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# DESIGNING INFORMATION LITERACY TUTORIALS

## TIPS, TECHNIQUES, AND TRENDS

Yvonne Mery

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# Designing Information Literacy Tutorials: Tips, Techniques, and Trends

*Yvonne Mery*

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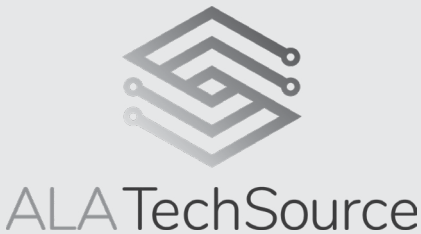




## About the Author

**Yvonne Mery**, Associate Librarian, leads the Instructional Design and e-Learning unit at the University of Arizona Libraries. She is also adjunct professor in the iSchool at the University of Arizona, where she teaches courses in research methods and e-learning. Ms. Mery has designed and implemented online courses in information literacy skills for undergraduate students and collaborated with departments across campus to support students and instructors in their research needs. She has authored several papers and a book on the integration of information literacy in online classes and presented at numerous national conferences on best practices for online information literacy instruction. Ms. Mery has also designed and delivered workshops and courses in instructional design and tutorial development. She is the cofounder of Sidecar Learning, an e-learning platform. In addition to her MLS, she also holds an MA in teaching English as a second language and a BA in English literature. She has extensive experience working with a diverse group of undergraduate and graduate students.

## Abstract

Even before the pandemic, many librarians were teaching online via video or interactive tutorials. But how do we know if our tutorials are any good? This issue of *Library Technology Reports* (vol. 58, no. 5), "Designing Information Literacy Tutorials: Tips, Techniques, and Trends," explores how librarians can create engaging and effective tutorials that are aligned with how this generation of students learns. The report starts with how to design better tutorials by using newer, agile instructional design models and implementing adult learning theories. The next chapter takes a deep dive into one trending and successful approach: microlearning. Chapter 3 discusses accessibility and universal design. Next, we take a look at getting feedback from our users, and we wrap up with a look at some helpful e-learning tools librarians need to create better tutorials.

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Chapter 1

# Design Trends and Approaches

## We Need Better Tutorials

Once a concern of only librarians and a few educators, information literacy is beginning to be seen by others in and outside of education as essential skills needed to succeed in college and beyond. The International Federation of Library Associations and Institutions' 2021 *Trend Report* lists information literacy as one of its top twenty trends and notes that "building information literacy may come to be seen as the only sustainable way of combating misinformation online."[1] Released yearly, EDUCAUSE's *Horizon Report* profiles trends in higher education and technology, and for many years information literacy was barely mentioned and only in relation to digital literacy. But the report listed information literacy skills as a key trend in 2018.[2] Similarly, experts believe the Fourth Industrial Revolution will call for critical-thinking skills as one of the top ten skills needed to succeed in the workplace.[3] Information literacy skills are critical-thinking skills, as these skills allow students to critically evaluate information they encounter and to understand how they will use it to solve problems.

One way librarians teach these skills is through online tutorials. Visit just about any library website, and you'll find a list of information literacy tutorials students can take at their own pace. However, the quality, look, and feel of these tutorials vary greatly. Some are simply text-based library guides, others are videos, and others are more interactive. Unfortunately, many tend to be content-focused, overly long, and lacking in engagement. This trend is a problem not just for librarians but for many instructional designers. Each year my university creates online tutorials for a number of mandated trainings on topics such as workplace harassment, cybersecurity, and the Family Educational Rights and Privacy Act. Each tutorial is built using the same software and follows the same design pattern of content (usually in the form of text), question, content, question, and so on, until you reach the final quiz, which must be passed in order to receive a certificate of completion. The tutorials are tedious, forgettable, and dreaded by everyone across campus. Unfortunately, most tutorials I have come across follow this basic pattern, and going through them feels more like punishment than training.

