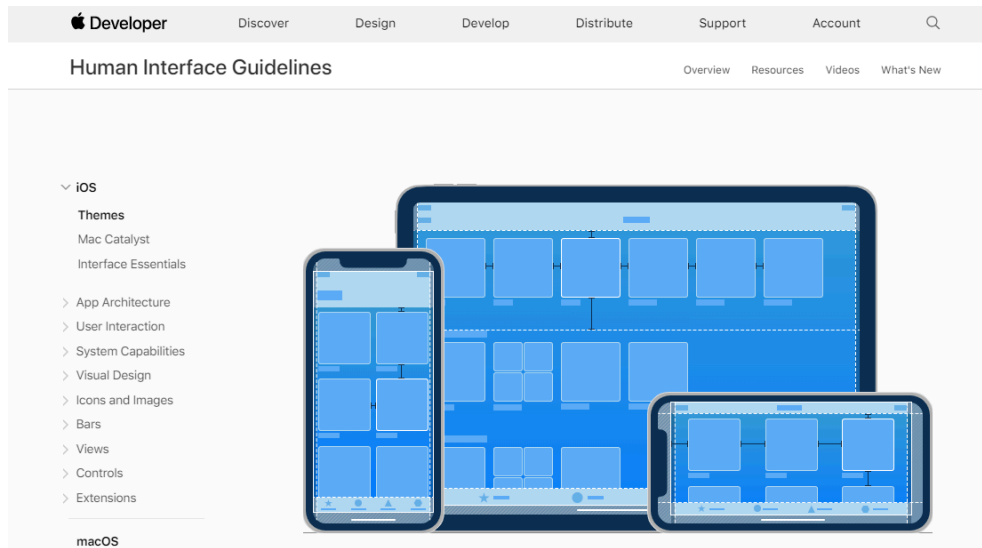
Explore Apple Human Interface Design

Material Design was created by Google to guide designers in the development of products across various "materials." This includes websites, apps, print materials, etc.
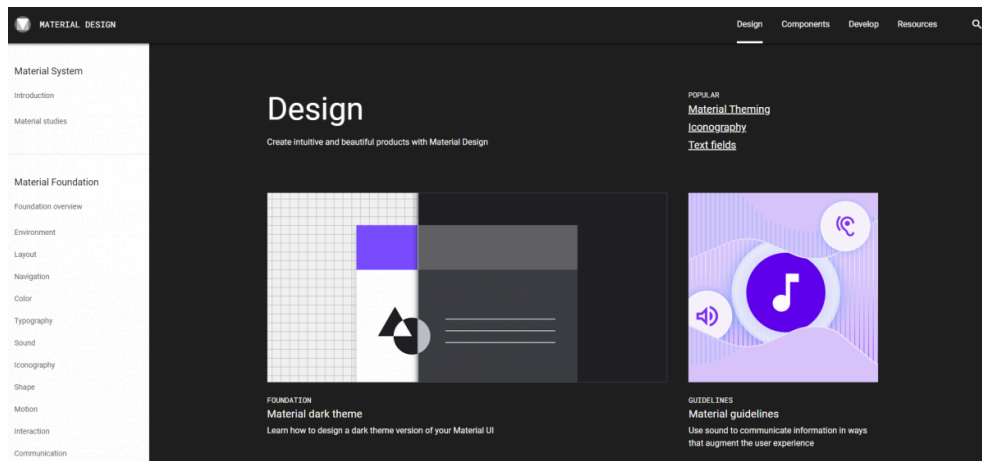
Explore Google Material Design

Microsoft Design and standards for Windows apps are meant to ensure that apps built for Windows-based computers and phones are uniform and of high quality.
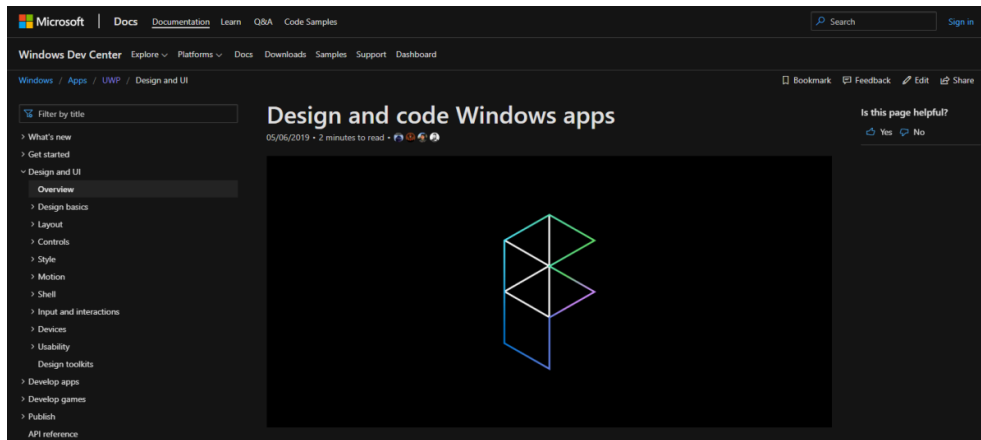
Explore Microsoft Design and Coding for Windows Apps

Learning Activity

Spend at least 20 minutes exploring each of the three design guides mentioned above. Then, in a reflective journal or class discussion forum, address the following questions:

- Which design guide resonated most with you in terms of visual style and why?
- Which design guide did you find to be most useful and why?
- What commonalities and differences did you notice between the different approaches to design?
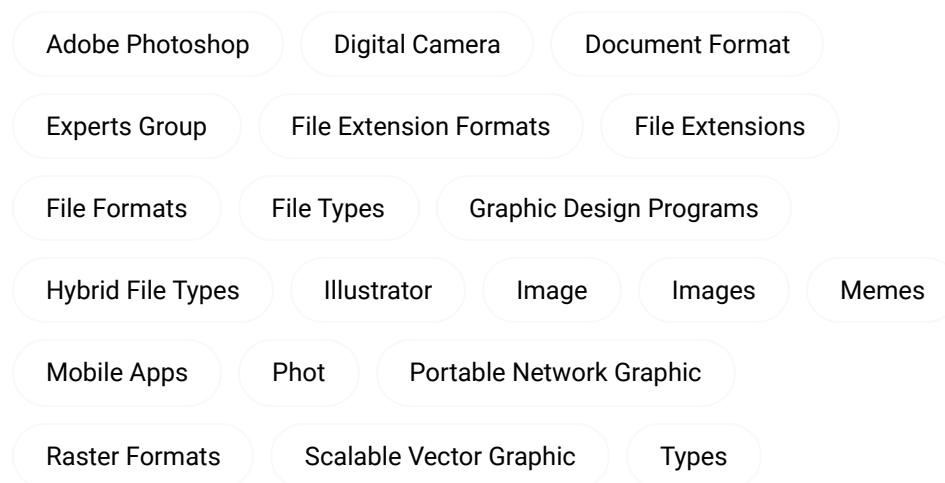
Open this shared Google Spreadsheet and contribute one row of information, where you (a) ask a visual design-related question, (b) answer the question from each of the design guides' perspectives, and (c) summarize a common principle derived from them.

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long as you properly attribute it.

What do all of these different image file formats and extensions mean, and why do they matter?

Adobe Photoshop   Digital Camera   Document Format

Experts Group   File Extension Formats   File Extensions

File Formats   File Types   Graphic Design Programs

Hybrid File Types   Illustrator   Image   Images   Memes

Mobile Apps   Phot   Portable Network Graphic

Raster Formats   Scalable Vector Graphic   Types

"Incomprehensible jargon is the hallmark of a profession."

Kingman Brewster, Jr.

If you have done any work with images or graphic design programs, you may have noticed that they use a variety of file extensions representing different file formats, such as .jpg, .png, .gif, .ai, .pdf, and so forth. Though the differences between these formats may not make much sense on the surface, some basic understanding of how image files are saved and processed will help you to understand how to use these file extensions to your advantage.

For starters, there are two basic categories of image file types: raster and vector (see Table 1). Raster images rely on a grid of pixels to represent images, while vectors rely upon mathematical equations connecting points on a geographic plane. In addition, hybrid file types also exist that allow designers to combine raster and vector graphics together. This chapter will briefly explain the differences between these file types, their benefits and limitations, and when to use each.

Table 1

Common File Extension Formats with Notes

File Extension	Format Name	Type	Web / App Compatibility	Notes
.jpg/.jpeg	Joint Photographic Experts Group	Raster	Yes	
.png	Portable Network Graphic	Raster	Yes	Only raster that can be transparent
.gif	Graphical Interchange Format	Raster	Yes	Only raster that can be animated
.svg	Scalable Vector Graphic	Vector	Limited	Only non-proprietary vector format
.ai	Adobe Illustrator	Hybrid	No	
.psd	Adobe Photoshop	Hybrid	No	
.xd	Adobe XD	Hybrid	No	
.xcf	Gimp	Hybrid	No	
.sketch	Sketch	Hybrid	No	
.pdf	Portable Document Format	Hybrid	Limited	More compatible than other hybrids (at least for viewing)

Figure 1

Example of a Raster Image
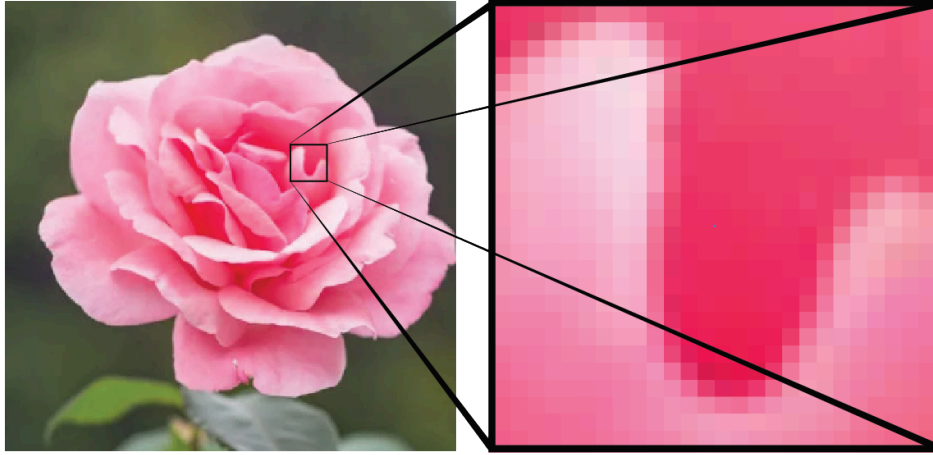
Raster images are likely the types of images that you have had most exposure to. Any smartphone or digital camera that takes a photo saves it as a raster image, such as a .jpg or .png. Memes you see online are raster images, and so are almost all of the images that you see on websites and mobile apps.

A raster image is simply an image that stores data as a collection of pixel colors. If you think of an image as a two-dimensional array of pixels (e.g., 100 pixels wide and 100 pixels tall), then a raster image will save the color of each of those 10,000 pixels (e.g., the position [1,1] should be pink, the position [1,2] should be green). This is why smartphones and digital cameras will often boast about how many megapixels their cameras allow: it dictates how high-resolution of an image you can capture.

Saving images as raster images is useful because it means that any device or program viewing the image should be able to display it properly, and some file formats can even compress images by combining nearby pixels of similar colors together, thereby reducing data redundancy and file size.

The major problem with raster images, however, is that they can only be resized in a lossy manner, meaning that if you attempt to make them larger, they will become fuzzy, and even at times when you make them smaller, they will become distorted, because the program you are using must make decisions about which colored pixels to keep and which to delete, when to erase a border, and so forth. Be that as it may, raster images remain the most popular types of image file formats simply because they are easy to share and universally viewable, and if you are going to share your work with others, there will always be situations when you will need to convert your files to raster images.

Figure 2

Example of a Vector Image ([Floral Vectors by Vecteezy](#))
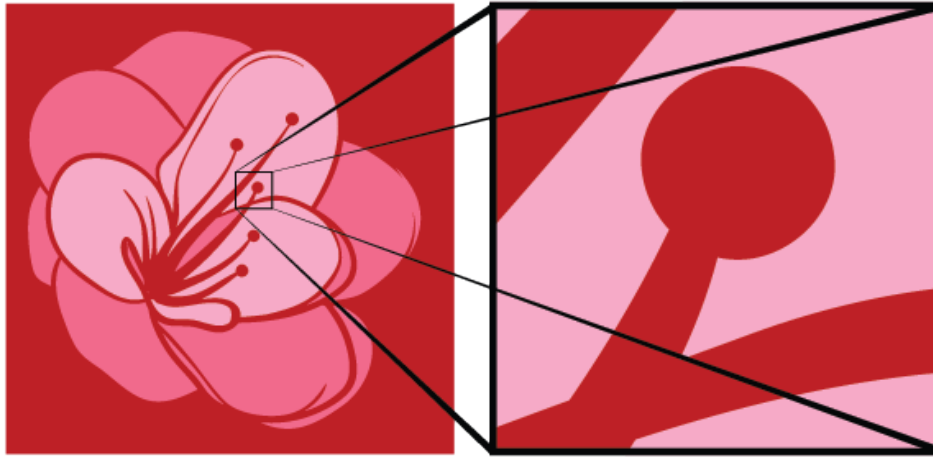
Vector graphics, on the other hand, are comprised of specific points on a geographic plane connected by line segments and curves, much as if you created a mathematical grid of dots and had a computer connect the lines for you.

This means that when you view a vector image on a screen, your computer is rebuilding the view of the image for you, no matter how much you zoom in or out on the image, and the great benefit that vector graphics have over raster graphics is that they can be infinitely resized losslessly (without becoming fuzzy). They can also be relatively small in file size, when compared to raster images, because a simple vector could be resized to fill an entire page with a few lines of code, whereas a raster image would need to store the color for every pixel on the page.

One problem with vector images, though, is that they are more complex to create than raster images, especially if you are attempting to replicate minute, photorealistic details. For this reason, vector graphics are often used as the source files for graphical projects that may need to be resized, such as icons, graphs, and fonts, but are not used for photographs.

Another problem with vectors is that they are less compatible with a variety of devices and programs. Web browsers now have some vector display capabilities (via .svg and HTML5), but because vectors rely upon programs to interpret the mathematical equation for displaying the image, this may require significant processing power and may not yield identical results across all programs (especially when graphics become increasingly complex). Thus, vectors remain widely used in the graphic creation stages of a project (e.g., when images may need to be resized or adjusted), but they are typically then exported for viewing as raster images at some point to allow for reliable compatibility in final products.

Hybrid formats are simply file formats that allow for vector and raster images to be mixed together in the same file. This approach is common in graphic and UI design applications, such as Adobe Illustrator and Sketch, where the designer must work with both vector and raster elements at the same time.

Hybrid formats receive all of the benefits of both raster and vector formats, but they also receive all of the barriers as well. While working in a hybrid document, such as an .ai file, you can resize vector components in the file losslessly, but you cannot do the same with raster components. Similarly, if you want to share your work with someone else, you may find it difficult for them to open your file and see everything the way you do because this will depend upon their program version, settings, installed components (such as fonts), and so forth.

Thus, hybrid formats are great for designers to work with, because they allow designers to make full use of both vector and raster components, but once it comes time to share your work, you will typically need to export your project in a raster format.

Since we've mentioned resizing, fuzziness, and file size, it is also worthwhile to gain a brief understanding of how resolutions work. Resolutions are expressed in several ways, but the most common is DPI or "dots per inch." In the case of a raster image, this means that the program you are using will save and show the image with that number of colored pixels for each inch of screen or print space. So, if an image is 100x100 (width x height), this means that it will be 100 pixels wide and 100 pixels tall.

Figure 3

Example of Pixel Widths

Most web browsers nowadays are designed to show web pages that are roughly 1,000 to 1,200 pixels wide for laptops and about 360 pixels wide for smartphones. For instance, if you are viewing this web page on a full-size computer, then this sentence will be about 1,000 pixels wide, while if you view it on a smartphone, it will be considerably smaller.

One important thing to understand about resolutions is that they can be adjusted to show images at different sizes, but they cannot be used to make a small raster image larger (without making it fuzzy). Movies—where detectives use magic imaging software to "enhance" photographs—are currently fictional (though there are some advancements in AI that suggest this could be a possibility in the future). At present, however, computers cannot magically create detail where there is none. This means that if you download a small raster image from the web and want to use it in your project, you will not be able to use it in any manner larger than the original file (without it being fuzzy).

The hybrid or vector format you use will be determined by the editing software you choose and will be the format used for saving any original project files. So, the bigger question is which software you should use. This depends on your project goals and your role in the project. If the scope of your work is to only create visual mockups for a website, for instance, then you might use Adobe Illustrator or Gimp, but if your scope is to also show interactivity, then you might use Adobe XD or Sketch.

Guiding you in making this decision is beyond the scope of this book because it will also be influenced by constantly-changing affordances of each tool as well as what tools you have available to you as an employee or student. As a result, the best answer I can give you here is just to do your homework, try some different tools, and decide from there.

Because we need some common platform for communicating for the remainder of the book, however, I will focus on Adobe Illustrator simply because (a) it is commonly used by professionals, (b) skills and processes developed in Illustrator are readily transferrable to other software, such as Sketch or XD, and (c) Illustrator provides more options for visual editing than any other tool, which is the emphasis of this book.

As you may have noticed from the table above, none of the common hybrid formats used by designers are directly compatible with web or app viewing. This means that if you create an infographic in Illustrator, for instance, then you will need to export it into a raster format in order to show it on a website or to include it in an app. As the table suggests, the three most popular file formats for universally sharing image files are .jpg, .png, and .gif, but it is often not clear to novices which of these three to use when they are exporting.

Each of these file formats has its own complex benefits and limitations that can be somewhat situational, but without digging too deeply into the technical aspects of each format, here is a simple workflow to follow that will help you make the right choice for your export file format 99% of the time.

Table 2

Workflow for Choosing a Raster Export Format

Step	Ask Yourself	Outcome
1	Is your image animated (have motion)?	If **yes**, then use **.gif**.
2	Does your image have a transparent background?	If **yes**, then use **.png**.
3	Is the majority of your image photographic in nature or comprised of drawn shapes?	If **photographic**, then use **.jpg**. If **drawn**, then use **.png**.

As the table suggests, the most subjective part of this workflow comes into play with Step 3, and at that stage either .png or .jpg will work, but one might just look better than the other or provide a smaller file size. File size becomes increasingly important with large images used in web-based applications but may not be important in other settings. At any rate, you can test the export in both formats and see which one looks better and which is smaller before making your final decision.

Learning Activity

You are creating an icon for your app or website, and the icon needs to have a transparent background. Which image format should you use?

- [ ] .bmp
- [ ] .jpg
- [ ] .png
- [ ] .tif

You are creating an icon for others to use, and the icon needs to be scalable. Which image format should you use?

- [ ] .gif
- [ ] .jpg
- [ ] .png
- [ ] .svg

Which format can be used for animated images?

- [ ] .bmp
- [ ] .gif
- [ ] .jpg
- [ ] .png

What does dpi stand for?

☐ data per iteration

☐ dots per inch

☐ decipherable pixel image

☐ dimensional pixel integer

Which of the following is a reasonable set of pixel dimensions for a large icon on a website?

☐ 1x1px

☐ 10x10px

☐ 100x100px

☐ 1000x1000px

Which of the following is a reasonable set of pixel dimensions for a banner image on a web page (e.g., a photograph that accompanies a news story and spans the page)?

☐ 2x1px

☐ 8x4px

☐ 100x50px

☐ 800x400px

In pixel dimensions, what do the two numbers represent?

☐ width x height

☐ width x depth

☐ height x depth

☐ height x width

If a jpg image is 100 x 100 at 100 dpi/ppi and it is scaled up to be 4 inches wide without changing the resolution, what do you know about the image?

☐ it looks the same

☐	it is clearer
☐	it is fuzzier
☐	you don't know anything based on this information

If you have a first image that is 100 x 100 at 100 dpi/ppi and a second image that is 100 x 100 at 200 dpi/ppi, what do you know about the two images?

☐	the first image has more visual data (pixels or file size)
☐	the second image has more visual data (pixels or file size)
☐	the two images have the same amount of visual data (pixels or file size)
☐	the amount of visual data is not discernible from the provided information

You download a jpg from the internet that is fuzzy. What can you do to make it clearer without changing its visual size on the screen?

☐	switch it to CMYK instead of RGB color
☐	adjust the dpi/ppi down
☐	convert it to a png
☐	none of these will make it clearer

How should I approach using color in my designs?

Age   Branding   Comprehension   Corporate Client

Error Screens   Gender   Learner Attitudes   Learners

Material Design Visual Language   Retention   Websites
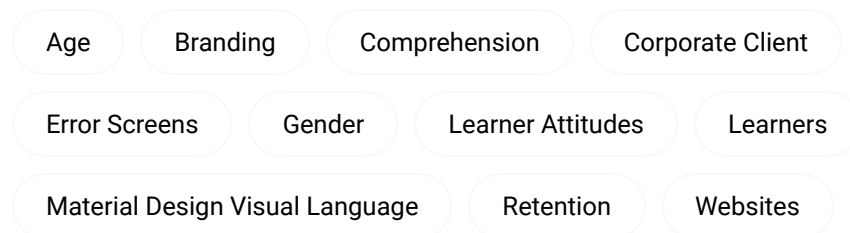
"Color is my day-long obsession, joy, and torment."

Claude Monet

Outside the visual arts, color is rarely discussed by professionals in systematic ways; among UX and LX designers, color is generally approached in a strange give-and-take between technical prescription and intuitive preference. For instance, the color system outlined in

Google's (n.d.) material design visual language provides precise guidance on how to generate a color palette from your primary color, what to use secondary colors for, and what colors are typical for specific elements (such as error screens), but it does not provide designers any guidance on what primary color to pick in the first place, when to use different types of color palettes (e.g., analogous, complementary, triadic), and why. This is likely because, when designing for a corporate client, designers are generally constrained by the preexisting branding requirements of the client (e.g., "our brand is periwinkle") and must work from a particular color starting point when making designs.

But designers must also often counterbalance their own and their clients' everyday assumptions and receive wisdom about color in order to create the best designs for end users and learners. For instance, early in my professional experience creating websites for clients, I delivered a mock-up that I thought looked good and met the client's requests perfectly. Frustrated with what he saw, the client furrowed his brow and slowly replied, "Yes, but I need something that pops." This, in turn, frustrated me, because the only explanation he then provided would result in what I thought would be a terrible-looking design. "What does 'pop' really mean?" I thought. And "How can I fix the design to be something that the client likes and something that I'm proud of?" And, perhaps most of all, "How can my client and I communicate about color in more meaningful ways?"

Beyond this need for designers to meaningfully communicate with clients, color also plays an important affective and cognitive role in learners' experiences. Various studies have shown that color-use influences learner attitudes, comprehension, and retention (Gaines & Curry, 2011). Some of these influences are broadly universalizable, others are contextual to the learner's age, gender, or culture, and others are contextual to the subject matter or learning objectives being targeted. Furthermore, there might be multiple right or useful ways to use color in a particular design project, and inappropriate or ineffective color-use in one project might constitute optimal use in another.

For these reasons, clear and reliable guidance on the what, how, when, and why of color-use in UX design is difficult to come by, and the problem of effective color-use is a prime example of why UX design cannot be approached purely as a science nor as an art but as a craft that synergistically merges the two. Toward this end, I will begin in this chapter by briefly providing some rudimentary groundwork on the underlying physics of color and its technical representation in digital formats. This will give us a common vocabulary for referencing specific aspects of color (e.g., hue vs. tone) as well as some technical knowledge necessary for actually using color in UX design scenarios. After this, I will briefly explore the science of color-use in UX by summarizing some of the emotional, cognitive, and physiological effects that color-use has on learners.

With this backdrop, I will then address some of the applied aspects of color-use that will influence the craft of UX and ongoing research in this area. Specifically, I will explore four guiding considerations of color-use that should be addressed in UX — contrast, attention, meaning, and harmony—and then provide guidance on how to use color schemes to improve harmony by highlighting five dominant types of color schemes. I will then conclude by providing specific craft guidance on using color for UX projects and comment on how this should connect to ongoing UX research.

We must begin this chapter by reviewing some of the physics of light and color. Color is a visual sensation created in the mind of the viewer from differing wavelengths of visible light, ranging from low-frequency reds to high-frequency violets. Some color sensations can be produced by a narrow band of wavelengths, but others are produced as multiple color wavelengths are mixed. For instance, when all color wavelengths are mixed together, they make white light, which is why a dispersive prism can be used to split white light into a rainbow of spectral colors. By putting the primary colors of light together, then, white can be created additively, as in Fig. 1, and various other colors not even present in the rainbow can be created by mixing light wavelengths together, such as red and blue making magenta.

Figure 1

Additive and Subtractive Color Mixing Models
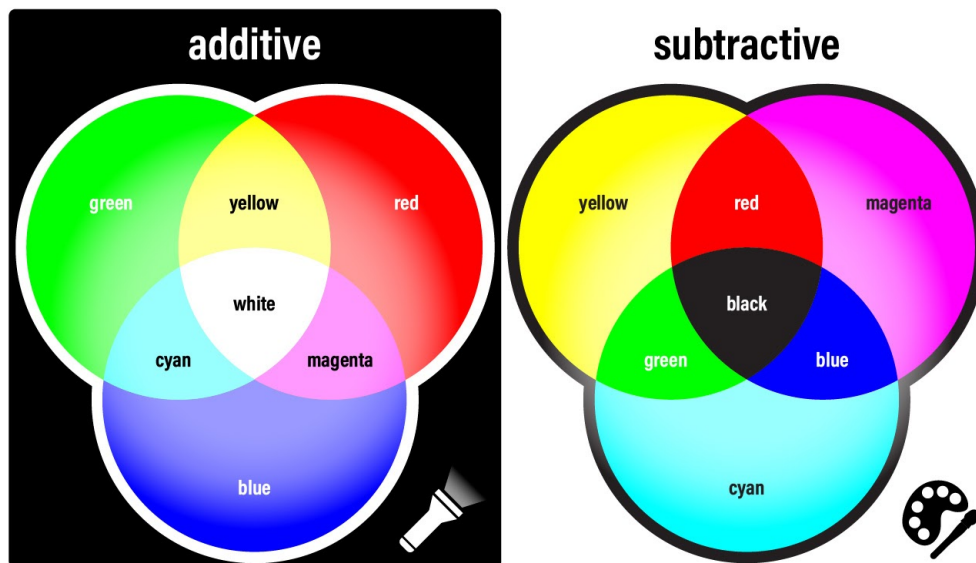
For this reason, computer screens and other displays have historically used differing intensities of only three primary colors of light: red, green, and blue (RGB). On screens, RGB dots are used in combination to create colors ranging from white, when they are at full intensity, to black, when they produce no light, and the millions of color combinations in between that are commonly used in movies, games, simulations, images, and websites.

However, visual media that rely upon physical materials to reflect (rather than generate) light, such as ink and paint, operate from a different model of color mixing. Though mixing a green ray of light and a red ray of light would produce yellow light, combining green paint and red paint would produce a dark brown. Such materials rely upon a subtractive color model (cf. Fig. 1), wherein black is the sum of all colors and white is the absence of all colors.

Recognizing these two approaches to color mixing is important to understand common notations present in design and authoring software. For instance, when creating a website, video game, mobile app, or illustration, RGB notations are used, such as rgb(255,255,0) for

yellow, wherein each number represents a range of 0 (lowest) to 255 (highest) intensity for the primary colors. Hexadecimal notations are also commonly used as a shorthand version of RGB, such as #ffff00, wherein the number ranges are converted to a base-16 number system, ranging from 0 to ff, without losing any information. When creating print media, on the other hand, CMYK notation is commonly used, such as cmyk(0,0,100,0) for yellow, wherein each of the primary colors is represented as a percentage of intensity (0-100%) and black is provided as a fourth color mixin, because true black is difficult to make through mixing (in real-world applications, mixing would only generate dark browns and grays). Table 1 provides some notation examples of common colors.

Table 1

Notation Examples of Common Colors

Name	Additive		Subtractive
	RGB	Hexadecimal	CMYK
White	rgb(255,255,255)	#ffffff	cmyk(0,0,0,0)
Black	rgb(0,0,0)	#000000	cmyk(0,0,0,100)
Red	rgb(255,0,0)	#ff0000	cmyk(0,100,100,0)
Green	rgb(0,255,0)	#00ff00	cmyk(100,0,100,0)
Blue	rgb(0,0,255)	#0000ff	cmyk(100,100,0,0)
Yellow	rgb(255,255,0)	#ffff00	cmyk(0,0,100,0)
Cyan	rgb(0,255,255)	#00ffff	cmyk(100,0,0,0)
Magenta	rgb(255,0,255)	#ff00ff	cmyk(0,100,0,0)
Gray	rgb(127,127,127)	#808080	cmyk(0,0,0,60)

Using any of these notations can generate millions of possible colors, including basic hues of the color wheel, low-saturation tints of hues (by lightening toward white), and low-brightness shades of hues (by darkening toward black), along with various mixtures of tinting and shading (cf., Fig. 2). These terms will be important moving forward for understanding research on color effects for the affective domain. Thus, hue represents the color's position around the color wheel, saturation represents the amount of white mixed with the hue, and brightness represents the amount of black mixed with the hue.

Figure 2

Hue, Saturation, and Brightness on a Color Wheel
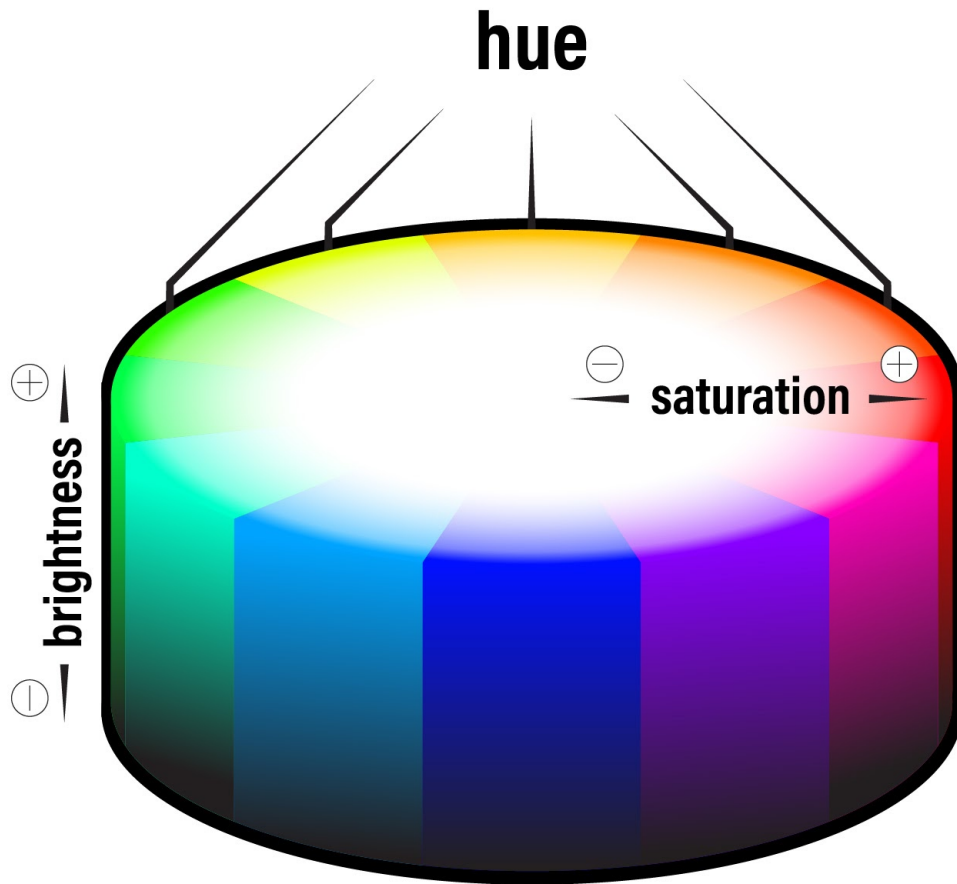
When people see the colors represented by the color wheel, they have various emotional and physiological reactions to them that influence their general experiences and also their learning. Alongside the famous cognitive domain taxonomy, Krathwohl, Bloom, and Masia (1964) also proposed a taxonomy for what they called the affective domain of learning, or the aspects of learning related to "a feeling of tone, an emotion, or a degree of acceptance or rejection" as expressed through goals oriented toward "interests, attitudes, appreciations, values, and emotional sets or biases" (p. 7). Recent years have seen renewed interest in the affective domain as educators and designers have struggled anew with how to support learner self-regulation, motivation, and persistence. Though the connection between color and learning may not be obvious at first, by influencing learner emotion, attitude, and interest, color can influence learner behaviors and attitudes, which in turn will influence their learning.

For instance, one study found that exposure to red prior to taking an IQ test subconsciously impaired performance, presumably by triggering feelings of danger, failure, or avoidance (Elliot, Maier, Moller, Friedman, & Meinhardt, 2007). Though such emotional states might have limited direct effects on learning outcomes, they may play an important role in improving intrinsic motivation and the desire to keep working (Heidig, Müller, & Reichelt,

2015); by employing positive emotion cueing, designers can help increase mental effort in the learner, reduce perceived difficulty of the material (Park, Plass, & Brünken, 2014; Um, Plass, Hayward, & Homer, 2012), and improve learner comprehension (Plass, Heidig, Hayward, Homer, & Um, 2014).

Psychological research on the emotional effects of color extends at least back to the 1950s. In their early work, Guilford and Smith (1959) found that, among the spectral colors, people preferred blue and green the most and orange and yellow the least. Subsequent research found that preference for blue, green, and white generally persisted across countries and cultures (Adams & Osgood, 1973). Additionally, some emotional reactions are universal, such as anger, fear, and jealousy being connected to red and black, while other colors, like purple, are more culturally mediated (Hupka, Zaleski, Otto, Reidl, & Tarabrina, 1997) or are influenced by gender (Osgood, 1971). For example, women take slightly more pleasure in bright colors and find highly-saturated colors slightly more psychologically arousing (Valdez & Mehrabian, 1994). Furthermore, even within a single culture, emotional reactions may change somewhat with age, such as childhood feelings of surprise and fear toward green maturing into adult feelings of happiness (e.g., Terwogt & Hoeksma, 1995).

Physiologically, studies have shown that human reactions to color vary by hue, with long-wavelength colors (e.g., reds and yellows) being more arousing (e.g., increased heart rate and respiration) than short-wavelength colors (e.g., blues and greens; Jacobs & Hustmyer, 1974; Wilson, 1966). Additionally, many studies have found that primary hues are preferred to secondary or tertiary hues (Kaya & Epps, 2004) and that all of these are preferred to grays. Some of these reactions can be explained by differences in intensity of photoreceptor stimulation in the eye (e.g., the eye is more sensitive to red), while others likely stem from common environmental experiences, such as associating white with cleanliness and blacks and grays with dirtiness (Valdez & Mehrabian, 1994).

Figure 3

Four Interface Examples That Cue Differing Behaviors, Trust Levels, Attitudes, Etc.

For a simple example of how this relates to UX and LX design, consider the password prompt interfaces in Fig. 3. If you were presented with each of these interfaces, how might your emotional and behavioral reaction to the prompt differ based upon its color? Seeing a red prompt might make you stop and consider "Is this really a secure site?" On the other hand, an orange prompt might get your attention but be somewhat confusing or concerning, a gray prompt might feel bland but also seem secure or professional, and a blue prompt might make you feel comfortable about entering your information when perhaps you should not be comfortable.

Figure 4

Four Display Options For a Mobile App About Pet Care With Variations on Color and Content
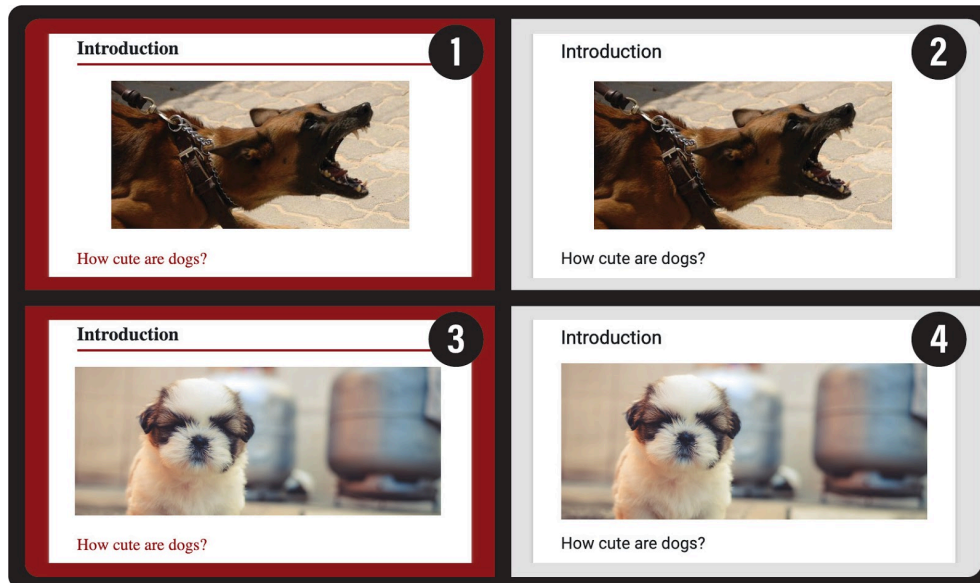
Similarly, suppose you are designing a learning app for young children on how to responsibly care for pets. In Fig. 4, four options are provided. Two use an aggressive image of an adult dog (1, 2), while the other two use an image of a soft puppy (3, 4). Two also use a blood red background (1, 3), while the other two use a neutral grey (2, 4). What might be student affective reactions to each of these and how might it impact their ability to achieve learning objectives related to being a responsible pet owner? Option (1) feels very aggressive both because of the content and the color, while option (3) feels like there is a mismatch between what is shown and how it is presented, thereby evoking conflicting emotions. The neutral grey background for (2) and (4), however, allows the content to convey the emotion. And so, if our objective is for children to have a positive attitude toward pet care, then option (4) would likely be the best.

Figure 5

Brightness and Saturation Levels of the Primary Blue Hue with Four Examples
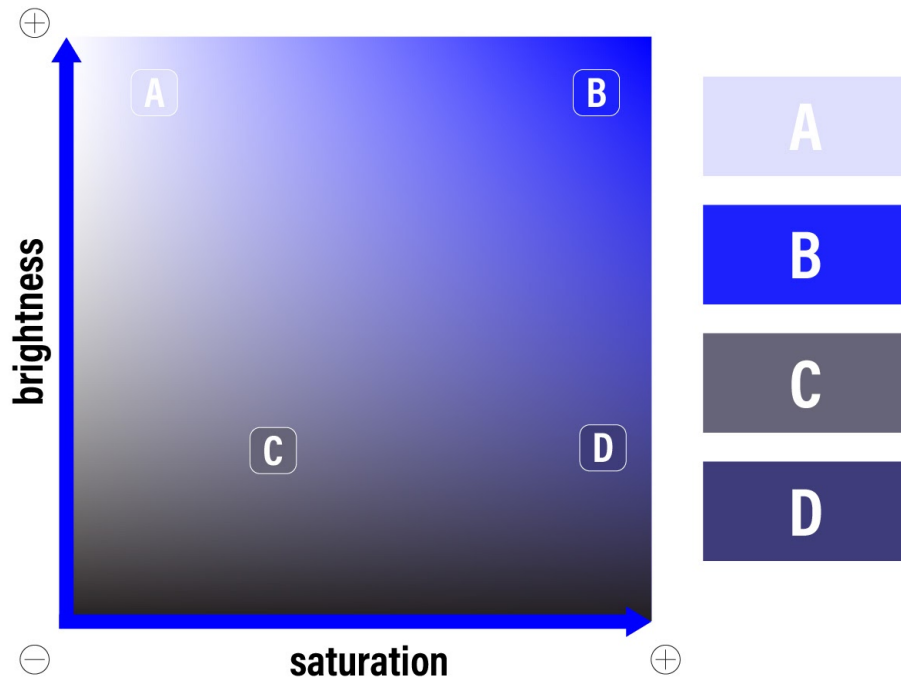
Hue is not the only aspect of color that influences emotion; a color's saturation (how little white is mixed in with it) and a color's brightness (how little black is mixed in with it) also has an effect. In research studying color effects on the Pleasure-Arousal-Dominance emotion model (Mehrabian & Russell, 1974), brightness was found to positively impact pleasure and negatively impact arousal and dominance, while saturation positively impacts all three (Valdez & Mehrabian, 1994). So, if using a blue hue, as in Fig. 5, you might choose from a variety of brightness and saturation levels, including (a) light blue (high brightness, low saturation), (b) azure (high brightness, high saturation), (c) blueish gray (low brightness, low saturation), or (d) indigo (low brightness, high saturation). Though each of these is a variant of blue, they all elicit different emotional responses in the viewer. For instance, (a) would be fairly pleasurable but not arousing or dominant, eliciting a feeling of tranquility; (b) would be the most pleasurable and somewhat arousing but not dominant, eliciting a feeling of amazement or awe; (c) would be the least pleasurable and fairly neutral for arousal and dominance, eliciting a feeling of boredom; and (d) would be the most arousing and dominant but neutral-positive for pleasure, eliciting more of a feeling of boldness or antagonism (Valdez & Mehrabian, 1994). In fact, brightness and saturation account for two-thirds to three-fourths of the detected variance in users' feelings toward color (Valdez & Mehrabian, 1994). This means that shifting from soft pink to blood red in a design would likely impact users' feelings more than shifting from soft pink to soft green or blue.