## Changing How We Design Instruction

Before starting any tutorial, an instructional designer needs an instructional design model to follow. An instructional design model is like a blueprint for a house. Yes, you can build a house without a blueprint, but chances are it will be unstable and soon fall apart. Designing a tutorial is both an art and a science. It is a science because instructional design models are grounded in pedagogical theories and cognitive science, but it is also an art because it calls for creativity. Adopting an instructional design model helps to ensure that your instruction or tutorial is effective, has clear objectives, and has relevant assessments; the model helps you to ask the right questions. In short, it helps you to create a product that is useful and usable. Which model you choose will depend on your own needs and resources, and no model is better than another. For years, the standard and most often used model of instructional design was the ADDIE model, which follows a linear approach of analysis, design, development, implementation, and evaluation. Traditionally, strict ADDIE followers advocate completing one phase before moving on to the next phase. The ADDIE model has some obvious benefits, including an in-depth analysis phase where the learning needs are clearly defined and detailed steps that should be completed before moving on to the next. However, it also has its drawbacks. Tutorial development is rarely a linear process. Rather, it is messy and cyclical. ADDIE is time- and resource-intensive; often, when creating

shorter tutorials, you don't need such a detailed process. Instead, today instructional designers and librarians need a more agile and streamlined approach. There are dozens of instructional design models. I have included two here that may be less well-known by librarians and that work well with the creation of shorter tutorials.

### SAM

SAM (Successive Approximation Model) was created by Dr. Michael Allen of Allen Interactions as a reaction to the inflexibility of ADDIE.[4] It is a rapid and iterative approach to e-learning design that emphasizes quick prototype development and feedback. The main phases of SAM are preparation, design, and development. The preparation phase starts with gathering information, including identifying key stakeholders, materials, learners, and any constraints. The next step is to create a rough prototype, perhaps a wireframe or even a paper wireframe. Once a prototype is created, feedback is gathered from stakeholders and the prototype is further worked on. From the prototype stage, we move on to the development stage, where the tutorial is fully implemented and can be evaluated further. Some of the obvious benefits of SAM are its flexibility (you can go back to any step at any point) and its quick prototype development. However, one drawback is a lack of an immediate and consistent understanding of the learner and their needs, wants, and experiences. Additionally, it can be time-consuming and resource-intensive.

### Design Thinking

In somewhat of a contrast to SAM, design thinking, a type of user-centered design, puts the user first and involves them throughout the process. It is not a traditional instructional design model, but it can be successfully used to create learning experiences, including tutorials. Unlike many instructional design models, design thinking stresses the importance of the learner and their experiences and feelings and not just the skills that need addressing. Design thinking is a nonlinear, iterative process with five phases:

1. *Empathize:* The first step is to get to know your learners in any way that you can. This can be done via focus groups, individual interviews, observations, surveys, and even reading about them. The idea here is to gain a thorough and empathetic understanding of where they struggle and what their biggest challenges are when using the library and conducting research.
2. *Define:* The next step is to define the problem that you believe needs tackling. Design thinking encourages you to bring in your own point of view as to what the real problem is. Here you need to succinctly define the problems students have with research. You can share your ideas in this step and get feedback from your students.
3. *Ideate:* The ideate phase is where you brainstorm solutions to the problems. Design thinking encourages you to come up with as many solutions as you can think of and to let your imagination take flight. This is not a time to limit your ideas because of a lack of resources, time, or budgets. At this stage you should share your ideas with students, get feedback, and adjust your ideas or even start over.
4. *Prototype:* In the prototyping stage, you create a rough skeleton of your idea and again get feedback. For an online tutorial, this may look like just a skeleton version of your tutorial with placeholders for images and other elements and with minimal content. This works really well with tutorials because you can get good feedback as to how something feels for the user and what they learned from the tutorial.
5. *Test:* The final step before full implementation is to test the tutorial with students and again get feedback from them. After testing you may need to make further adjustments before implementation, but if you have received feedback since the second step these adjustments should be minimal.

Design thinking does have its drawbacks. Mainly, it is time-consuming, and many of us will not have regular or repeated access to our students. However, you can and should adjust any model or process to fit your particular needs.