Figure 6

Four Variations of the Same Design That Elicit Different Affective Responses

In addition, the context of color-use is important, as in the case of otherwise pleasant colors being used in inappropriate or unnatural ways (Valdez & Mehrabian, 1994). Consider the four variations of the same website design in Fig. 6. Which of the four color variations is your favorite? For most people, (1) would likely be the preferred variation, because not only are the colors pleasant but the color-use more appropriately aligns with prior positive experience. In the other examples, the skin color of the hand looks a bit green, which may subconsciously suggest experiences of bodily disease or death to the user; similarly, the stems of the tulips in (4) are red rather than the expected green, which signals to the user that the experience is artificial or unnatural. In such ways, whether intentionally or unintentionally, our designs evoke affective responses; just as (1) might evoke memories of beautiful blue spring days with new life, the others might conversely evoke experiences of sadness, frustration, confusion, or discomfort, all of which will influence a user's motivation and persistence with using the product.

All of this research into the science of color-use is valuable, but how each of us then translates these findings into the actual, embedded craft of UX and LX design is a different matter. For this reason, a few considerations may be useful for guiding any color-use in UX and LX projects, including attending to contrast, attention, meaning, and harmony.

Contrast

First, ensuring high contrast is important in all designs for aesthetics but is especially important in those that use text. It is also a legal requirement for many UX projects to meet minimum accessibility expectations in many countries, such as those stipulated in the W3C's Web Content Accessibility Guidelines (WCAG) 2.0. Contrast problems are widespread in learning products. In fact, a recent study on K-12 school website accessibility across the U.S. found that contrast errors were the most common type of error among all sites (Kimmons & Smith, 2019). Contrast errors arise because, though two similarly-saturated

colors, such as crimson and blue, may look quite different to most viewers, when superimposed (as in Fig. 7) they can become difficult to decipher from one another. As a simple check of this, colored designs can be converted to grayscale to allow you to quickly see how similar the colors are to one another, or an automated contrast checker like the one provided by WebAIM can be helpful. To solve contrast problems, white and extremely light tints should be used to contrast highly-saturated colors, and black and dark grays should be used to contrast light tints.

Figure 7

Low-Contrast and High-Contrast Examples of Analogous Color-Use with Grayscale Conversions

Attention

Second, colors can be used to quickly and efficiently draw the attention of the eye to visual elements that matter. For instance, one eye-tracking study found that adding random colors to word labels on a grayscale figure moderately improved learner retention and transfer performance by improving the efficiency by which learners could differentiate textual elements (Ozcelik, Karakus, Kursun, & Cagiltay, 2009). On an app or VR interface, this might mean using a vibrant color only to effectively draw the learner's attention to a few important elements, such as commonly-used buttons or interactive elements necessary for progression. Similar principles are often applied to print media, with color only being applied to text in the case of headings, key terms, or blockquote elements. Any variation in color will generally draw the eye of the learner to the variation, and this means that UX designers should use this principle to intentionally draw user attention to elements that matter and avoid unnecessary color variation in elements that are less important. It also means that color cues can effectively be used as guideposts for directing the learner through progressive elements and to influence user pathways in desired ways.

Meaning

Third, because color conveys emotional (and sometimes even conceptual) meaning to learners, colors should be used in a manner that synergistically emphasizes the intended meaning conveyed by the overall project and individual content elements. As with the pet care mobile app example in Fig. 4, improperly using color can subvert intended meaning or set a tone that is either unhelpful, dissonant, or repulsive for learners. As mentioned early, actual meaning and affective influences of color can be complicated, contextual, and individual, but some influences are fairly universal, such as grays denoting lack of importance; warm colors evoking passion, dissent, or engagement; cool colors evoking comfort, closeness, or agreement; and so forth.

Harmony

And fourth, to use colors well in any design effort, the designer must not only understand the emotions elicited by each color itself but also understand how to use colors together in harmonious ways that meet the intended purposes of the project. For instance, it is common knowledge that warm (low-wavelength) colors draw more attention than cool (high-wavelength) colors and that highly saturated colors draw more attention than washed-out tints, but the mark of a skilled designer is knowing both (a) which colors to use and (b) how to use varieties of colors together in harmonious and intentional ways.

Figure 8

Two Websites Using the Same Colors but in Different Ways
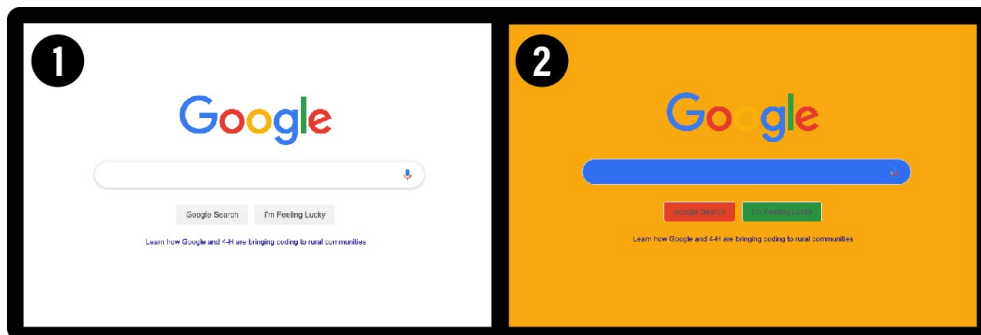
Even when two products use the exact same colors (as in Fig. 8), how the colors are used in relation to one another will influence the learner's affective experience. So, though both 8.1 and 8.2 use the same colors, 8.1 might feel cool, inviting, and professional, while 8.2 might feel comical, distracting, and amateurish.

As a rule of thumb, many designers propose following what is called the 60-30-10 rule, which is commonly used in many other visual fields such as interior design. According to this rule, you should choose a primary color to dominate 60% of the field of view, followed by a secondary color for 30%, and an accent or tertiary color for no more than 10%. For most UX products, this would mean choosing a subdued color as the primary color (such as the soft blue in Fig. 6.1 or the white in 8.1), a vibrant color as the accent color (such as the pink in

Fig. 6.1 or the "Google" primary colors in 8.1), and some variation in between as the secondary color (such as the brown in Fig. 6.1 or the grays in 8.1).

To promote color harmony, and to implement the other guiding considerations mentioned above, most designers will begin color-use in a project by developing what is called a color scheme. In most cases, color schemes include between two and six colors that will be drawn upon in intentional ways. Common color scheme types include: (a) monochromatic, (b) analogous, (c) complementary, (d) complex, and (e) achromatic. Each type has its own strengths and weaknesses as well as design considerations to attend to, which I will now explain. For each type, an example image will also be provided, which has the five scheme colors depicted on the right of the image and the color wheel placements of each scheme depicted on the bottom-right.

Monochromatic

Monochromatic schemes (from mono meaning one and chroma meaning color) utilize a single, dominant color and provide color variation only by using desaturated versions (or tints) of the dominant color. Since they rely on a single color, monochromatic schemes are easy to use in complicated designs to provide a sense of cohesion and uniformity. Because the overall scheme is simple (i.e., one color), this also allows you to include richer secondary elements, such as images in a Facebook news feed or a variety of images on a Pinterest board. The trade-off, however, is that monochromatic designs can be boring or overbearing if highly-saturated versions of the dominant color are overused. To prevent this, use plenty of white and very lightly-saturated tints of the dominant color to offset the more highly-saturated attention areas. In the provided example (Fig. 9), the navigation bars are a highly-saturated blue, so the content on the rest of the design needs to use plenty of white and very light blues for balancing.

Figure 9

Monochromatic Schemes Use a Single Dominant Color of Different Saturations

Analogous

Analogous schemes rely upon two or more nearby colors on the color wheel, generally spanning no more than one-third of the color wheel (e.g., red and blue, green and orange, cyan and violet). Since the colors are not distinct enough from one another to allow them to be placed side-by-side, plenty of white space should be used to separate instances of the two colors. Analogous schemes are more visually interesting than monochromatic schemes, because they provide more color variation, but they are also more difficult to use, because the two dominant colors must be well-separated, and any other visual elements should fit the scheme. In the provided example (Fig. 10), the crimson logo and carousel are clearly separated from the blue events block, and the image in the carousel has a dominant blue color (via the woman's sweater) that roughly matches the other blues in the design. If the woman's sweater was orange or green, however, the design would struggle to be harmonious; because the design is already using so much color complexity, any more complexity introduced by the secondary elements would be distracting. Because their colors are so close to each other on the color wheel, analogous color schemes in particular may introduce contrast problems.

Figure 10

Analogous Schemes Use Two Dominant Colors Less Than One-Third of the Distance on the Color Wheel from One Another
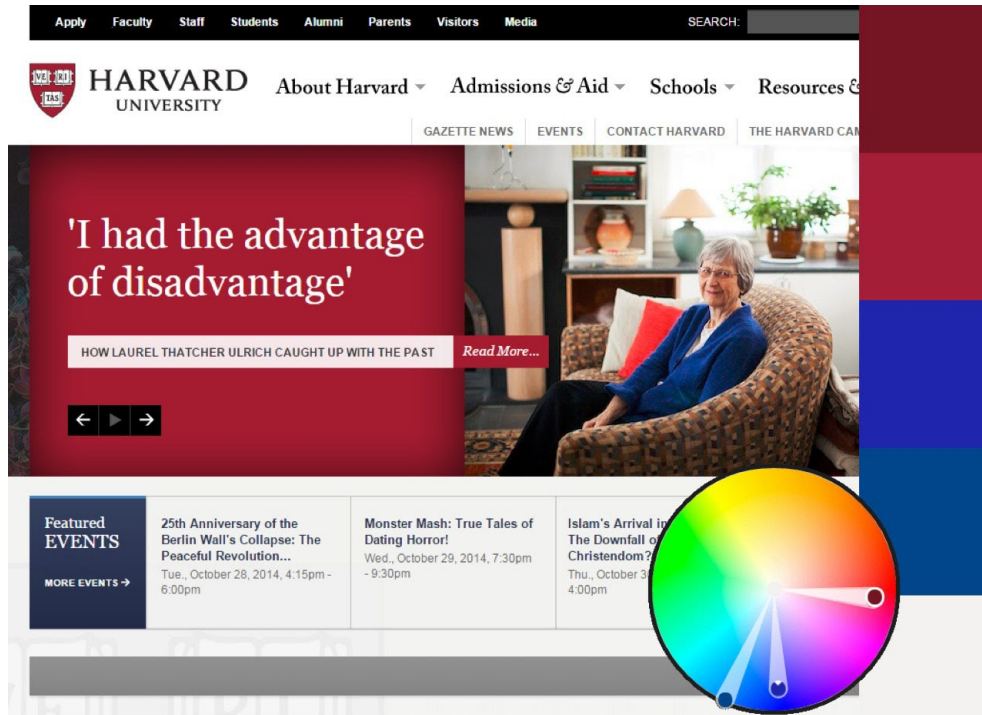
Complementary

The color wheel is conceived as circular rather than linear, because colors on opposite sides when (additively) mixed will make white. These are called complementary colors (cf. Fig. 11). Complementary schemes, then, use two dominant colors that are on opposite sides of the color wheel, such as blue and gold, orange and cyan, or pink and green.

Figure 11

Complementary Colors Reside Opposite One Another on the Color Wheel
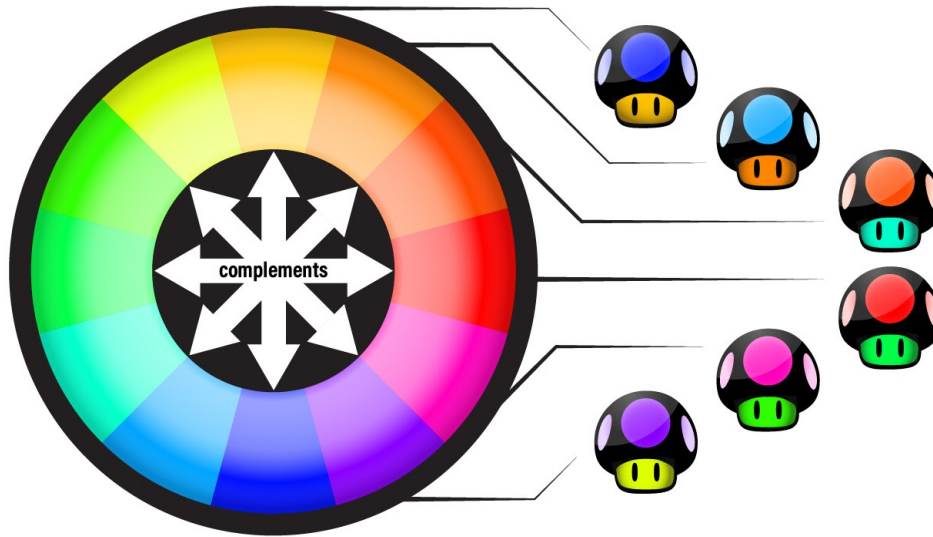
Complementary schemes are also visually interesting, but the dominant colors are distinct enough from one another that they can be used in closer proximity than can analogous colors. In the provided example (Fig. 12), the orange logo and thin horizontal bars are placed nicely beside or on top of the dark blues of the menu. However, though the two colors complement each other, one should be treated as the visually dominant color, and the other should be treated as the accent (in this case, the orange is the accent). Typically, the cooler color is used as the visually dominant color, and the warmer color is used as the accent. This allows for the design to show interesting variation while also using the accent color to draw the viewer's attention to specific parts of the design, such as the logo, buttons, or content separators.

Figure 12

Complementary Schemes Use Two Dominant Colors on Opposite Sides of the Color Wheel from One Another
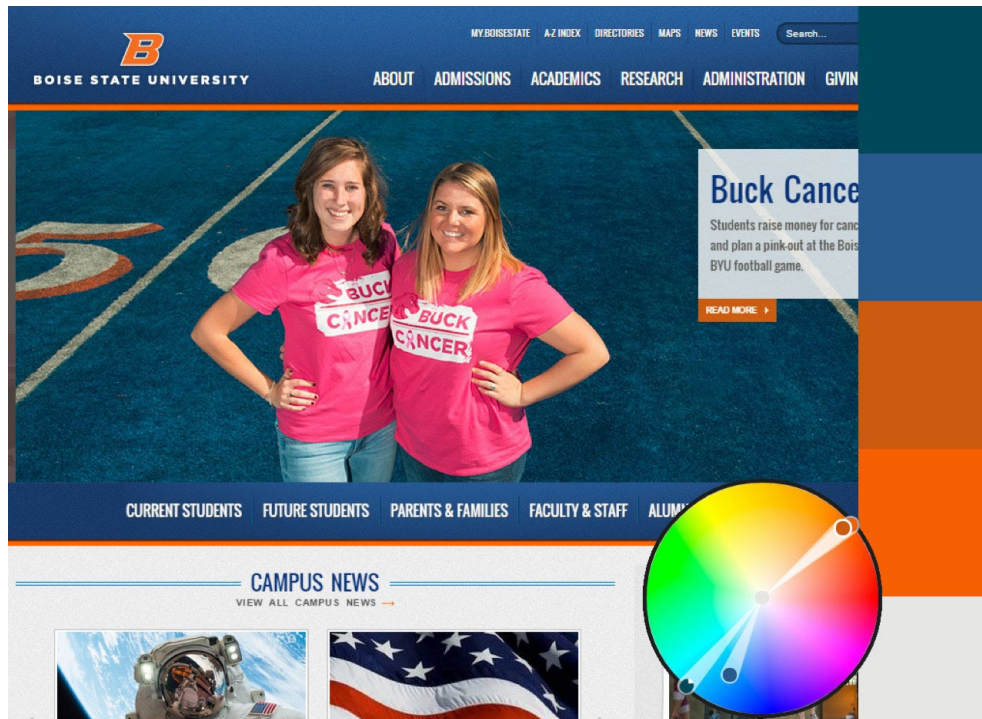
Complex

As the name suggests, complex schemes are the most complicated, because they use three or more dominant colors equally situated around the color wheel (e.g., blue, orange, red, and green). Because they use so much color variation, the visual space that the color takes up in the design should be very small and offset with plenty of white space. In the provided example (Fig. 13), the website uses a large logo with four very different colors but offsets this by using little to no color in the rest of the design. Because of their variation, complex schemes can be very bright and interesting but can quickly become overpowering if the visual footprint of any of the colors becomes too pronounced (as in Fig. 8.2).

Figure 13

Complex Schemes Use Three or More Colors Equally Situated Around the Color Wheel from One Another
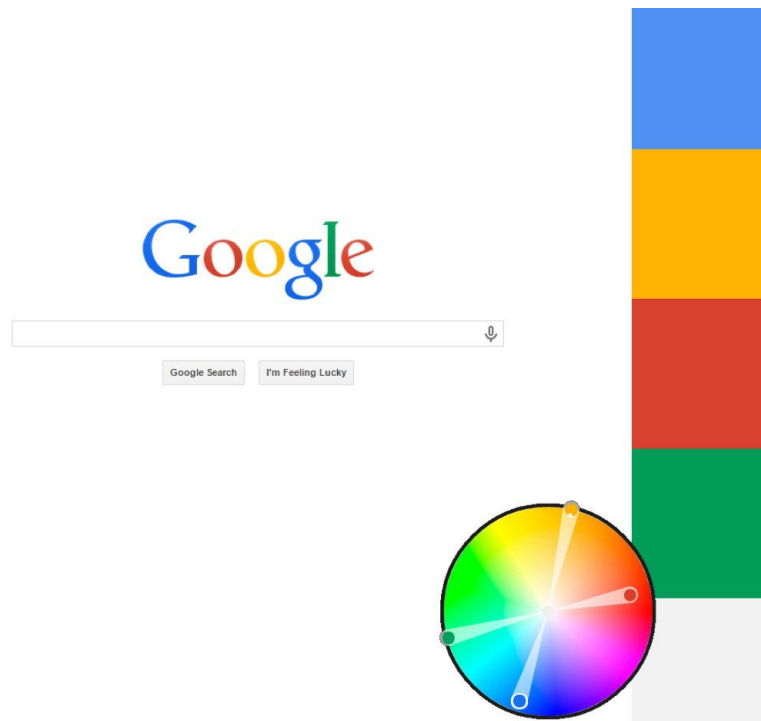
Achromatic

Achromatic color schemes (meaning no color) use only variations on black, white, and gray. Of all the schemes, this scheme is the easiest to use but can also be the least interesting, because it provides the least color variation. Sometimes, however, less design complexity is desirable. In the provided example (Fig. 14), the overall site design uses an achromatic scheme so that when colors are used in secondary elements they will draw the attention of the viewer (in this case, products that the vendor is seeking to sell are provided in full color, while menu items and logos are muted grays). Achromatic schemes may be helpful if secondary elements are complex and rich, but without these secondary elements, the design itself would be visually boring.

Figure 14

Achromatic Schemes Use Only Black, White, and Grays

Choice and Use

Various tools are available to designers that provide color scheme examples, such as the Adobe Color website or the Google Material Palette Generator, and there are many different ways to create a color scheme. For our purposes, however, I will offer two simple techniques to create professional-looking color schemes that anyone can follow.