## Changing What We Teach

For years, librarians approached information literacy instruction as teaching a set of discrete skills students needed to learn and practice in order to master them and become information-literate. There was also an emphasis on teaching how to use specific databases and on visiting classes for one-shot library sessions. The Association of College and Research Libraries' (ACRL) *Information Literacy Competency Standards for Higher Education*, which were widely used by librarians, stress the building of lower-order and higher-order thinking skills.[5] In contrast, ACRL's newer *Framework for Information Literacy for Higher Education* stresses the understanding of concepts and critical-thinking skills.[6] It also places greater emphasis on a more critical approach to information literacy that asks learners to consider authority, power, and privilege. Additionally, as learners and the tools they use (databases, Google) become more sophisticated and accurate, teaching skills such as evaluating sources

with checklists like the CRAAP test (explained below) and formatting citations has become irrelevant. Following are some examples of how the content we teach in tutorials is changing.

### Evaluating Sources

Evaluating sources of information is a common lesson librarians regularly teach online and in person. One popular method is the CRAAP (Currency, Relevance, Authority, Accuracy, and Purpose) test.[7] Learners answer questions about the information source and then decide how reliable the source is. Although the CRAAP test does have its merits, it just doesn't work anymore. As Jennifer Fielding writes, with online sources, including those that disseminate misinformation, "becom[ing] increasingly sophisticated and prolific, . . . restricting analysis to a single website's content without understanding how that site relates to a wider scope now has the potential to facilitate the acceptance of misinformation as fact."[8] In contrast, lateral reading takes into account several websites and focuses on what others are saying about a particular source or author. Lateral reading is a "strategy for investigating who's behind an unfamiliar online source by leaving the web page and opening a new browser tab to see what trusted websites say about the unknown source."[9] Researchers at Stanford found that fact-checkers often use lateral reading strategies to successfully verify sources.[10] Similarly, students can use these strategies to better determine how reliable a source is.

### Citations

One of the first tutorials I created showed students how to correctly cite different types of sources in APA and MLA styles. The students were shown a citation in the correct format and then an incorrect one that they needed to correct by moving around the different citation elements. At that time many databases and other searching tools did not have a Cite button, and sites like EasyBib were not popular with students. Today, students will rarely need to construct citations by hand, but still instructors and librarians insist on teaching them this skill. Instead, as the *Framework* suggests, we should create tutorials where students learn why citing is important, why organizations follow different styles, and why all information should be properly attributed.

### Sources

Many instructors require students to use only peer-reviewed material in their papers, and peer-reviewed articles remain the gold standard. However, allowing only peer-reviewed papers "means devaluing other means of knowledge communication . . . [and] we need to recognize that there are other kinds of items other than research or journal articles that are valid."[11] Most library tutorials include a discussion of the types of sources students may encounter, but these rarely go beyond the differences between traditional popular and scholarly sources. Our tutorials should teach students why and how certain voices are left out of the research and where to find those voices.

### Searching

Many tutorials that focus on teaching how to search emphasize the idea of creating the perfect search string with the right keywords and Boolean operators. Although this is a useful skill for learners to acquire, students are used to Google and getting what they need with little effort. The latest searching tutorial I created stressed that there is no perfect search and that students can learn from each unsuccessful search.

### Open Educational Resources

Open educational resources mean librarians have a plethora of information literacy tutorials, assignments, and readings readily available. For example, Community of Online Research Assignments, known as CORA, provides users with a searchable database of information literacy assignments aligned to the ACRL *Framework*. Assignments can be adopted as is or adapted for a particular need. CORA also includes several assignments that aim to teach social justice and critical information literacy.

*CORA*
https://www.projectcora.org/

## Changing How We Teach

### Mobile

Although a trend for years, mobile learning is becoming students' go-to method for accessing all types of information, including tutorials. As a result, our tutorials need to be not just mobile-friendly but mobile-first. Mobile-first means your tutorial is designed with the expectation that students will access it on a mobile device. Every design choice and on-screen element is developed for mobile devices. If something does not work well on a mobile device, it should not be included.

### Train the Trainer

With dwindling resources, budget cuts, a move away from one-shot sessions, and fewer subject specialists, it has become difficult to reach all students who need

instruction. As an alternative, we can develop tutorials and online classes that show faculty how they can integrate information literacy skills throughout their courses. Our library recently developed a self-paced course for faculty via the university's course management system. Conceived by librarian Nicole Pagowsky, the course ran over five days and covered topics including library anxiety in students, teaching information literacy skills, and inclusive information literacy. The course was well attended and exceeded our enrollment expectations.

### Micro-credentialing

Some libraries, such as Penn State and SUNY Albany, have developed extensive badging systems for students to demonstrate their mastery of information literacy skills, but this approach is still not mainstream. Micro-credentialing offers students a personalized and flexible way to learn that is more performance-based and not based on seat time.[12] One reason why badges have not become more mainstream is the time and resources it takes to develop them and for students to earn them. Penn State offers ten information literacy badges that are organized into three tracks. Each badge takes between forty-five minutes and an hour to complete.[13] Many learning management systems, such as D2L Brightspace, offer more simplified badges that are easy to create. At the University of Arizona Libraries, we have created a series of badges students receive automatically once they complete a short tutorial. Since several instructors may require students to complete the same set of tutorials, students can show their instructors their badges so they don't have to repeat the content.

### Flipped Classroom

Tutorials can go only so far, and they work best when they are integrated into the curriculum, required, and discussed again in the class. Flipped learning saves time and is more personalized. Instead of teaching students in class how to use a database, develop a tutorial on how to use it. Then, in the classroom students can practice using the database and ask questions specific to their needs. If you have a series of tutorials, you can have students choose a tutorial to complete on their own. Then, in the classroom, place them in groups based on which tutorial they completed and ask them to share three things they learned. This way students learn the skills covered in the tutorials without having to complete each one.

### Adaptive Learning

Adaptive learning uses computer algorithms to tailor the instruction to an individual learner. The content that one student gets is different from what another gets. Many online tests, such as the Test of English as a Foreign Language, are adaptive and adjust subsequent questions depending on the user's performance. Our students come to us with varied levels of information literacy, and a single tutorial will not meet all their needs. Tools like Storyline and Captivate use branching technology to guide students down different paths. Students can start off answering a set of diagnostic questions and then be placed in an appropriate level in the tutorial. With advances in AI technology, adaptive learning will become more sophisticated and more individualized and will be able to adjust the learning depending on how long it takes to answer a question, movements made on the screen, and even a student's mood.

*Storyline 360*
https://articulate.com/360/storyline/

*Adobe Captivate*
https://www.adobe.com/products/captivate.html

### Gamification

Gamification is the application of game design elements to non-game applications or situations and can be highly motivating. Language learning apps such as Duolingo include many gaming elements to help users engage with them on a daily basis. Gaming elements like points, levels, characters, a story arc, and challenges are easy to build into any tutorial.

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Chapter 2

# A Case for Microlearning

When I first started creating online learning tutorials about fifteen years ago, we tried to pack everything that we taught in a one-shot class session into one or two tutorials. These tutorials could take anywhere between thirty minutes and an hour to complete. We really had no idea if the tutorials were effective or not, but looking back, the tutorials were aligned with what we knew about how students learned online, which wasn't all that much. Today we know that adult students learn better when presented with shorter bits of information, especially when that content is delivered online.[1] Contrary to popular belief, this is not due to students' shortened attention spans, but rather because it is more aligned with how they consume any type of new information, such as online TED lectures, YouTube videos, or text-based web pages.[2] Shorter bits of learning are also better aligned with andragogical learning theories, which stress the importance of presenting students with information that is immediately applicable and relevant to their coursework and lives. Thus our learners are not telling us, "I am bored and can't concentrate," but rather, "Don't waste my time with information I don't need." Adult learners also want self-paced and self-directed learning. They want to decide what they want to learn, when, and in what order. This is where microlearning comes in.

Although around since the 1960s, microlearning has been growing in popularity over the past ten years or so. Today, it is being used a lot more in corporate training and is starting to become more popular in higher education, including in academic libraries and in information literacy instruction. There really is no set definition of microlearning. I have seen a lot of definitions in the literature, but I think this definition attributed to Hug and Friesen in a report on microlearning from Grovo captures what microlearning is: "Microlearning is generally characterized by low time commitment, small chunks, short effort, and narrow topics, but it is complex as a whole."[3] With this definition in mind, let's consider an example. Most zoos have an informational sign that offers some information about the animal, its habitat, its diet, and so on next to each animal exhibit. Are these signs an example of microlearning? It certainly meets some of the criteria—low time commitment, small chunks of information, doesn't take a lot of effort to access or complete, and introduces only a few narrow topics, but is it complex as a whole? The answer is no because microlearning is more than just a snippet of text.