The first approach is to start with a single, dominant color that matches your overall emotional objective for your product—blues might be calming or sad, greens might be fresh or healthy, yellows might be fun or playful, reds might be outrageous or dangerous, etc. However, this decision might already have been made for you via institutional branding or logo decisions. Once you have this color, plug the color into a color scheming tool such as Adobe Color, and use the provided radio buttons to switch between color scheme types (e.g., analogous, monochromatic, complementary). If you want a simpler, safer design, go with a monochromatic type, and drag the circles on the color wheel to various saturation levels to give you sufficient variation in the five-color scheme. If you want something more interesting, try the complementary or analogous type. In the case of analogous, you can drag the circles around the color wheel to increase color variation, but the colors generally should not extend more than one-third (120-degrees) the circumference of the circle, lest the variation be too great. In the example image (Fig. 15), I started with the Twitter logo blue (#00bbff) and found that an orange hue (#ff8400) might serve as a nice accent (complementary) color.

Figure 15

## *Choosing Different Color Scheme Types in Adobe Color from a Single Dominant Color*
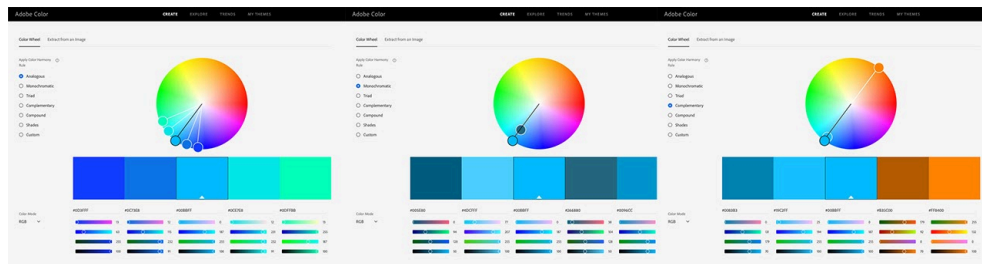
The second approach is to choose a picture or painting that you enjoy (preferably of a natural setting) that you feel exemplifies the emotional state you want to create with your design. Then, upload the image to Adobe Color via the "Extract from an image" feature. This will attempt to identify the dominant colors in the picture and to situate them in relation to one another in a harmonious manner. Once imported, you can click back on the color wheel to see where the colors fall and to switch between color scheme types. In the provided example (Fig. 16), the image of trees in autumn generated an analogous color scheme of oranges, yellows, greens, and burnt orange.

Figure 16

Extracting a Color Scheme in Adobe Color from an Existing Image
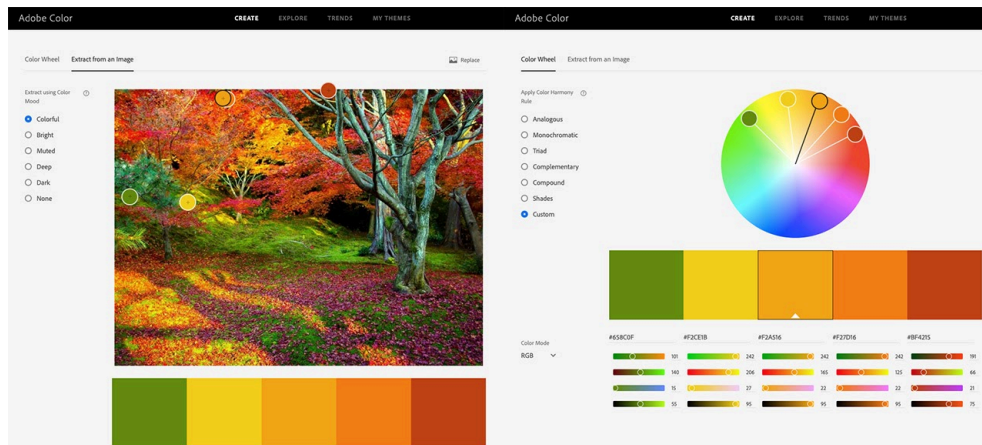
Once you have created a color scheme you are happy with, you can import the color scheme into other applications in a variety of ways. The simplest and most versatile method, however, is to simply take a screenshot and place it into your authoring tool or to manually transfer the hexadecimal codes.

This chapter has provided an overview of (a) the physics and technical notations for color, (b) scholarly literature on the relationships between color, emotion, and learning, (c) some guiding considerations on how to use color in UX design, and (d) concrete information on effectively using color schemes to improve harmony and contrast in designs. Some major takeaways for designers should include the following:

- Choose dominant colors that will influence emotions aligning with your intended design goals.
- Use colors in ways that are intentional (e.g., accentuating important content) and natural or appropriate by drawing upon users' prior experiences.
- Ensure that color contrast is sufficient and that color is used strategically to allow learners to clearly and readily identify important content and follow intended user pathways.
- Choose a color scheme that counterbalances the complexity of your content (complex content requires a simpler color scheme, while simpler content can use a more complex color scheme).
- Use whitespace and white, black, or gray text to increase contrast and to balance color-use.

By following these suggestions, UX and LX designers can create designs that increase motivation and persistence by making user experiences more pleasing, more intentional, and less frustrating.

From a research perspective, much work is still needed to help designers better understand issues of contextual color-use, differential affective influences on learners, and interactions between various colors as well as between color, content, and objectives. Because effective color-use in UX design is best described as craft (or synergy between science and art) and because learning contexts vary so greatly, it is reasonable that the most important research in this area moving forward will focus on applied, focused uses of color through iterative design cases and continual improvement. Though UX designers might not have the same obsession with color that Monet expressed, hopefully our obsession for learning will help us to more fully recognize that color is an important aspect of the learner's experience that should be better understood and more skillfully applied.

Learning Activity

Using Illustrator or another program, create 3 or more versions of a visual interface element, such as a button, icon, menu, form element, or banner image (see Figure 3 for an example). Then, in a reflective journal or class discussion forum, share these

images and reflect upon what the different color choices suggest, how they might influence learners or other users, and when each might be appropriate.

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Where can I find templates for creating interfaces that follow existing design guides?

Adobe   Adobe Illustrator File Download   Bootstrap

Cognitive Load   Google Material Design

Google Material Design Kit   Javascript Library   jQuery

Mobile Devices   Navbar   Twitter   User Interface Design Kits

"Don't try and reinvent the wheel—just work on making it better than anyone else."

John Muir

In addition to providing Design Guides, many successful companies and designers also share the nuts and bolts of their design components in the form of User Interface Design Kits so that anyone can reuse them in their own designs. This makes your life much easier as a designer because it means you do not have to create every button, form, layout, navbar, or display element from scratch but can rather use what others have found to be successful and tweak as necessary.

Using standard design kits also makes experiences better for your learners, because relying on standardized elements means that learners don't need to interpret a new visual language every time they open a new app or go to a new website. If a button is shown one way on one app, then making it look a similar way on another app reduces cognitive load and confusion, allowing the learner to get down to learning more quickly and making the interface less of a barrier.

Each of the design kits provided on this page represents a system to website or app development that designers have re-engineered with vectorized versions to allow you to use Adobe Illustrator, Adobe XD, Sketch, or other programs to create visual mockups. Links provided for each design kit below will direct you to an Adobe Illustrator file download for the design kit, but other kits are often available online via a quick search.

Apple's iOS has its own unique design approach that is shared across phones, tablets, and other mobile devices.
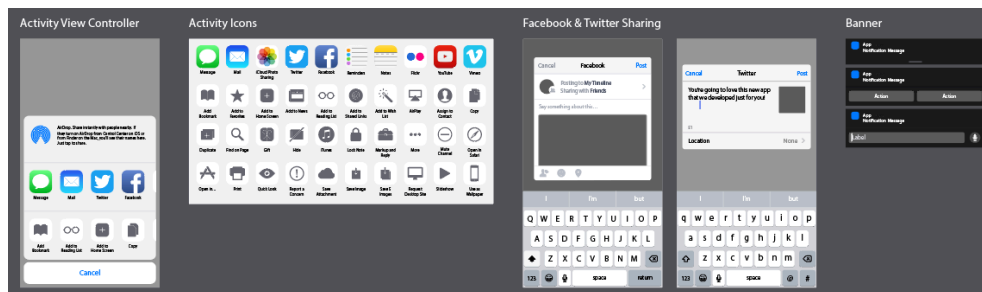
Download "iOS UI Kit" by Mercury (.ai)

Google's Material Design approach is used across various Android-based apps.
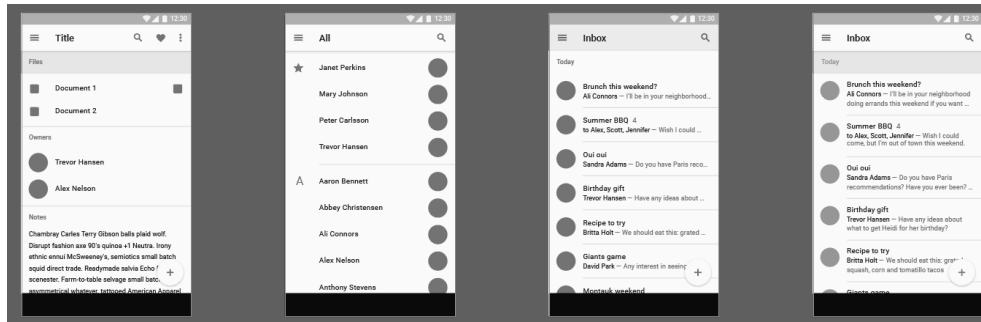
Download "Google Material Design UI Kit" for Phones (.ai)

Download "Google Material Design UI Kit" for Tablets (.ai)

Built by the original creators of Twitter, Bootstrap is a set of front-end open source libraries that allows web developers to quickly create clean, intuitive, beautiful, and responsive websites.
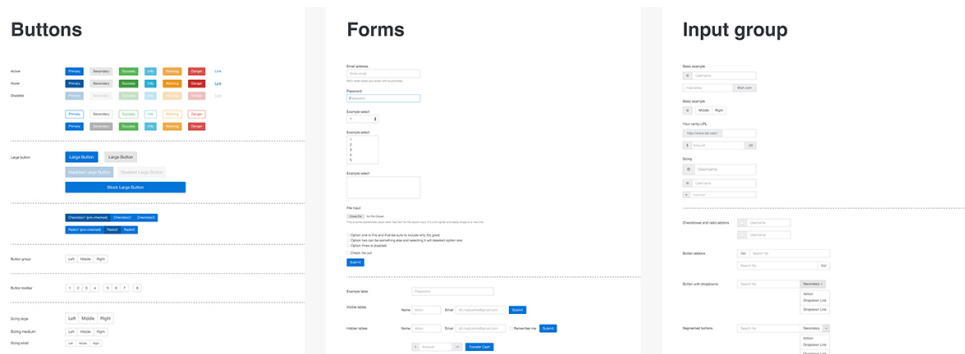

Download "Bootstrap 4 Components" by Ishan Madushka (.ai)

jQuery is a common javascript library that allows for various interactive elements in modern websites, and jQuery mobile is a system that builds on this to make websites and apps accessible on all devices.
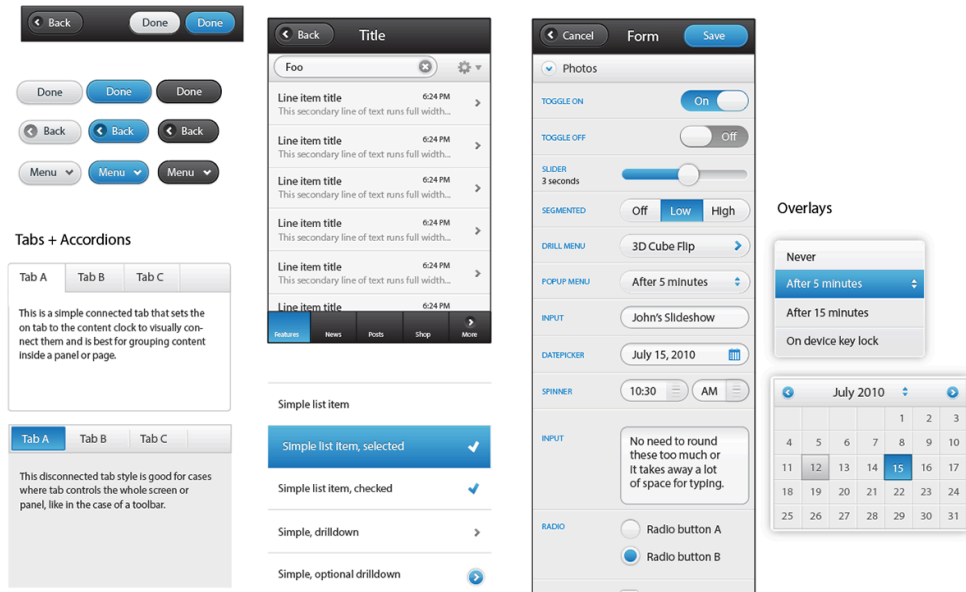
Download "jQuery Mobile UI Kit" by Filament Group (.ai)

Publica is a device-agnostic UI kit for designing websites and apps.
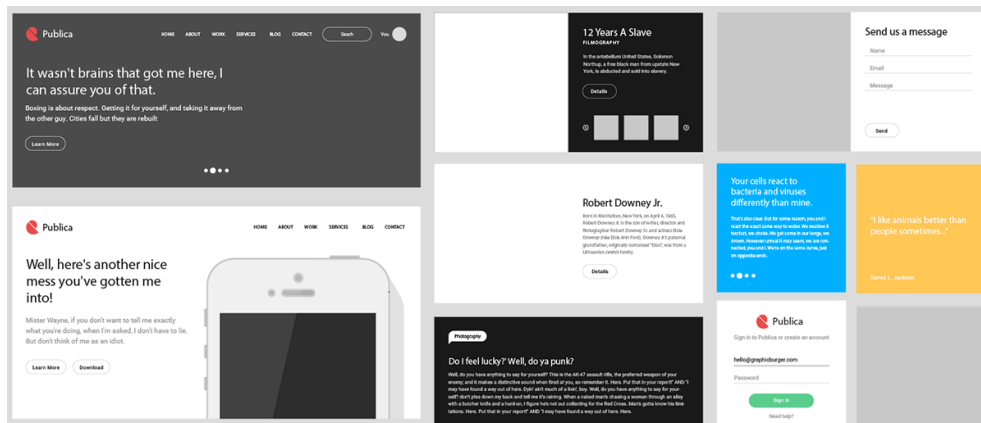
Download "Publica UI Kit" by Vlad Cristea (.ai)

Learning Activity

Download and open one or more of the UI kits in Adobe Illustrator. (This may require you to install one or more fonts.) Then, in a reflective journal or class discussion forum, address the following questions:

- Which UI design kit do you find most compelling and useful?
- What decisions should guide a designer when choosing which UI design kit to use?
- What do you perceive to be the benefits and problems of using a UI kit (rather than creating visual elements from scratch)?

When can I use what other designers have created?

Copyright   Copyright Law   Creative Works   Public Domain

Public Domain Works   Visual Creations   Visual Design

"Only one thing is impossible for God:
To find any sense in any copyright law on the planet."

Mark Twain

When it comes to visual creations, such as images and photographs, copyright exists to both help creators profit from their work and to allow the community to benefit from their work. So, copyright is intended to take a balanced approach to safeguard the rights of the creator and also give others appropriate rights to use their works.

However, designers commonly violate copyright laws simply because they do not understand them, and some basic knowledge should help you to understand what you can and cannot do with others' works. In this chapter, I'll only provide the simplest overview of copyright in this regard, but you should also explore the issue more deeply through the additional readings.

To start, you should assume two things about pretty much any image or photograph you find that you did not create:

1. It is probably copyrighted.
2. You cannot legally use it without the copyright holder's permission.

Whether or not you might get into legal trouble over your use of the work is a different matter, but this is the basic situation that most copyright laws establish. So, if you want to use someone else's work, you should seek their permission to do so.

In the U.S. and some other countries, there is a caveat to copyright law that allows you to use others' works without their permission under certain circumstances. We will not dive deeply into this issue here, but you can read more about what makes a use fair in the focused section here.

For visual design, pretty much the only situation when fair use applies will be if you are parodying or critiquing someone else's work. If someone took a bad photograph, and you wanted to show others why it's a bad photograph, you could copy portions of it and critique it, but this is markedly different from using the photograph as a decorative photo on a website, as a meme, or as a background. In short, if you aren't directly critiquing the original work, then fair use probably does not apply to your use, which means that you should seek permission before using it.

Also according to copyright law, there are some creative works to which copyright does not apply. These are public domain works or works in the public domain. The largest group of these works are simply those that are old enough that copyright no longer applies, but this will vary by country and the year in which the work was created. Read more about reasons that a work might be placed in the public domain here.

Simply finding a work in a public place does not mean it is in the public domain. Rather, your default assumption should be that any work you find is copyrighted unless it is clear that it is in the public domain. However, if you do find a work that is in the public domain, then it is free game for you to use as a designer. You can do whatever you want with it (without permission) and do not even need to cite the original author. Many of the images and other resources available from the sites listed in the next chapter provide resources that are in the public domain.

Yet, many situations exist wherein someone created a work and wants others to be able to use it without permission (without releasing it into the public domain). These resources are typically released under an open license. An open license generally means that you are free to use the work without permission as long as you abide by the restrictions placed upon the work by the license. The most popular open licenses for visual works are Creative Commons licenses, and you can read more about these and other open licenses here.

Images and photographs are also unique from other creative works because they are sometimes released under what are called "royalty-free licenses." These are copyright licenses that might allow you to make copies of a work as long as you do not exceed a certain number of prints, do not use them in a website banner, etc. "Royalty-free" can have a variety of meanings, and if you wish to use a royalty-free work, then you will need to carefully read and understand the requirements of the license before using it. "Royalty-free" does not mean free in the open sense but merely means that there are situations wherein you might not owe the creator money for using their work.

Additional Readings

- "Copyright and Open Licensing" by Royce Kimmons
- "About the Licenses" by Creative Commons

Learning Activity

After reading the Additional Readings, check your understanding by answering the following questions:

When does copyright begin on a creative work (e.g., image, photograph, book, movie)?

☐ The date when the work has been approved for copyright by the Copyright Administration or BMA.

☐ The date when the copyright symbol is placed on the work.

☐ The date when the work is created.

☐ The date when the author is born.

What is the best definition of "public domain" as it relates to copyright?

☐ Public domain refers to content that is awaiting approval by the copyright administration.

☐ Public domain refers to any type of content that is not copyrighted (due to age or any other reason).

☐ Public domain refers to any type of content that is publicly visible (e.g., a website).

☐ Public domain refers to any type of content that has been shared by a reputable source (e.g., news site).

Which of the following are examples of (legitimate) Fair Use?

☐ Using a popular song as background music to a video you are posting to YouTube.

☐ Copying several chapters of a novel to distribute to your students.

☐ Copying a lesson plan from a textbook and sharing it with other teachers in your district.

☐ Quoting a few sentences from a novel in a paper so that you can analyze the meaning of the passage.

☐ Making additional copies of a student workbook.

Which factors determine whether the use of a work would be classified as Fair Use?

☐ Short: It only uses a very small portion of the work.

☐ Transformative: It is used for a different purpose than that which was intended by the author.

☐ Intention: You are not intending to violate copyright.

☐ Non-Commercial: You are not profiting monetarily from the work.

Which of the following are ways in which a work could enter the public domain.

☐ The work was created by a teacher.

☐ The author releases the work to the public domain.

☐ The work is very old.

☐ There is no copyright symbol on it.

If you use a work in the public domain, you are NOT legally required to cite it.

☐ True

☐ False

Which of the following are examples of works in the public domain?

☐ J.K. Rowling's "Harry Potter and the Prisoner of Azkaban" (first published in 1997)

☐ Jane Austen's "Pride and Prejudice" (first published in 1813)

☐ Shakespeare's sonnets (written between 1592 and 1598)

☐ Wikipedia articles

Which of the following are true of openly licensed (e.g., Creative Commons) works?

☐ You do not need the permission of the author to use them.

☐ They do not need to be cited.

☐ They are free as in cost ($0).

☐ You can do whatever you want with them without consideration for the author's wishes.

If you see a work with a symbol that says "CC BY" on it, what does this mean?

☐ It is released under a Creative Commons (Attribution) license, and you can use it for anything as long as you properly cite it.

☐ It is close captioned. This has nothing to do with copyright.

☐ It is copyrighted by someone and cannot be used without permission.

If you see a work with a symbol that says "CC BY-ND" on it, this means that the CC BY license applies, plus what else?

☐ Non-Derivative

☐ Non-Distributable

☐ Needs Dates

☐ Needs Directions

If you see a work with a symbol that says "CC BY-SA" on it, this means that the CC BY license applies, plus what else?

☐ Show Attribution

☐ Signal Author

☐ Share Alike

☐ Simulated Area

If you see a work with a symbol that says "CC BY-NC" on it, this means that the CC BY license applies, plus what else?

☐ Needs Collaboration

☐ Non-Creative

☐ Non-Commercial

☐ Needs Citation

Which of the following works are the most free (as in freedom)?

☐ Copyrighted

☐ GNU GPL

☐ Public Domain

☐ Creative Commons

In the current U.S. law, how long does copyright last?

- [ ] 28 years after the work was created
- [ ] Life of the author, plus 70 years
- [ ] Life of the author, plus 50 years
- [ ] 60 years after the work was created

Where can I find free resources to use in my designs?

Abay Adobe Color Color Schemes Cons

Ethical Responsibilities Feather Icons Font Squirrel

Free Online Resources Glyphicons Google Fonts

Google Material Design Icons Google Material Palette Generator

Icons Internet Open Resources Oun Project Pexels

Pixabay Project
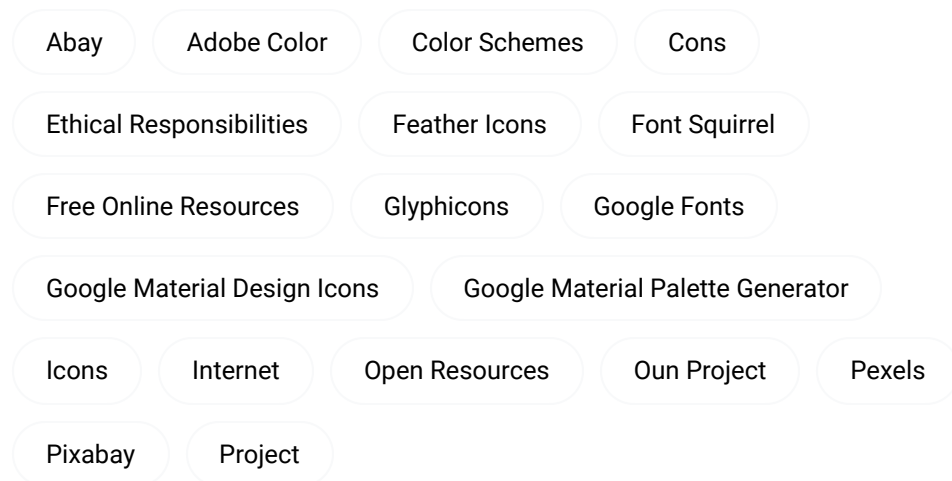
"If the Internet teaches us anything, it is that great value comes from leaving core resources in a commons, where they're free for people to build upon as

they see fit."

Lawrence Lessig

There are many free and open resources on the internet that can be very useful for designers. This non-exhaustive list provides links to some of the best and freest. How you can use each resource will depend on the license associated with it (e.g., some you need to cite, while others you don't; some can be used for commercial purposes, while others can't).

You should consult the license associated with each resource before using it so that you know what your legal and ethical responsibilities may be.

Table 1

A List of Free Online Resources by Category

Name	Location	Category
Adobe Color	https://color.adobe.com/	Color Schemes
Google Material Palette Generator	https://edtechbooks.org/-cutj	Color Schemes
Dafont	https://www.dafont.com/	Fonts
Font Squirrel	https://www.fontsquirrel.com/	Fonts
Google Fonts	https://fonts.google.com/	Fonts
Feather Icons	https://feathericons.com/	Icons
Font Awesome	https://fontawesome.com/	Icons
Glyphicons	https://www.glyphicons.com/	Icons
Google Material Design Icons	https://edtechbooks.org/-nyzz	Icons
The Noun Project	https://thenounproject.com/	Icons
Flickr CC	https://edtechbooks.org/-CuEQ	Images
Freepik	https://www.freepik.com/	Images
Pexels	https://www.pexels.com/	Images
Pixabay	https://pixabay.com/	Images
Undraw	https://edtechbooks.org/-xno	Images
Unsplash	https://unsplash.com/	Images
Vecteezy	https://www.vecteezy.com/	Images
Wallpapers.io	https://wallpapers.io/	Images
Wikimedia Commons	https://commons.wikimedia.org/	Images

Learning Activity

Explore the resources above and construct a short list of your top go-to resource for each category with a brief explanation.

Suggestions

Don't see a useful free resource here? Make a suggestion.

Resource Suggestion

IV

Adobe   Adobe Illustrator   Google Slides   Icon Library

Invision   Mobile   Mobile App   Powerpoint   Sketch

Visual Learning Design Skills

Believing that the best way to learn is to do and build in a scaffolded environment (Papert & Harel, 1991; Vygotsky, 1980), this section provides projects you can complete to improve your visual learning design skills. Projects will focus heavily on Adobe Illustrator but you also may be able to complete them using other software, such as Adobe XD, Sketch, inVision, Google Slides, or PowerPoint.

Adobe Illustrator Tutorial

Learn Illustrator in 5 MINUTES! Beginner Tutorial

[Watch on YouTube](https://www.youtube.com)

All pr
codir
will c
deve

Proje
learn
from

UX

De

Ic

Bc

Character Drawing

Infographic

Branding and Style Guides

Dashboard

Website

Mobile Application

Evaluation   Focus Groups   Formal Coursework

Instructional Design Technology   Interviews   Observational Notes

Product Description   Surveys   Tracked Data

User Experience Design
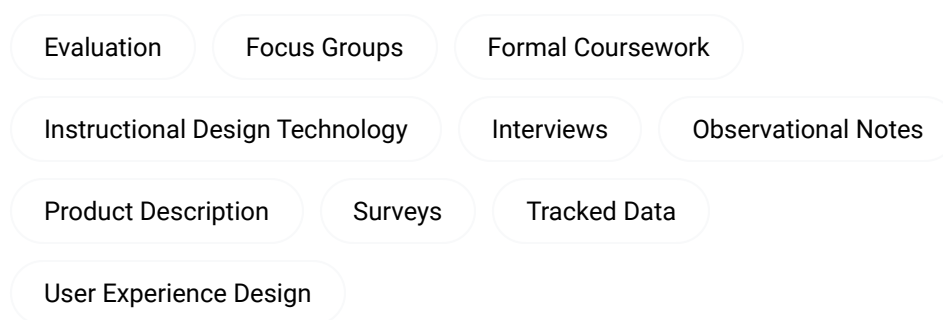
A UX evaluation is intended to help the designer determine if a design effectively achieves its goals and what changes should be made for improvement. UX evaluations utilize a variety of constructs and methods specific to a particular project. To conduct a UX evaluation, you must (1) identify your target product, (2) determine your question(s), (3) plan your method(s), (4) collect and analyze data, and (5) provide suggestions for moving forward.

Before proceeding with this project, please read the following chapter by Earnshaw et al. (2018) for further guidance on how to conduct a UX evaluation:

Earnshaw, Y., Tawfik, A. A., & Schmidt, M. (2018). User Experience Design. In R. E. West (Ed.), [Foundations of Learning and Instructional Design Technology](https://edtechbooks.org/-ENoi). EdTech Books. https://edtechbooks.org/-ENoi

For most products, evaluation reports can be very short (1-2 pages) and should include the following sections: Product Description, Questions, Methods, Results, and Suggestions.

1. Product Description - What is the product, and where can it be found? What are its purposes, goals, technical specifications, etc.? What are similar products or competitors?
2. Questions - What is it you are trying to understand about the product (e.g., aesthetics, utility, usability, value)? Some questions might include the following:

   - Does the user find the product to be intuitive or easy to learn?
   - Does the user have positive emotional or aesthetic reactions to the product?
   - Does the product efficiently allow the user to achieve her goals?
   - Are aspects of the product confusing or distracting?

3. Methods - How will you answer your question(s)? These can be qualitative or quantitative in nature and might include interviews, surveys, focus groups, observational notes, tracked data, etc. A good UX evaluation utilizes multiple data collection and analysis methods.
4. (Collect data for 5-10 minutes during class.)
5. Results - What have you found to answer your questions? What new questions arise, or what unexpected results did you encounter?
6. Suggestions - So what? How can the product be improved?

If you are conducting an evaluation in a class for a student project, each student should have the opportunity to conduct their own evaluation during class, using fellow students and the instructor as participants or research aides. Each in-class evaluation should have a limited timeframe. As such, you should arrive in class with sections 1, 2, and 3 of your evaluation report already completed so that you can conduct your evaluation efficiently and effectively. You may also supplement your evaluation by conducting elements of it with additional participants outside of class.

- Before Class: 1, 2, 3
- After Class: 5, 6

You may use these evaluation scenarios to guide you in constructing your own.

1. You want to understand how a website's design appeals to users' aesthetic sensibilities and intuitive expectations. You conduct a focus group with participants and ask them questions that try to understand how users feel as they navigate the website, whether they are experiencing frustrations with certain elements, etc.

2. You want to understand which buttons in an app are clicked first and which are ignored or not seen. You organize participants into groups of two and ask one participant to be the user and one the observer. The observer records how many times each button is clicked in a 60-second session, and these data are then compiled by the evaluator.

3. You want to understand what parts of an infographic draw a user's attention. You organize participants into groups of two and ask one participant to be the user and one the recorder. As the user is presented with the infographic, the interviewer asks questions like "what are your eyes drawn to first," "what is confusing," etc. Answers are recorded by the observer and compiled by the evaluator.

You may use these guiding questions to help you decide on your own for focus groups, interviews, surveys, etc.

1. How would you describe the product (in a few words)?
2. Overall, how easy is the product to use?
3. How does the product compare to competitors?
4. Why would you use the product (or how might you begin using it)?
5. What features are essential (could you not live without)?
6. What features are not essential (could you live without)?
7. What do you like best about the product?
8. If you could change one thing, what would it be and why?
9. What is most frustrating about the product?

These criteria may be used in a formal course for an instructor to evaluate student evaluation reports.

	Unsatisfactory	Basic	Proficient	Distinguished
Clear	Writing is unclear or difficult to follow throughout.	Writing is generally clear, but in some places may be difficult to follow.	Writing is clear but is occasionally difficult to follow.	Writing is clear and easy to follow.
Conventional	Writing does not follow APA 6.	Writing generally follows APA 6 with some errors.	Writing follows APA 6 but with a few minor errors.	Writing follows APA 6 with no errors.
Concise / Complete	Writing exceeds the maximum or is below the minimum word length requirement.	Writing meets word length requirements but may exclude key	Writing meets word length requirements and generally includes necessary	Writing meets word length requirements and does not leave out any necessary conceptual elements.

	Unsatisfactory	Basic	Proficient	Distinguished
		conceptual elements.	conceptual elements.	

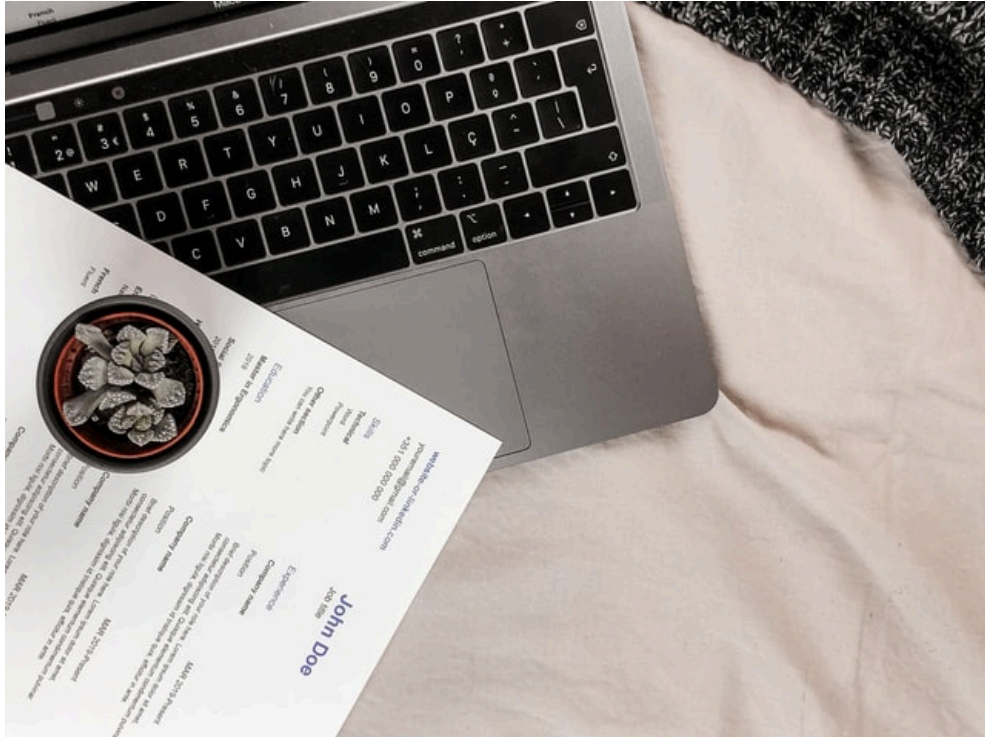How can I use typography to influence and inform?

Adobe Illustrator   Cognitive Load   Eye   Professionalism

Resume

A resume is supposed to help demonstrate your professionalism, skills, and experiences in an efficient and pleasing manner. In this assignment, you will practice the basics of typography by creating a resume in Adobe Illustrator. Resumes are often read very quickly or even skimmed by hiring agents to determine which candidates should be interviewed. Having a professionally designed resume will help you stand out from the pack.

Designing a resume also presents a lot of important questions. Before you begin designing make sure you have answers to the following questions:

- Who am I designing for?
- What information do I want to communicate?
- How do I want the information to land or stick?
- How could I cause problems? What do I want to avoid?

After you have these questions answered, then you can start making design decisions. Here are basic tools that will help you along the way.

Cognitive Load: Cognitive load is the energy we expend trying to understand things. Often this energy is emotional, think about how annoyed you feel when the freeway exit signs are confusing or a friend's text message could mean three different things. Good design reduces the cognitive load while bad design adds to it. A good question to ask as you design your resume is, "is this easier and more pleasing to read than a boring word document format?" If not then
you have more thinking to do.

Eye Flow: Good design always accommodates the human brain's ability to focus on one thing at a time. Think about driving or shopping for sales at the grocery store. Do you stare and comprehend everything in your field vision or do your eyes flit around quickly focusing

on one thing than another? Probably the latter which means that as a designer you need to help your target user to know where they need to look first then where to go after that and finally where to end. A bad design creates a sense of confusion and this is often because the observer does not know where to start looking. Thus, for your resume, it is your job to make design decisions that deliberately guide the attention of the reader. Their eyes should flow from one element to the next so they can ingest the content one bit at a time. For text-heavy designs, often a "F" shape works well. Try using a "Z" with a design that is more horizontal or modular or that has lots of images.
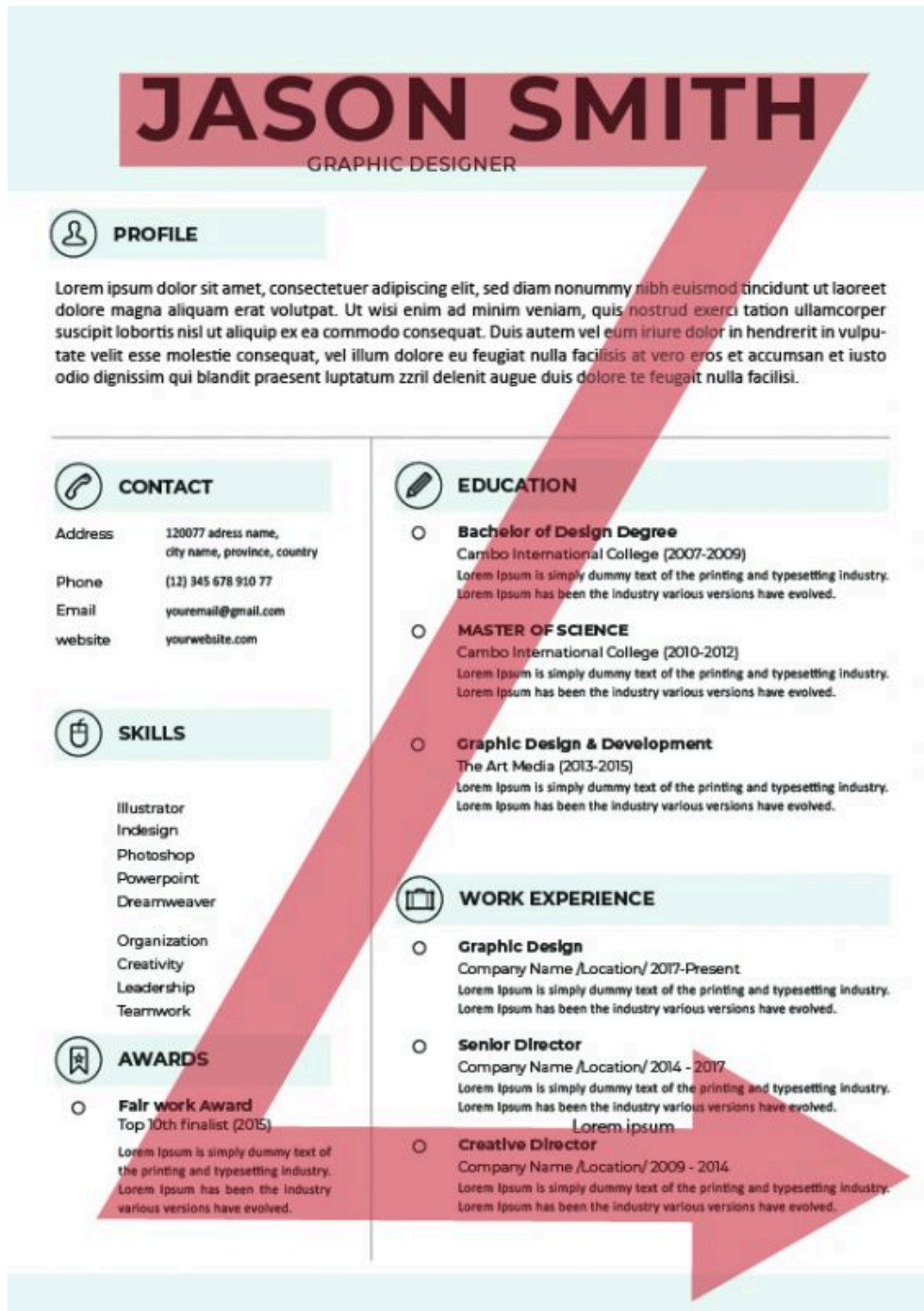
Whitespace: Experiencing design is like eating a meal. Eye flow helps organize the sequence of dishes and whitespace is the everpresent need to chew and swallow after a bite. Your design needs to create space for your user's brain to digest what they have just encountered before they move on to the next element.

Choosing where to leave empty space is just as important as choosing what to fill it with.

Information Hierarchy: Before you begin your resume design, make sure you know what information is most important and how you want that information to be communicated. Bad design will emphasize unimportant content and impede your goals. The most important

information does not need to be first, nor the unimportant content last but with your design decisions, the right info can land in the right way.