A microlearning activity should consist of an entire lesson: content, guided learning, practice, and feedback or reflection. It should also be easy to access and learn. Students should not come across barriers in order to access the content, so they should already be familiar with the delivery mechanism or it should be easily accessible and navigable. This is in contrast to a macrolearning course like one offered via a course management system where students may need to learn how to use several different parts of the system before they can get started with the content. Microlearning is intended to be remembered immediately, as it is just a small bit of information and is intended to have immediate application. Macrolearning may be forgotten, as it may not be used for months down the road. Microlearning can consist of individual parts to cover more topics, but those individual parts must be independent of each other. In contrast, macrolearning often uses textbooks with chapters and content that build upon each other. Finally, there is no consensus among educators as to just how short a microlearning lesson should be, but under ten minutes should be a rule. Others advocate for less time and have found that, independent of content, students began to lose interest in videos after six minutes.[4]

The benefits of microlearning include both better engagement and better learning. Most of us dread mandatory e-learning trainings for two major reasons: they tend to be boring and too long. Students approach online tutorials, especially those that they are not

required to take, in the same way: dread and boredom. Students often do not have the time to complete a long tutorial, but they do have the time to complete a tutorial that takes less than ten minutes. All types of online learning courses and tutorials that are not mandatory have notoriously low completion rates.[5] Reich found that for MOOCs, across subject matter, between 2 and 10 percent of learners complete a course.[6] One reason why is the sheer amount of time it takes to complete such a course. Microlearning courses, however, have been found to have 75 to 100 percent completion rates.[7] Since microlearning tutorials address only a few outcomes and are quick to complete, students can easily access the tutorial again if they need to. There is also a lower cognitive load; working memory can hold only a certain amount of information, and we forget about 70 percent of what we learn within twenty-four hours.[8] Shorter means learners have less information to retain and later recall. Shorter also means greater motivation. Our learners are busy. They see a short tutorial that will take them about five minutes and they think, "OK, I can do that." A long tutorial will have the opposite reaction. Finally, short tutorials are also easier to create and later edit, so this can save us time and resources.

Of course microlearning is not for everyone nor for all subjects. It can be fragmented, and we want our students to gain a lot more than just a few skills here and there. Information literacy skills are long-term goals that need revisiting, reinforcement, and repeated application, and these skills need to build on one another, so microlearning is not ideal for teaching complex concepts. Thus, while microlearning will work if the goal is to teach conversational Spanish, it might not work all that well for teaching Spanish literature. In terms of information literacy skills, microlearning works well when teaching discrete skills, like creating search strategies, but won't work so well with concepts such as critical information literacy.

## Designing Microlearning Tutorials

### Backward Design

Often when designing a learning activity, we start with the content and lay out how we are going to teach it—that is, this concept will come first, then we will work on this, followed by this topic. Then we may design some activities for learners to do and end with how we may assess students' learning. This process leads to a flat learning experience that is content-focused and not student-focused. Backward, as the name suggests, starts at the end. It starts with learning goals and thinking about what you would like your students to be able to do after completing a tutorial or other learning intervention. I like to start my tutorial design by writing three types of goals: cognitive, behavioral, and affective. I am interested not only in what my learners should know but also in what they should be able to do and how their feelings or attitudes might change. For example, a tutorial on evaluating online resources may have the following goals:

After completing the tutorial students will

- explain what lateral reading is
- evaluate an online source for credibility
- feel confident in their ability to judge a source for credibility

The next step in backward design is to create an assessment that can measure these outcomes. Only then should a tutorial be designed for content, sequencing, and activities. A backward design approach also helps with creating more engaging tutorials because it forces you to put the content on the back burner and the learner's experience first.