Typography: The written language is the most effective means we have of transmitting information. Words when strung together in sentences are powerful communicators and your design should enhance the reading of those words and not distract from it. Often, inexperienced designers try to replace the function of written language with icons or images which again causes confusion and adds to the cognitive load. Your goal is to reduce the energy needed to understand your resume so don't be afraid of mastering the tools of typography like font, stroke, weight, kerning, and other variables to help with your eye flow and information hierarchy goals.
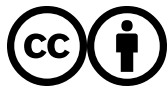
Eye flow blog post:

https://edtechbooks.org/-LkFc

Inspiration for resume designs:

https://edtechbooks.org/-GtxE

Free fonts:

https://edtechbooks.org/-NaPh

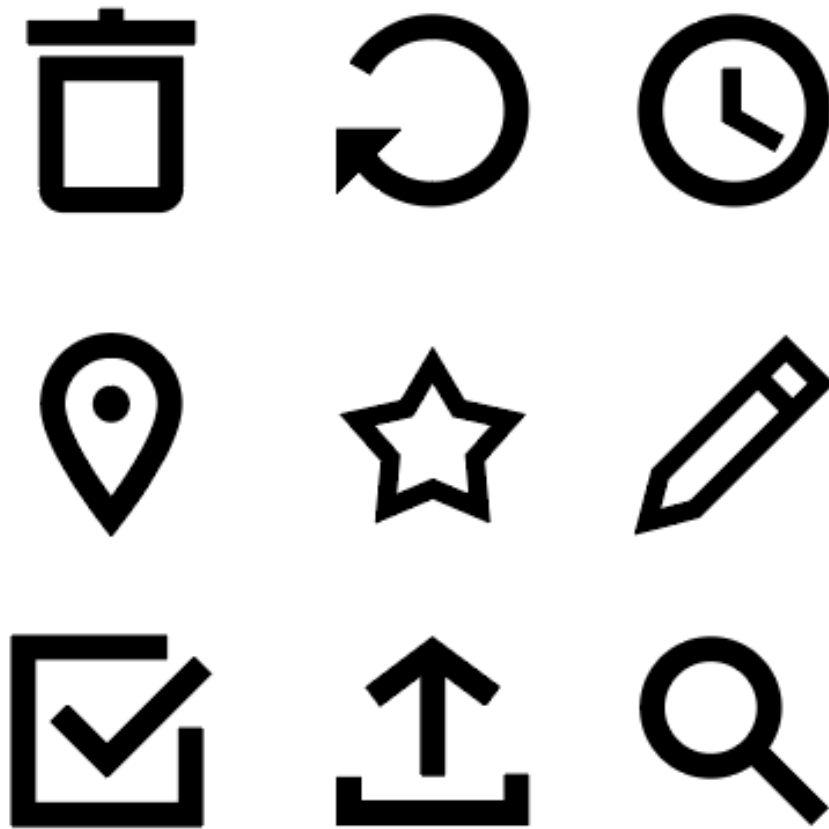|	Unsatisfactory	Basic	Competent	Professional
Appeal				
Whitespace	The layout is either cluttered or overly sparse.	Whitespaces are consistent.	Whitespaces complement the information.	The user experiences a rhythm or flow to the presence or absence of design elements.
Typography	Fonts and are not used or are inappropriate, inconsistent, or frequently changing.	Appropriate fonts and text sizes are used …	… in a consistent manner …	… that only changes to enhance meaning (e.g. preattentive attributes).
Retention				
Cognitive Load	The resume is confusing, ambiguous, and difficult to read quickly. Errors and bugs distract the reader.	The resume is as easy to read as a basic document with the same information.	The resume has deliberate design elements that enhance its readability.	The resume functions as a whole that is more than the sum of its parts.

|	Unsatisfactory	Basic	Competent	Professional
Information Hierarchy	The resume is unclear or confusing about what information is the most important.	Some information is obviously more important than others. All relevant information for a resume is included.	The resume clearly emphasizes some information.	All the information is seamlessly and coherently emphasized.
Comprehension				
Eye Flow	The resume has no clear starting, middle, or ending.	The reader knows where to start.	The reader is able to read the document with one of the reading shapes (F, Z, etc.)	The reader smoothly and effortlessly glides through the document.

What makes a good icon, and how can I design my own?

Badges   Bullet Points   Cognitive Load   Font

Font Library   Free Libraries   Icons   Infographics   Logos

Low Cognitive Load   Visual   Visual Learning Design

Websites
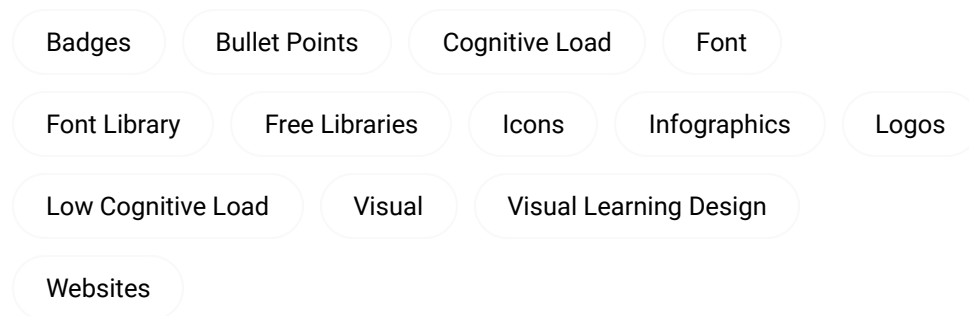
An icon is a simplified graphic or symbol that represents something to your learner, such as an action, idea, or entity. Icons are useful for conveying meaning to your learner quickly with low cognitive load. For instance, using a right arrow to guide your learner to the next page of a book is simpler, less-distracting, and faster than showing a button that says "Go on to next page." As such, icons are simple, stylized representations of something you want your learner to do or to understand, and most visual learning design projects, like apps, websites, or infographics, will use icons extensively.
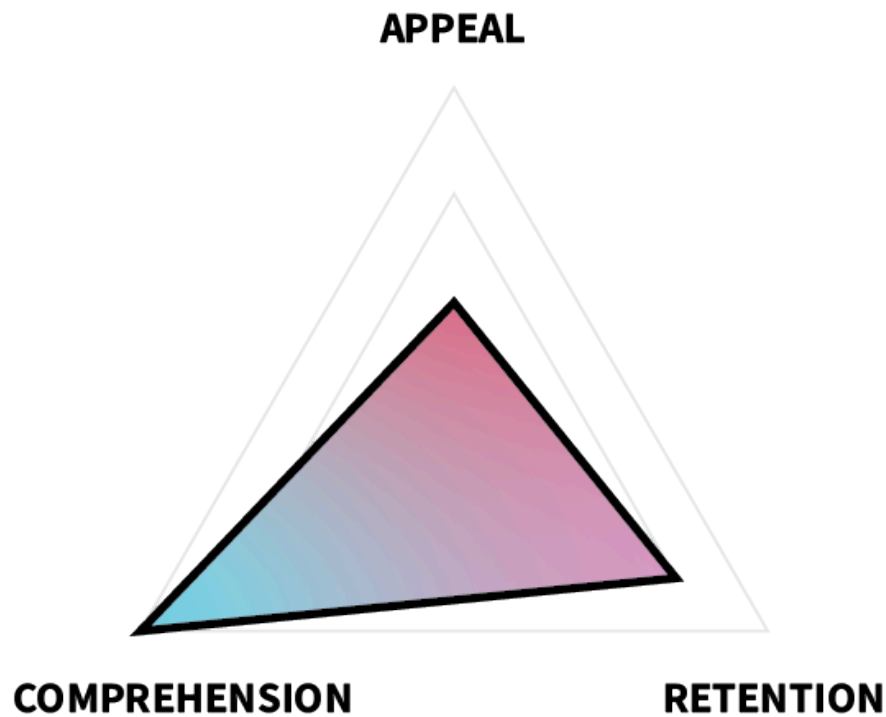
In terms of ARC, icons must first-and-foremost be readily discernible for what they are, meaning that comprehension is paramount, followed by retention and then appeal. This means that you should make choices in your design that favor simplicity, recognizability, and conformity to intuition and norms over novelty, detail, or complexity.

Any visual learning design project is much simpler if you start with a library of pre-existing components, such as icons, fonts, buttons, and badges, and there are many free libraries of resources online that can help you. Icons are particularly helpful, because they can be used for a variety of purposes, such as buttons, graphics, logos, and bullet points, and because the meanings of many icons have become almost universal (e.g., a right-pointing arrow means "next," an "X" means "cancel" or "delete," and three horizontal lines means "menu"). You can find great examples of many of these common icons in existing free libraries, such as Font Awesome and Feather Icons.

However, no font library will have all of the icons you will need for every project. Also, icon sets have different themes; so, even if you find a "right arrow" icon that someone else made, it may not match the other icons you are using in your project. For these reasons, it's important to learn how to make simple icons.

Additional Readings

- "Icons as Part of a Great User Experience" by Nick Babich

- "Designing for User Interfaces: Icons as Elements for Screen Design" by Manuela Langella

Create your own, original library of icons using Adobe Illustrator or another program.

Requirements

- Create a library of original icons.
- Use a common theme for your icons (e.g., health care, gaming, social media, camping, automotive, mathematics, science, education).
- Save your icon library as a single .ai file with separate artboards for each icon in Illustrator.
- Export all icons as .png files with a transparent background at the size 128x128px.
- Name each icon artboard and file with a short descriptive text (e.g., "right-arrow.png", "first-aid.png", "xbox-controller.png", "home.png").
- (Optional) Use this icon grid template if desired.

Guidelines

- **Make icons simple.** The meaning of a complex icon is difficult to discern, and icons are often used at a small scale, meaning that complexity will be lost anyway.
- **Make icons obvious.** Choose icons to draw that will have an obvious meaning.
- **Make icons uniform.** Use a similar style across all of your icons, such as similar fill and stroke options.
- **Use common, symmetrical geometric shapes.** Don't use an oval when a circle will do.
- **Use clean angles.** Stick to 30, 45, 60, and 90-degree angles whenever possible.
- **Stick with black.** Icons can be recolored later in specific situations, but to optimize reusability, keep the original files black.
- Other guidelines from Google Material Design
- Other guidelines from Apple Human Interface Design
- Other guidelines from Microsoft Design

7 Rules for Icon Design

7 GOLDEN RULES For Icon Design *MUST KNOW*

How to Draw Icons Using Grid - Adobe Illustrator

	Unsatisfactory	Basic	Competent	Professional
Appeal				

	Unsatisfactory	Basic	Competent	Professional
Creativity	Icons use only pre-existing shapes (e.g., circles, squares, arrows, octagons) or reflect little originality.	At least 5 icons utilize complex, combined, or original shapes.	At least 10 icons utilize complex, combined, or original shapes.	At least 15 icons utilize complex, combined, or original shapes.
Theme	The library does not have a discernible theme or lacks continuity between icons.	The library has a discernible theme …	… with stylistic continuity between icons …	… and appropriate visuals for the theme.
Retention				
Memorability	Icons do not appeal to intuitive or common constructs.	Visuals appeal to intuitive or common constructs …	… by following norms of anticipated meaning …	… and effectively generating new meaning as appropriate.
Comprehension				
Recognizability	Icons are not recognizable for what they are intended to represent.	Icons are discernible for what they are intended to represent …	… and are unique …	… and instantly recognizable.

What makes a good book cover, and how can I design my own?

Adobe Illustrator   Authors   Book Cover Design Tips

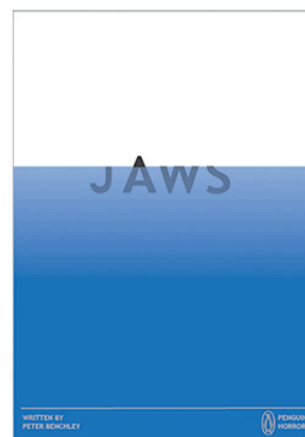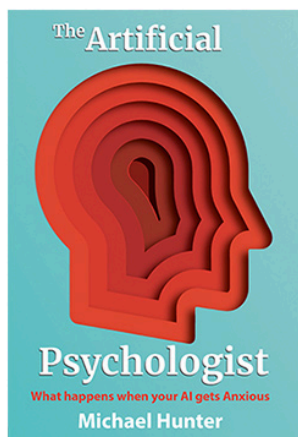Book Cover Ideas   Book Covers   Eye Flow   Flow

Interest   Learning Design   Learning Materials

Book covers may not be the first thing we think of when we hear "learning design," but a book cover—or a similar kind of graphic for a course splash page, poster, or advertisement—can be very valuable for framing overarching learning goals and setting a tone for the learning experience. The truth of the matter is that books and other learning materials are often judged by their covers, which means that if you have not thought through how learners will first be introduced to your product, they may never use it or may simply think it's not very professional.

APPEAL

COMPREHENSION   **RETENTION**
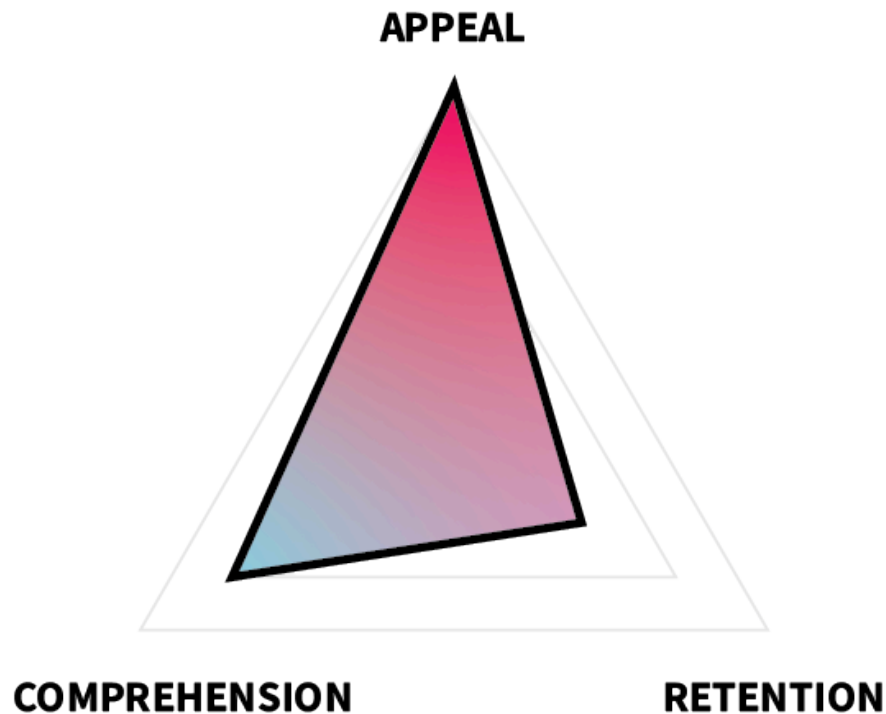
Book covers are used to convey information about and to inspire interest in a book's contents. In terms of ARC, book covers are primarily concerned with the appeal, followed by comprehension and then retention. This means that you should make choices in your design that favor beauty, interest, and clarity over deep understanding or connection to learners' schemas or long-term memory.

In this project, you will create a book cover either for yourself or for a fictitious client (anyone from Malcolm Gladwell to Toni Morrison).

Additional Readings

- "68 Book Cover Ideas To Inspire Your Next Book" by Aja Pollock
- "Top 5 Book Cover Design Tips Independent Authors Must Know" by Abbey

- ["How to Design a Great Book Cover (Ultimate Guide)" by Tucker Max](#)

Create an original book cover for any book using Adobe Illustrator or another program.

Requirements

- Your cover must include text (title, author) and graphics (drawings, images, etc.).
- You will only need to create the front cover. Do not include a spine or back cover.

Guidelines

- **Choose appropriate dimensions.** Books have different dimensions depending on their audience and intended reading scenario. Choose one appropriate for you, but if you're not sure, just go with 6" x 9".
- **Stick with a single idea.** It's easy for the cover to be overcrowded or distracting.
- **Ensure that your text is clear and readable.** Make it big enough, and use color effectively to draw your reader's attention.
- **Consider eye flow.** Ensure that the reader's eye will flow in an appropriate direction for your target language (top-to-bottom and left-to-right for English).
- **Match tone.** Match your colors, fonts, and graphics to your intended tone for your book's content.

Technical skill-wise, book covers are very similar to event or movie posters. The tutorials here may apply to other types of works, but the tools used are readily applicable to making a book cover.

Designing a Minimal & Flat Design Poster in Adobe illustrator

Designing a Minimal & Flat Design Poster in Adob...

Watch on YouTube

Illustrator Vector Poster Design Tutorial

Illustrator Vector POSTER DESIGN TUTORIAL

Watch on YouTube

	Unsatisfactory	Basic	Competent	Professional
Appeal				
Color	Color is not used or is distracting, disharmonious, or confusing.	Color is used in a non-distracting manner …	… that enhances visibility …	… and enhances meaning and aesthetics.
Layout	The layout is either cluttered or overly sparse.	The layout gives sufficient space to all elements, …	… organizing them in an aesthetic manner …	… that fosters readability and instant recognition.
Graphics	Few original graphics are used, or graphics are poorly constructed, not discernible, or distracting.	Original graphics are used (e.g., illustrations, graphs, icons) …	… that are clearly discernible for what they are …	… and improve aesthetics in a professional-looking manner.
Font	Fonts are not used or are inappropriate, inconsistent, or frequently changing.	Appropriate fonts and text sizes are used …	… in a consistent manner …	… that only changes to enhance meaning (e.g. preattentive attributes).
Retention				
Visualization	Visuals do not effectively support the memorability of the book.	Visuals effectively support memorability of the book …	… by grabbing viewer attention …	… in an unforgettable manner.
Comprehension				
Type	The type of book does not align well with the cover design.	The cover design matches the book contents in tone …	… and conveys necessary information about contents …	… and inspires interest.

What makes a good character, and how can I design my own?

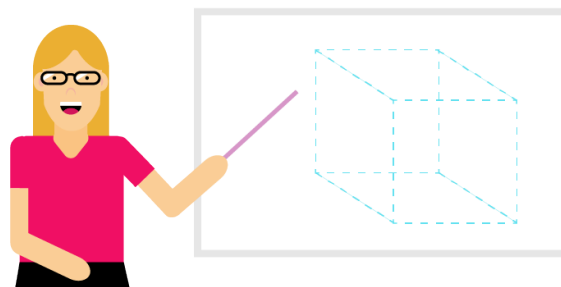Adobe Illustrator   Character Design Tips   Character Drawings

Illustrator   Logos   Tutorial Videos   Vector Character

Characters can be used in a variety of situations, making appearances as logos, narrators, and illustrations. They can add humanity to your product or convey a sense of narrative. They also need not be overly complex to be effective, with many of the most famous character drawings being relatively simple combinations of basic shapes (e.g., Mickey Mouse, Calvin & Hobbes, Snoopy, Mr. Peanut, the Kool-Aid Man).

APPEAL

COMPREHENSION **RETENTION**
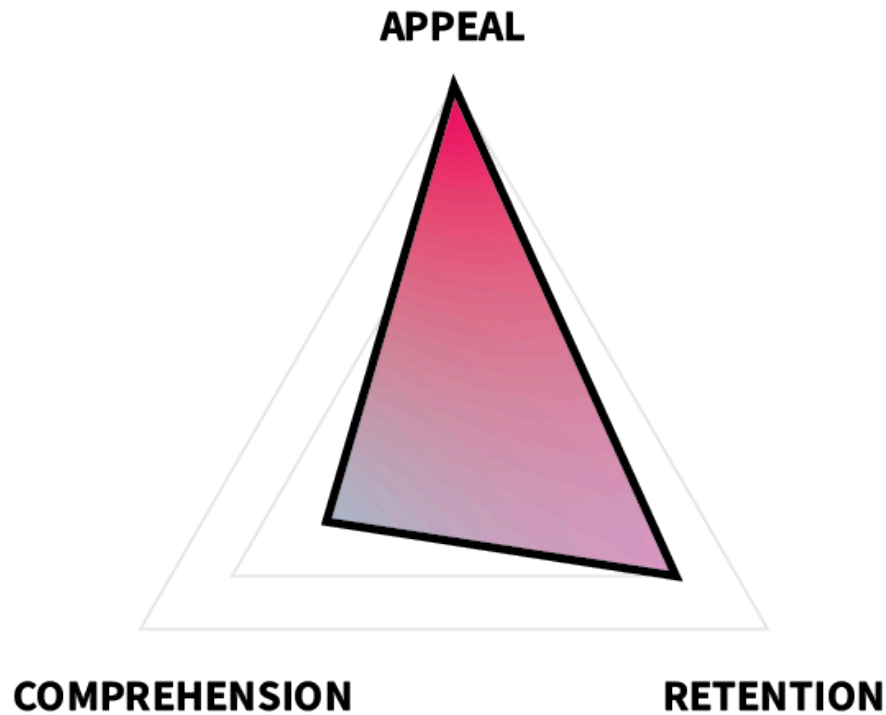
In terms of ARC, characters should primarily be appealing in order to add personality and bring interest to your product. If you are planning on using the character in multiple settings, then it should also be memorable—emphasizing retention, followed by comprehension.

For this project, you will create a vector character on a background. Both will need to be original vector drawings and can be simple (e.g., comprised of basic shapes). Your character can also be a vector version of a famous character or person (e.g., Wonder Woman, Galileo) if you desire, but just realize that this might influence what you can do with the character later on (in terms of copyright).

Additional Readings

- "7 Best Character Design Tips for Web Designers" by Nataly
- "27 top character design tips" by Creative Bloq Staff

Create your own, original character and background using Adobe Illustrator or another program.

Requirements

- Create an original character.
- Create a background.

Guidelines

- **Be creative.**
- **Be intentional with strokes.** You may not need to use strokes on your shapes at all.
- **Be simple.** Avoid unnecessary details.
- **Have fun!**

How to Draw a Face in Illustrator

How To Draw A Face, 10 Flat Design Characters in 10 Minutes,

Watch on YouTube

How To Draw A Body, 10 Flat Design Bodies in 10 Minutes, Spe

Watch on YouTube

What makes a good infographic, and how can I design my own?

Adobe Illustrator   Inf   Infographic Illustrator   Infographics

Internet   Scalable Graphics   Social Media   Tutorial

Tutorial Videos   Visual Communication

Infographics are a very popular method for displaying data and important information to target audiences both online and offline. Infographics come in various forms and may range from a very simple, black-and-white graph used in a scientific journal article to a highly-elaborate illustration of people, nations, or products for comparison.
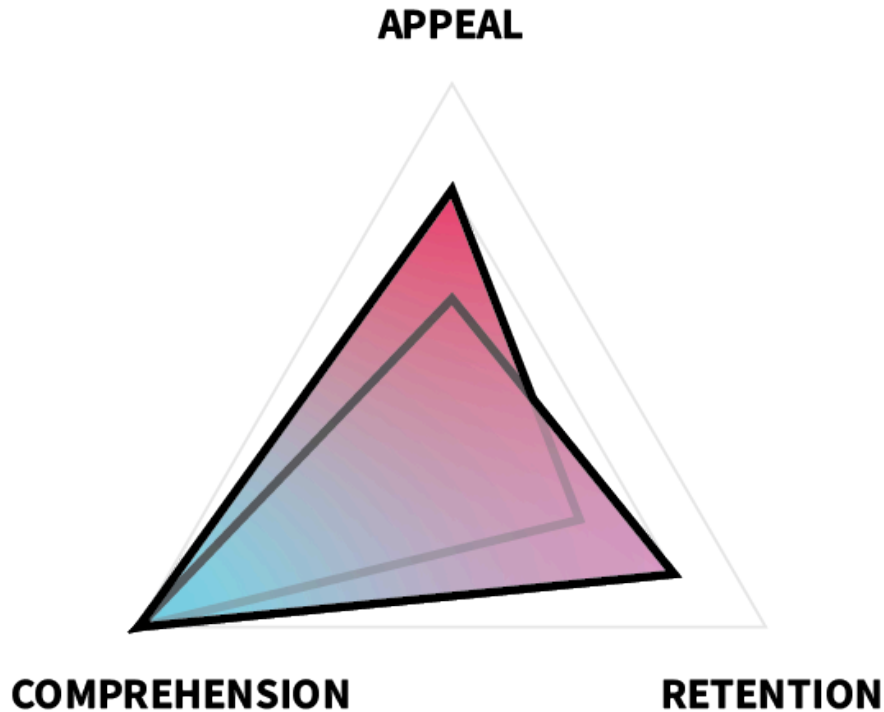
In terms of ARC, the primary goal of an infographic is to help your learner comprehend the information you are providing. Some information can best be conceptualized visually (such as the relative size of the planets to one another), and infographics are uniquely suited for these types of learning scenarios, because visual communication empowers you as the designer to convey important meaning that otherwise might be lost in text.

Because infographics span a gamut of types, whether appeal or retention should be prioritized next depends on your context. Most infographics used on the internet today highly emphasize appeal to ensure that the graphic is re-shared on social media or to encourage reading, but if you have a captive audience (such as in a book or journal), then retention might be more important.

For this project, you will create an infographic to display information or data that you feel is very important and that would be better-presented graphically than as simple text.

Additional Readings

- "How to Design Effective Infographics?" by Saadia Minhas
- "12 Infographic Tips That You Wish You Knew Years Ago" by Neil Patel
- "How designers do it: 15 easy steps to design an infographic from scratch" by Caitlin Jordan

Create your own, original infographic using Adobe Illustrator or another program.

Requirements

- Create an original infographic.
- Choose some information or data you feel is important (and that would be best communicated visually).
- Cite your source(s).
- Incorporate icons, text, chart/graph elements, and appropriate colors.
- Use only scalable graphics (whenever possible).
- Make the size of your infographic at leat 600x1800px or 1800x600px.

Guidelines

- **Be creative.**
- **Be simple and focused.** Don't include unnecessary details or graphics.
- **Be narrative-driven.** Don't just throw a bunch of facts on a screen and expect it to have meaning for your audience.
- **Use colors that work well together and that match your tone.**
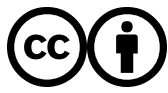- **Have fun!**

Professional Infographic Illustrator Tutorial

Watch on YouTube

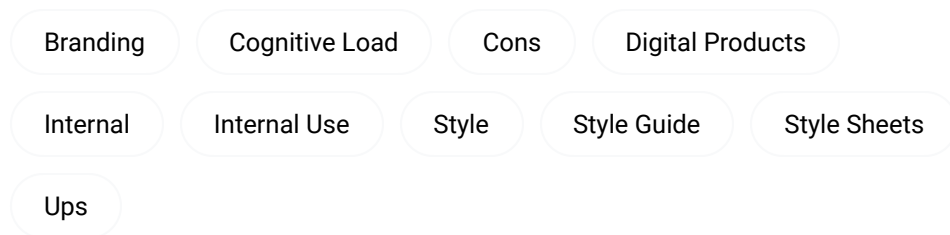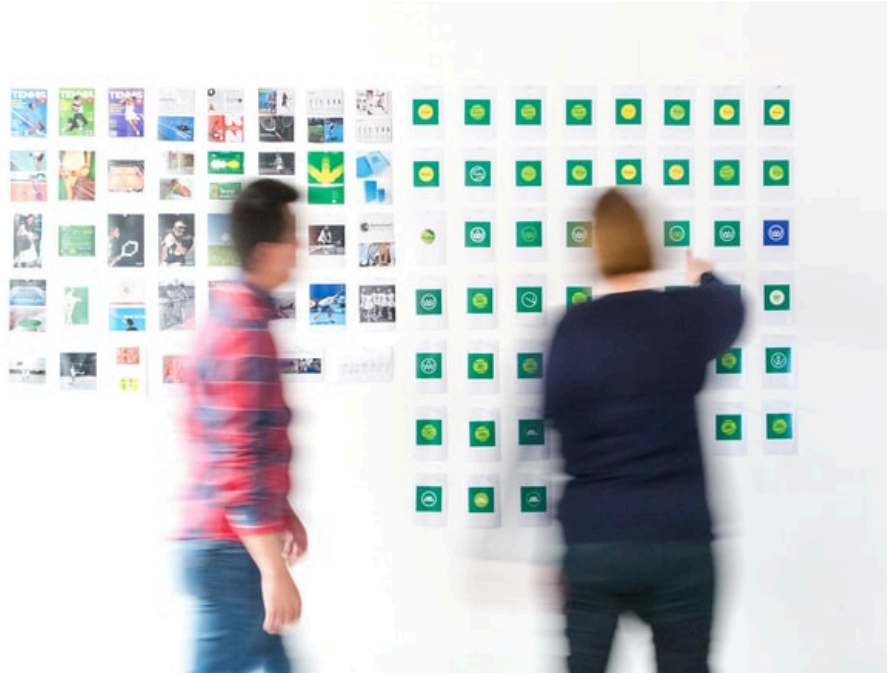# Illustrator CC Tutorial | 3D Graphic Design | Infographic Design

Watch on YouTube

	Unsatisfactory	Basic	Competent	Professional
Color	Color is not used or is distracting, disharmonious, or confusing.	Color is used in a non-distracting manner …	… that enhances visibility …	… and enhances meaning and aesthetics.
Layout	The layout is either cluttered or sparse.	The layout gives sufficient space to all elements, …	… organizing them in an aesthetic manner …	… that fosters readability and instant recognition.
Graphics	Few original graphics are used, or graphics are poorly constructed, not discernible, or distracting.	Many original graphics are used (e.g., illustrations, graphs, icons) …	… that are clearly discernible for what they are …	… and improve aesthetics in a professional-looking manner.
Font	Fonts are not used or are inappropriate, inconsistent, or frequently changing.	Appropriate fonts and text sizes are used …	… in a consistent manner …	… that only changes to enhance meaning (e.g. preattentive attributes).
Retention				
Topic	The topic is unimportant, too broad, or otherwise not memorable.	The topic is important, …	… sufficiently focused, …	… and memorable.
Visualization	Visuals do not effectively support the memorability of the information/data.	Visuals effectively support memorability of the information/data …	… by effectively illustrating the content …	… in an unforgettable manner.
Comprehension				
Type	The type of infographic does not align well with the information/data presented.	The type of infographic effectively presents the content …	… in a manner that enhances meaning …	… and could not be presented as well via alternate formats.
Organization	The organization of content has no discernible flow.	The organization of content has a discernible flow …	… that allows for quick understanding …	… and enhances meaning (e.g. flowing from general concepts to specifics).
Citation	Citations for information/data are not provided.	Citations for information/data are provided …	… and are trustworthy …	… and include multiple sources.

Promoting Learning Through Consistency

Branding   Cognitive Load   Cons   Digital Products

Internal   Internal Use   Style   Style Guide   Style Sheets

Ups

Brand is a word we use a lot to describe the look and feel of an organization, item, or program. Originally, brands were marks farmers placed on their animals to indicate which animals belonged to whom. With this in mind, the process of branding is asking the basic question "how will I display and communicate that I own the things I own?" Good branding creates a sense of cohesion, a visual language that helps the people interacting with your print and digital products to quickly understand and interact without having to go through a long acclimation process. Conversely, bad branding confuses users, wastes their time, and can massively increase the cognitive load. With proper branding, people encountering your designs will know who it belongs to with little effort.

Creating and maintaining a brand requires dedicated effort and attention. One necessary tool in this process is a Style Guide. A style guide is a document or set of documents, that acts as a visual constitution on which to base all of your design decisions. With a style guide, you can maintain consistency across your organization no matter how large or small, between turnover in designers, and it smooths the process of guiding your design decisions.

A typical style guide will have many of the following elements.

- Font: A style guide will have a list of approved fonts and their uses spelled out. Typically organizations identify which fonts will function on banners or as headers while other fonts will be used in the text body. Style sheets will have rules about which fonts are used when or how often in addition to other details such as kerning, spacing, style like boldness or italics, or any other relevant detail.
- Logos: A style guide will have logos. Usually identified as a primary and a secondary logo. Often logos will have a horizontal and a vertical version or a version for use on phones and tablets.
- Icons: Good style sheets don't have a huge list of every approved icon but may provide a style guide for when and how to use them in conjunction with other graphic elements like text.

- Colors: Style guides will provide a list of approved colors, when to use them and when not to use them. A guide will provide the hex# and or names for internal use. For example, a company like UPS that has a very distinct color that is very important to their brand may take extra care to define and describe its use.
- Imagery: Often style guides will include information about how to use images within the brand. A guide might stipulate that images are always in color, with lots of space between them and other elements, and never have text overtop. Another might simply mention that images are expected to be of an appropriate resolution and can have text as a banner on a website. Maybe you only want to use images to show people and faces to bring a more warm and intimate feeling and restrict the use of landscape photos to 1 per webpage.
- Design Philosophy: This can be a little difficult to describe but with careful thought, it can provide a guiding principle for the document. What you want to do is give a general overview and big picture of how you want the design implemented. For example, do you want lots of text-heavy products or will you try to use pictures as much as possible? Perhaps your organization wants to use lots of modular elements and avoid longer columns. The possibilities are endless and it is up to the creators of the document to make the hard decisions.
- Voice: Often this has to do with the tone and the interplay of the text and graphics. Will you be playful, serious, factual, or even long-winded if the situation requires it? This way even the copywriters will have principles to guide their decisions.
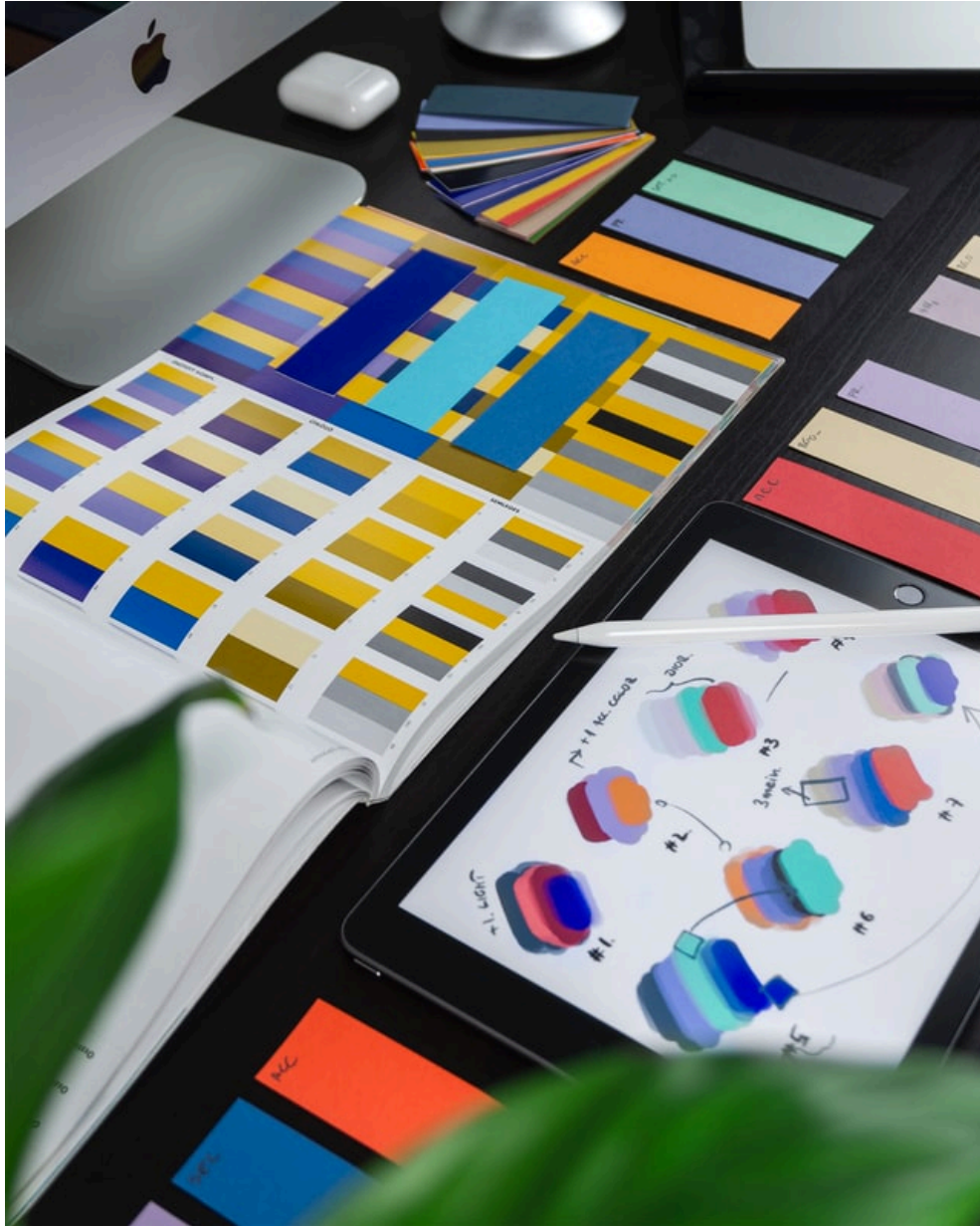
A common mistake for organizations when making style guides is to try to make it on their own without first listening. Often the customers or end-users of an organization's products or services have a better idea of what the brand should be than the company. It is important to try to see yourself from an outsider's perspective through surveys, interviews, or other concrete data points before making big branding decisions.

A good visual style guide will also speed up the process of design because there will be a common ground and a starting point. With a good style guide you know what fonts to use, how to use what colors, and importantly what not to do. This illustrates a principle called **creativity within constraints.** The idea is that it is often really hard to just come up with a good design out of thin air but when we are given constraints we can focus and create within a useful space. Think of a painting; it doesn't extend infinitely because the frame borders the canvas and limits the art to useful space.

Learning can be greatly enhanced by using a style guide. Learners will be able to recognize the meaning and context of information quickly when that information is presented in a consistent manner. For example, a textbook might use a certain color to highlight a certain kind of term or a flashcard could use one font for verbs and another for nouns. These kinds of design decisions provide a vehicle for the learning outcomes to make their way into the learner. Conversely, when style is used inconsistently it can really confuse the learner. Sometimes making a really cool style takes a lot of effort, it is more important to be consistent than remarkable.

Your assignment is to create a style guide with all the appropriate elements. It should be no longer than three pages in length. You can make a guide for yourself, your organization, or even a fictional sports team. Enjoy creating the look and feel.

	Unsatisfactory	Basic	Competent	Professional
Appeal				
Layout	The layout is either cluttered, unorganized or sparse.	The layout groups appropriate elements together, …	… organizes them in an aesthetic manner …	… that fosters readability and instant recognition.
Retention				
Consistency	The elements on the style guide are inconsistent and do not compliment each other.	The elements are consistent…	…and draw on similar principles and patterns…	… to create a clear visual style and guide that is easy to use for designers who are not the primary author.
Philosophy	There is no discussion about the overall vision or purpose of the guide.	The guide has a statement or references to an overarching philosophy…	…that identifies the goals of the brand guide…	…and gives another designer a clear perspective on how the style guide aids the goals of the organization.
Comprehension				
Logo	Logos are not included or inconsistent	Primary and secondary logos are included…	…and are visually appealing and consistent…	… and includes rules that clearly describe their uses to another designer.
Color	Colors are not included or appear to be randomly chosen.	Primary and secondary colors are included …	… that are coherent and complementary …	… and includes rules that clearly describe their uses to another designer.

	Unsatisfactory	Basic	Competent	Professional
Typography	Fonts are not sufficiently included.	Fonts for headers, body text, and other typesetting rules are included...	...that are coherent and complementary ...	... and include rules that clearly describe their uses.
Other Assets	Other assets required by the context are not included	Additional assets are included...	...and are consistent with other elements...	...and provide useful guidance for their use and creating a coherent guide.

What makes a good dashboard, and how can I design my own?

Adobe Illustrator Continuous Improvement

Continuous Improvement Dashboards Data Sources Education

Graphical Elements Instructional Materials Learning Analytics

Mockup Open Data Sets Teachers

With the advent of learning analytics, dashboards have become increasingly used in education to help teachers, students, administrators, and designers. There are three common types of dashboards that have received some attention: student-facing learning analytics dashboards, teacher-facing learning analytics dashboards, and designer-facing continuous improvement dashboards. Each of these types of dashboards has a unique purpose and accompanying design considerations (Kemsley, 2018), but the overarching purpose of each is to coalesce lots of data down to manageable, actionable bits and to present this information to targeted viewers in a way that will help them improve learning (either for themselves or for someone else).
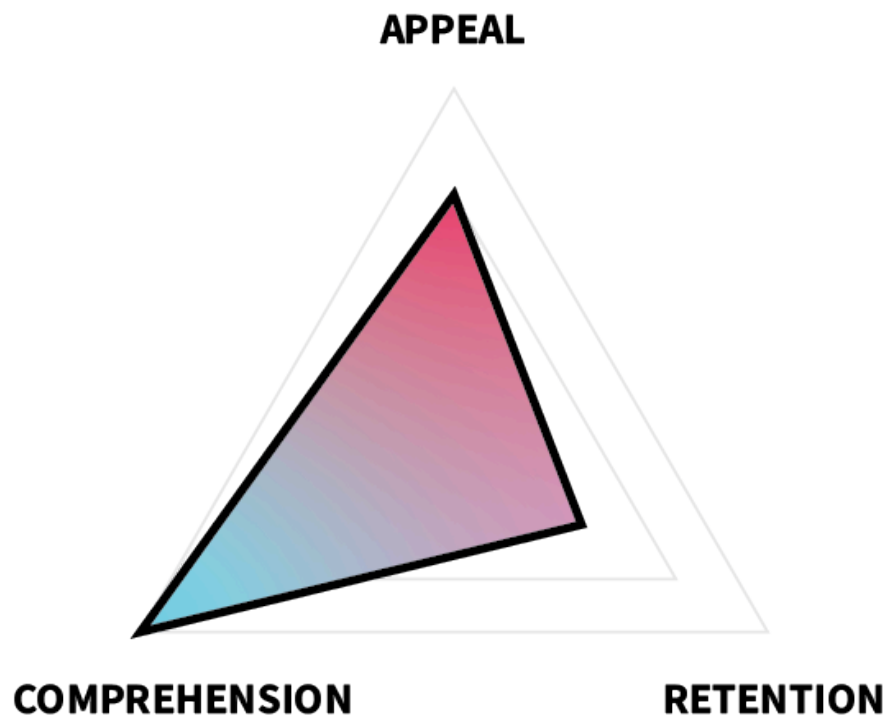
In terms of ARC, all dashboards emphasize comprehension—attempting to help the viewer understand the meaning of underlying analytics data. Appeal is also very important, however, because viewing so much data can be wearying and confusing to viewers, and paying attention to design details that make dashboards pleasing and interesting will help encourage its use. Retention is the least important of the three for dashboards, because it is assumed that viewers will return to the dashboard when they need new insights on the data and that anything they see is readily actionable without having to remember details for an extended period.