### The ABCs of Outcomes

There are three words (there are probably more, but these will suffice) you should never use when writing learning outcomes: *know*, *learn*, *understand*. Why? Because learning outcomes should be specific, observable, and measurable. Although you could write specific learning outcomes with any of these words (something along the lines of "Learners will know how to request a book via the library's loan service."), it is not possible to observe or measure what learners *know* or what they have *learned*. Immediately after writing an outcome, you should have a good idea of how you could measure the extent to which the learner achieved that outcome. Let's take this same outcome but write it with an action verb: "Learners will explain the steps in requesting a book via the library's loan system." Here, the assessment almost writes itself: the student will list the steps needed to complete a book request using the library's interlibrary loan system. There are thousands of online resources that list action verbs aligned to Bloom's taxonomy.

Outcomes are a first step to creating any type of lesson or tutorial, and just about any course in teaching will point out the importance of learning outcomes and making sure learners are aware of them. Letting students know what the learning outcomes are ahead of an instructional session has a myriad of benefits, including an increase in engagement and motivation, more focused attention, more self-directed learning, and quicker mastery of skills.[9] However, learning outcomes should never be listed at the beginning of any microlearning tutorial. Most teachers don't stand up in front of a class and read aloud each learning outcome they wrote for that day's lesson. This would be a very effective way of boring students. However, almost

**Table 2.1.** Sample tutorial instructions

| Original Directions | Revised Directions |
|---|---|
| dataZoa has many helpful features including custom charts. You will probably need to customize your chart with different types of labels. Customizing your chart is not difficult, but it will take a few steps to learn. Let's learn how to customize the chart you have created. You can change the labels for the chart data.<br><br>Go to the Series Settings tab in the chart window. Choose the "Real Personal Consumption Expenditures: Education" series from the Which Series drop-down menu.<br><br>Look for the Label box toward the middle of the screen. Change it to "Education." Click outside the Label box, and you'll see that the legend under the table shows the blue line is now just "Education."<br><br>Change the Which Series drop-down menu to "Real personal consumption expenditures: Clothing, footwear, and related services" data (the red line), and change the Label to "Clothing, footwear, and related services." | **Customizing Your Chart**<br><br>Let's learn how to customize the chart you created.<br><br>**Your Turn**<br><br>• In the **Series Settings** tab, choose "Real Personal Consumption Expenditures: Education" from the **Which Series** drop-down menu.<br>• Change the **Label** box toward the middle of the screen to **Education**.<br>• Change the **Which Series** drop-down menu to "Real personal consumption expenditures: Clothing, footwear, and related services."<br>• Change the **Label** to "Clothing, footwear, and related services." |

all information literacy tutorials I have come across start with a long set of learning outcomes. Learning outcomes, especially when designing microlearning tutorials, are for us as teachers and designers, not for our students. We have a very limited amount of time with students, and we don't want to waste that time with a list of outcomes that are often ignored. Yes, we must orient our students to the learning, but this can be done via descriptive titles, section or chapter headings, or one sentence that is part of the narration. Again, this is more aligned with how students learn today. Many YouTube video tutorials start with, "Hi, today we are going to learn about . . ." and not a list of outcomes.

## Cutting Out the Fluff

A microlearning tutorial should include only essential information, which means cutting out the fluff. The fluff is anything that is not directly aligned to the learning outcome. Some of the most popular videos on YouTube are how-to tutorials. Usually these tutorials start off with an introduction to the channel, the YouTuber, a request for a Like, and an introduction to what we are going to learn that day. This usually takes up over half the video, and more often than not, the viewer fast-forwards through it and ignores it. If we need to figure out how to use a new feature on our phone, we do not need to know how much a particular phone cost, where it was purchased, when it was purchased, how long the person has had it, and so on. Cutting out the fluff means eliminating all this extra information that might be good to know but is not needed to achieve the learning outcome.

## Limiting Text

As an instructional designer for our library, I often create tutorials based on content developed by librarians, and the first thing I do each time is cut and rewrite text. Librarians, in their quest to be as helpful as possible, often write unnecessarily complicated and long text passages, and this goes against how users consume digital text. I have come across several studies that show that users rarely spend all that much time reading text on a screen. One study by the Nielsen Norman Group found that users read anywhere from 20 to 28 percent of the words on a screen.[10] Knowing this and knowing we have a limited amount of time with our learners, we need to cut out any text that is not directly related to our learning outcomes, and we want to make our text easier to skim and scan. The easiest way to do this is to use headings, bold lettering, and bullet points. Table 2.1 shows two examples of a set of directions that was created for a tutorial. In the example on the right, I eliminated any unnecessary text, added a heading, broke up text into chunks, and added bold letters and bullets. In the revised example, a learner can easily skim and scan the page and follow the directions more easily.

## Comprehension Checks

Remember, an effective microlearning tutorial is not simply a video. Rather, it is an entire lesson with an assessment component. Comprehension checks throughout a tutorial allow the user to receive immediate feedback on their progress. Multiple-choice and reflection items are two common and easy ways to allow students to check their comprehension and receive feedback. In my book on creating online information literacy courses, I include several guidelines for writing effective multiple-choice items that can be easily aligned to different levels of Bloom's taxonomy.[11] Among the most important of these are creating effective prompts that don't confuse the student and writing distractors that are plausible and challenging for the student in order to truly gauge student

learning. Before writing a multiple-choice question, I strongly suggest taking a look at these easy-to-follow guidelines. Often used to check simple recall, multiple-choice items can also be used to test higher-order thinking skills such as analyzing and evaluating. For example, in a tutorial on using sources, a common question may be to ask learners to recall the definition of plagiarism. A higher-order thinking skill question would have students read a short passage followed by some rewrites of that passage and an analysis of which may be plagiarized.

Reflection questions build engagement and motivation by allowing students to assess their own learning, understand themselves better as learners, and come up with solutions on their own.[12] As with multiple-choice items, reflection questions can be used throughout a tutorial, including before learning begins to help activate learners' prior knowledge. Reflection questions should be concise and address one specific learning outcome. They should also be based on the learner's experience, and they should challenge the learner so that they need to pause and think about the question. To use at the beginning of a tutorial, write questions that ask students to recall and reflect on a time when they used a similar set of skills as those that are about to be taught. For summative reflection questions, I like to have students reflect on what they feel was the most important thing they learned and why, or I have them reflect on three things they learned. Most e-learning tools allow you to give answer-level feedback, and this feedback should be meaningful. Meaningful feedback means a thorough explanation of why a particular answer was incorrect. Students should be allowed and encouraged to try answering a question again if they get it wrong. Feedback should also have a friendly tone. Instead of using "correct" or "incorrect," we often use "oops," "not quite," or "almost." Reflection questions should also include feedback, even if the feedback is a canned reply or something along the lines of "Thanks for your answer."

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Chapter 3

# Designing for All

## Accessibility 101

You'll find that almost every e-learning platform is 508-compliant, meaning that it is accessible and meets 508 guidelines. Essentially, Section 508 of the Rehabilitation Act states that any institution receiving federal funding, including schools and universities, must provide disabled users "access to information comparable to the access available to others."[1] Two notes of caution here. First, although a tool may be accessible, many of its features may not be. Often interactivity options like drag and drops are not compliant; neither are videos that don't have captioning. Additionally, to make a tutorial accessible using most e-learning tools will require additional development. Articulate Storyline is 508-complaint, but you must individually add accessibility information to any element on the screen that conveys information. As a best practice, you should integrate this additional work into your workflow, and not treat it as something to add later in the development process. Second, these guidelines are the *minimum* that you should use in any tutorial. The Web Content Accessibility Guidelines (WCAG) are stricter than the 508 guidelines. For example, Section 508 and WCAG both call for captioning of audio content, but WCAG also calls for audio controls like the ability to stop, pause, and adjust the volume of audio.[2] For a complete list of WCAG guidelines, see the General Services Administration's "Guide to Accessible Web Design and Development." Many of these guidelines may not be relevant to tutorials, so I have included here the most useful accessibility tips for tutorial development.

*Guide to Accessible Web Design and Development*
https://www.section508.gov/content/guide-accessible-web-design-development/

### Text Alternatives

Some users may use a keyboard or a screen reader like JAWS to go through your tutorials. As a result, you must include text alternatives for any elements on the screen that need to be read by the screen reader. We are pretty familiar with alt tags for images but may not be so familiar with alt tags for buttons, multiple-choice questions, and boxes. Any element on the screen that is not purely decorative must have a tag that can be read by a screen reader.