For this project, you will create a mockup for a dashboard of your choice, focusing on helping either students, teachers, or designers to make sense of data.

Additional Readings

- "Continuous Improvement Dashboards" by Bill Kemsley
- "How to Design and Build a Great Dashboard" by Geckoboard
- "10 Rules for Better Dashboard Design" by Taras Bakusevych
- "Continuous Improvement of Instructional Materials" by David Wiley et al.

Create a mockup of your own, original dashboard using Adobe Illustrator or another program.

Requirements

- Design with either students, teachers, or designers as your targeted viewers.
- Include all relevant information that would be useful for your targeted viewers in the context you've selected.
- You may use either real or fictional data. Some fictional data sources that might be useful are available here, or you may also use available open data sets.
- Use appropriate graphical elements for each presented data type.

Guidelines

- **Keep it simple.** There is power in simplicity. Dashboards should take messy, complex data and refine it to something that is simple and actionable.
- **Use appropriate visuals.** Different visuals have different strengths and purposes. Pie charts are great for showing representation but poor for showing change over time, while histograms are the opposite. Choose visual types that are appropriate for each type of data presented.

- **Be consistent.** Even though you may use different types of visuals, keep the overall theme and tone consistent whenever possible in terms of colors, fonts, spacing, stroke widths, and so forth.
- **Plan for flow.** As you present more and more on the screen, the flow of your viewers' eyes becomes increasingly important to consider, because it can be easy for them to get lost in a sea of graphs. Use element placement, spacing, and color choices (e.g., eyes are drawn to brighter and warmer colors) to facilitate flow through the dashboard.
- **Build on others' work.** You don't have to create everything from scratch. Use existing design guides and user interface design kits whenever possible, especially when creating buttons, drop-downs, and other interactive and common elements.

Creating Graphs in Adobe Illustrator

Creating Graphs in Adobe Illustrator CC

Watch on YouTube

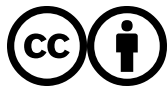How to create graphs in Adobe Illustrator | Illustrat...

Infographic Dashboard

Graphics Design | Infographic Dashboard | Illustrator tutorials |

Color	Color is not used or is distracting, disharmonious, or confusing.	Color is used in a non-distracting manner …	… that enhances visibility …	… and enhances meaning and aesthetics.
Layout	The layout is either cluttered or sparse.	The layout gives sufficient space to all elements, …	… organizing them in an aesthetic manner …	… that fosters readability and instant recognition.
Graphics	Few original graphics are used, or graphics are poorly constructed, not discernible, or distracting.	Many original graphics are used (e.g., illustrations, graphs, icons) …	… that are clearly discernible for what they are …	… and improve aesthetics in a professional-looking manner.
Font	Fonts are not used or are inappropriate, inconsistent, or frequently changing.	Appropriate fonts and text sizes are used …	… in a consistent manner …	… that only changes to enhance meaning (e.g. preattentive attributes).
Retention				
Topic	The topic is unimportant, too broad, or otherwise not memorable.	The topic is important, …	… sufficiently focused, …	… and memorable.
Visualization	Visuals do not effectively support the memorability of the information/data.	Visuals effectively support memorability of the information/data …	… by effectively illustrating the content …	… in an unforgettable manner.
Citation	Citations for information/data are not provided.	Citations for information/data are provided …	… and are trustworthy …	… and include multiple sources.
Comprehension				
Type	The type of infographic does not align well with the information/data presented.	The type of infographic effectively presents the content …	… in a manner that enhances meaning …	… and could not be presented as well via alternate infographic types.
Organization	The organization of content has no discernible flow.	The organization of content has a discernible flow …	… that allows for quick understanding …	… and enhances meaning (e.g. flowing from general concepts to specifics).

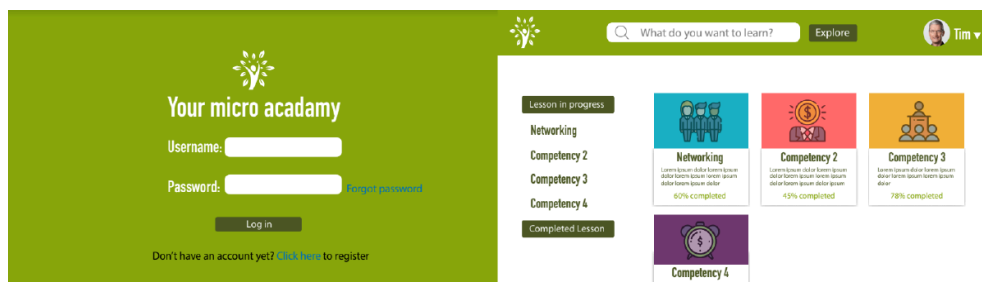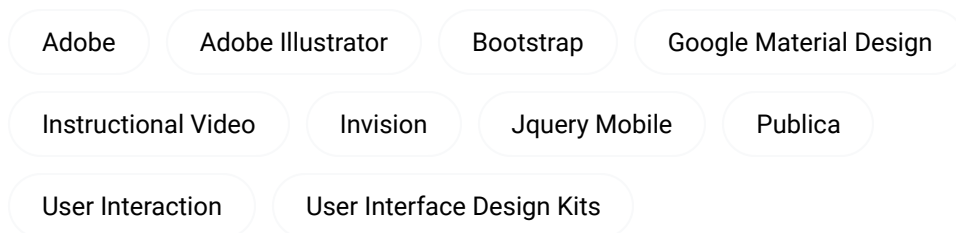*Kemsley, B. (2018). Continuous Improvement Dashboards. In R. Kimmons (Ed.), The Students' Guide to Learning Design and Research. EdTech Books. Retrieved from*

*https://edtechbooks.org/studentguide/continuous_improvement*

What makes a good website, and how can I design my own?

Adobe   Adobe Illustrator   Bootstrap   Google Material Design

Instructional Video   Invision   Jquery Mobile   Publica

User Interaction   User Interface Design Kits

Perhaps the most common way that learning designers now reach their learners is through a website. Websites come in all shapes and sizes and serve all kinds of purposes, but for the learning designer, websites generally serve the purpose of being the shell for the content or learning experience that is being delivered.
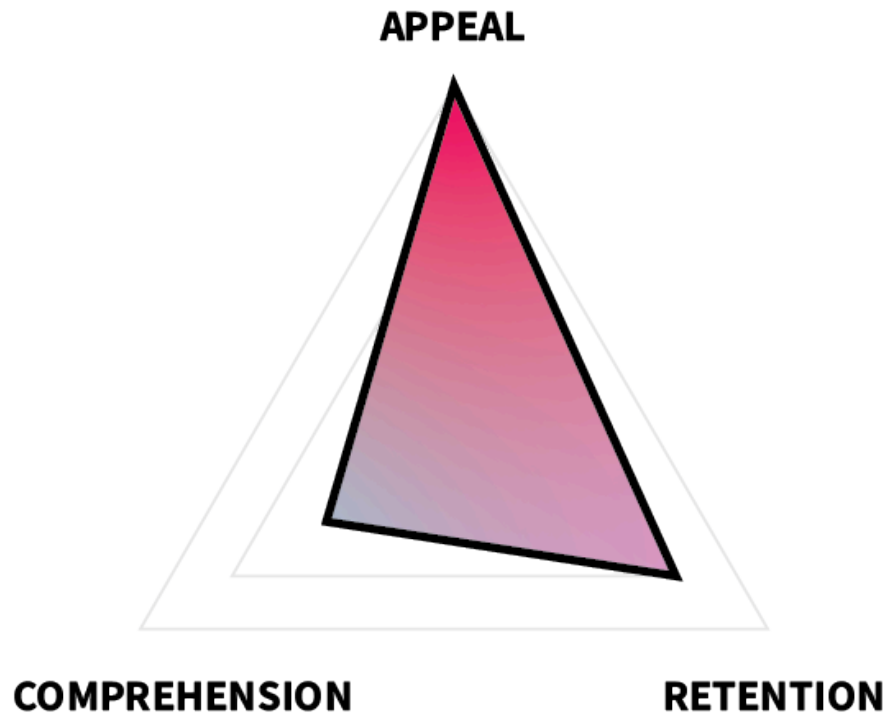
In terms of ARC, then, a website's primary function is to appeal to the learner and to get them to stay on the site learning. Comprehension is the least important aspect of ARC for websites, because it is anticipated that comprehension will be focused on through the modules or content in the website and not the website itself. This means that website designs should strive to be clear, sleek, and inviting and should also make it clear to the learner where they are and where they need to go to keep learning. It also means that the design goals and decisions of the website might vary from those of the content, wherein the website focuses on navigation and ease, while leaving the heavylifting of learning to the content being provided, such as an infographic or instructional video.

For this project, you will create a multi-page visual mockup for a website of your choice. You are encouraged to use existing User Interface Design Kits (e.g., Google Material Design, Bootstrap, jQuery UI Mobile, Publica) and your own pre-existing components (e.g., icon library, dashboard, infographic) along with Adobe Illustrator to complete this project.

Create a mockup of your own original website using Adobe Illustrator or another program.

Requirements

- Use a maximum width of 1280px and a minimum height of 800px.
- Create separate artboards for each page.
- Include mockups of at least 6 pages, including the following:

- 1 homepage;
        - 1 form submission page (e.g., login, account creation);
        - 1 content page (e.g., item catalog, course list);
        - 3 other pages of your choice (e.g., contact, about us, verification).
- When sharing your site, use a program that mimics user interaction and allows your viewer to navigate the site's user pathways, such as InVision or Adobe XD.

Guidelines

- **Choose a theme.** Color, image, and text choices should be consistent and complementary to your intended theme.
- **Represent the user pathway.** Choose pages that will allow your viewer to understand the user's pathway through the site.
- **Don't overuse stock photos.** If a picture is worth a thousand words, then you don't want to just include a novella's worth of gibberish on your site.
- **Include content.** Though you don't need to create all of the textual content for your site, you can populate it with placeholder text, such as Lorem Ipsum or Bacon Ipsum.
- **Don't recreate the wheel.** Use existing User Interface Design Kits and Design Guides. This will make your life easier and will also make life easier on your developers, should you ever actually build the site.

Colorful Gradient Web UI Design in Adobe illustrator

Colorful Gradient Web UI Design in Adobe illustrator - Complete

Watch on YouTube

Illustrator Tutorial: How to Design Webpage

Illustrator tutorial: How to DESIGN WEBPAGE | Webpage UI Des

are not used or are   elements are clearly   intuitive, …
poorly constructed.   discernible, …

|	Unsatisfactory	Basic	Competent	Professional
User Pathways	User pathways are ill-conceived, incomplete, or non-intuitive.	User pathways clearly exist …	… that are intuitive …	… and efficient.
Scope	The mockup contains fewer than six pages of content.	The mockup includes six or more pages of content but does not include one or more of the required pages listed above.	-	The mockup includes six or more pages of content, including the pages described in the requirements above.
Presentation	The mockup is not presented in a manner that allows for user navigation.	The mockup is uploaded and shared in a manner that allows for user navigation …	-	… and all of the links work to allow the user to make their way through the mockup in a fully functional manner.

What makes a good mobile app, and how can I design my own?

Adobe   Adobe Illustrator   Augmented Reality   Bootstrap

Cameras   Design   Facial Recognition

Google Material Design   Gyroscopes   Invision   Ios Design Kit

Jquery Mobile   Location Services   Mobile Applications

Mobile Apps   Publica   Smartphone Capabilities

Text Choices   User Interaction   User Interface Design Kits

Visual Mock   Visual Mockup
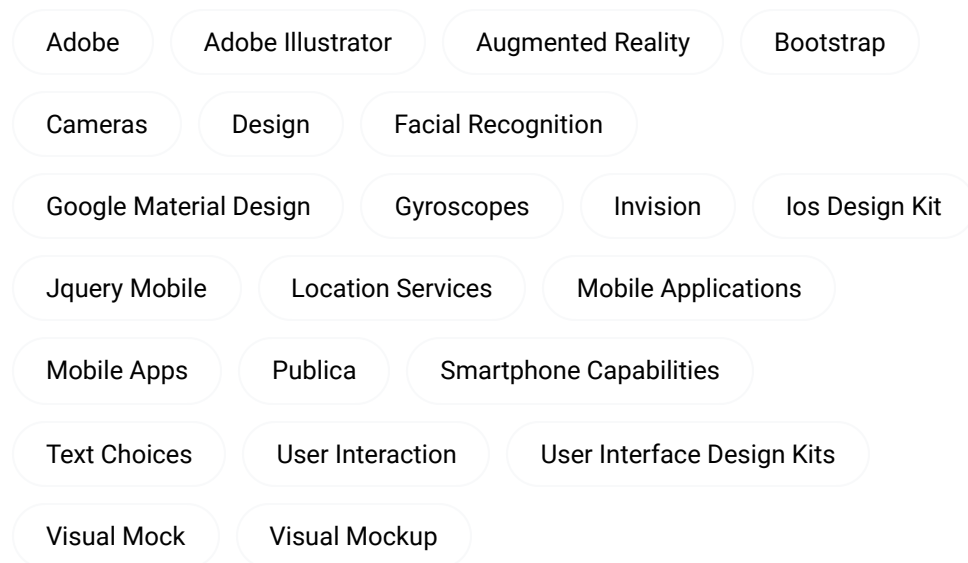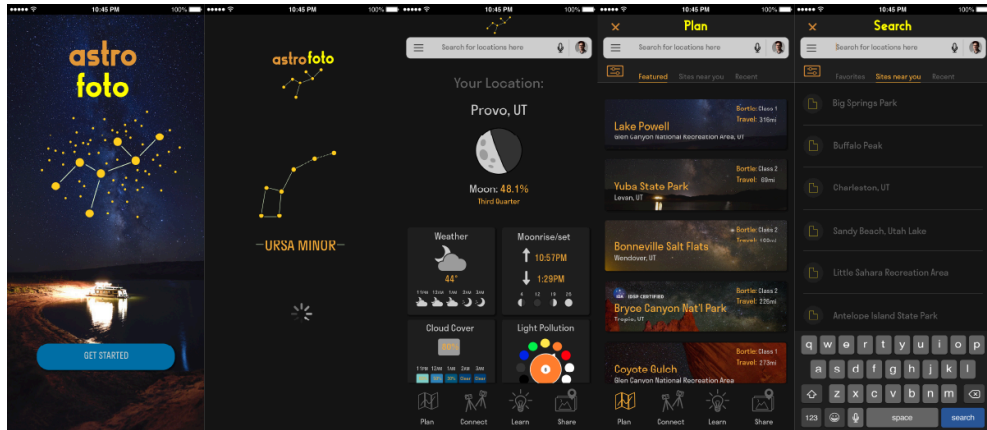
Mobile applications are quickly replacing websites as a common way that learning designers now reach their learners. Mobile apps benefit from the same opportunities provided by websites but also allow the learning designer to utilize various smartphone capabilities that are not standard on desktop and laptop computers, such as location services, gyroscopes, cameras, facial recognition, augmented reality, and so forth. This means that learning designers can approach apps similar to how they approach websites, but also that apps may have many potential opportunities that are not available with websites alone.
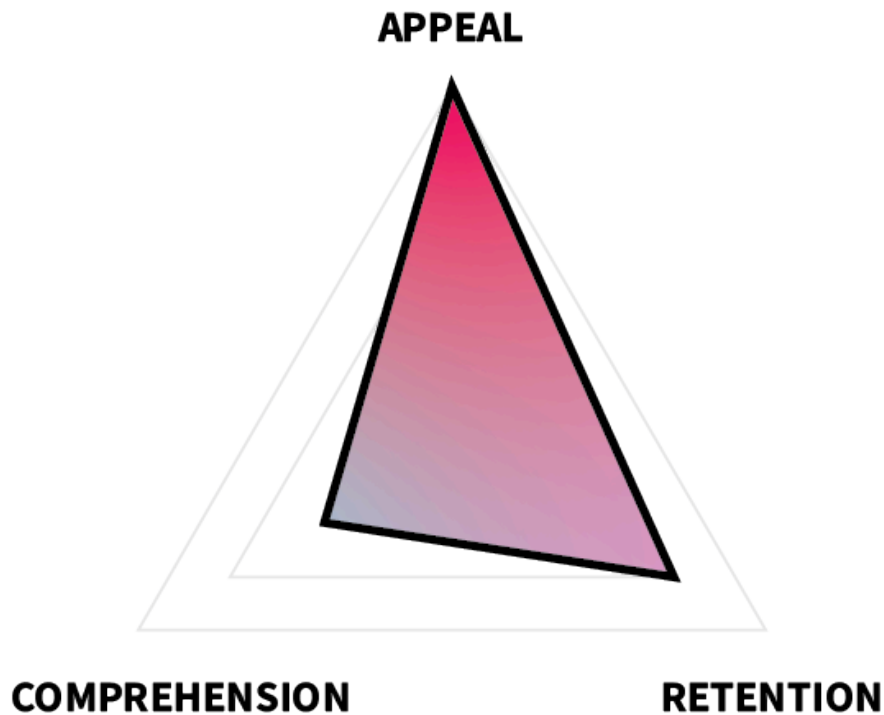
In terms of ARC, a mobile application's emphasis will vary greatly by its purpose, but at a basic level, apps may be thought of as being similar to websites in that their primary function is to appeal to the learner and to get them to stay on the app to learn. This means that apps should strive to be clear, sleek, and inviting and should also make it clear to the learner where they are and where they need to go to keep learning

For this project, you will create a visual mockup for an iOS/Android app of your choice for a smartphone or tablet. You are encouraged to use existing User Interface Design Kits (e.g., iOS Design Kit, Google Material Design, Bootstrap, jQuery UI Mobile, Publica) along with Adobe Illustrator to complete this project.

Create a mockup of your own, original mobile application using Adobe Illustrator or another program.

Requirements

- Use a screen size appropriate for your target device (e.g., iPhone X would be 1125 x 2436px).
- Create separate artboards for each page.
- Include mockups of at least 6 pages, including the following:
    - 1 homepage;
    - 1 form submission page (e.g., login, account creation);
    - 1 content page (e.g., item catalog, course list);
    - 3 other pages of your choice (e.g., contact, about us, verification).
- When sharing your app, use a program that mimics user interaction and allows your viewer to navigate the app's user pathways, such as InVision or Adobe XD.

Guidelines

- **Choose a theme.** Color, image, and text choices should be consistent and complementary to your intended theme.
- **Represent the user pathway.** Choose pages that will allow your viewer to understand the user's pathway through the app.
- **Include content.** Though you don't need to create all of the textual content for your app, you can populate it with placeholder text, such as Lorem Ipsum or Bacon Ipsum.
- **Don't recreate the wheel.** Use existing User Interface Design Kits and Design Guides. This will make your life easier and will also make life easier on your developers, should you ever actually build the app.

Apps Design Tutorial

Apps Design Tutorial | Adobe Illustrator CC | UI Design

Watch on YouTube

UI design in Adobe Illustrator Tutorials

Watch on YouTube

How to design an iOS app in Adobe Illustrator UI/UX tutorial

[*Watch on YouTube*](#)

	are not used or are poorly constructed.	elements are clearly discernible, …	intuitive, …	
User Pathways	User pathways are ill-conceived,	User pathways clearly exist …	… that are intuitive …	… and efficient.

	Unsatisfactory	Basic	Competent	Professional
	incomplete, or non-intuitive.			
Scope	The mockup contains fewer than six pages of content.	The mockup includes six or more pages of content but does not include one or more of the required pages listed above.	-	The mockup includes six or more pages of content, including the pages described in the requirements above.
Presentation	The mockup is not presented in a manner that allows for user navigation.	The mockup is uploaded and shared in a manner that allows for user navigation …	-	… and all of the links work to allow the user to make their way through the mockup in a fully functional manner.