### Video

Videos should have both closed-captioning and a video transcript. Including a transcript not only allows for the use of screen readers but also allows the learner to go at their own pace and choose how they would like to access the content. There are a number of free and paid captioning services. However, the free ones, like YouTube, tend to lack accuracy. Rev, a paid service that costs $1.50 per minute, claims to have a 99 percent accuracy rate.[3] As a best practice, add captioning only when you are certain you will not be making any additional changes to the video. Learners should also be able to control the video and adjust the volume. Additionally, a video with sound should not start automatically, but rather the learner should choose when to start the video.

*Rev*
https://www.rev.com/

### Tab Order and Focus

Users with visual impairments and those with motor skills disabilities may not be able to use a mouse or trackpad. Instead they use the tab key or space bar

to move through a tutorial. The tab key will read any elements on the screen that have an alt tag. However, as part of the development process, you must decide in which order the tags will be read and also which elements do not need tags and will be ignored. Similarly, you will need to decide what to do about interactive options that cannot be used with a tab key or space bar, such as drag and drops, slides, and matching questions. You should either avoid these features or include an equivalent alternative.

### Tables

Tables are a great way of organizing and presenting content. However, they are not automatically accessible. Individuals using screen readers do not automatically know that a table is present. To make tables accessible, you will need to add a description for the table, headers for rows and columns, and HTML markups for individual cells.

### Color

Designing for all means designing for a spectrum of vision disabilities from individuals with low vision to those with color blindness. Some color combinations may look good together from a design standpoint but may be difficult to see. Black and white has the highest contrast, but from a design point of view that combination is rather boring. The WCAG provides standards for minimum text and background contrast and ratings from AAA to Fail.[4] For normal size text, you want to achieve an AA rating. You can easily check the contrast ratio of your text with the WebAIM Contrast Checker. On the topic of color, you don't want color to be the only way that you communicate information. For example, if you have two buttons, a green one for Yes and a red one for No, you should also include the words *Yes* and *No*. In addition to words, you can also give the two buttons different shapes to further communicate information.

*WebAIM Contrast Checker*
https://webaim.org/resources/contrastchecker/

## Universal Design: Going beyond Accessibility

Universal design differs from accessibility in that it is broader and not aimed solely for individuals with disabilities but rather for *all* individuals. Originally created by architect Ron Mace, universal design is "the concept of designing all products and the built environment to be aesthetic and usable to the greatest extent possible by everyone, regardless of their age, ability, or status in life."[5]

The seven principles of universal design are

1. Equitable Use
2. Flexibility in Use
3. Simple and Intuitive Use
4. Perceptible Information
5. Tolerance for Error
6. Low Physical Effort
7. Size and Space for Approach and Use[6]

Some examples of designs that incorporate these principles are sidewalk curb cuts, doors that open automatically, scissors that can be easily used by right- and left-handed individuals, adjustable desks, and Ikea assembly instructions. So how is this all related to creating tutorials? Related to universal design and based on the science of how people learn, Universal Design for Learning (UDL) focuses on minimizing barriers to learning for *all* learners.[7] Learners come to us with diverse motivations, diverse educational preparedness, and diverse linguistic and cultural backgrounds. The UDL guidelines provide educators with a means for meeting the needs of all learners in the same educational situation. The UDL principles are

1. Provide multiple means of engagement [how students interact with teacher, the content, and other students]
2. Provide multiple means of representation [how learning materials are delivered to the learners]
3. Provide multiple means of action and expression [how students show they achieved the learning outcome][8]

Let's take a closer look at how these principles can be used in the design of a tutorial.

1. *Multiple means of engagement:* Like the library guides and websites we create, our information literacy tutorials are accessed by users with many different motivations and often, in the case of tutorials, little intrinsic motivation. To better motivate and engage students, allow students to choose from a number of different topics and levels. For example, a tutorial on keywords and searching can be taught in the context of any research topic. Having the student choose the topic that interests them most will lead to more motivation to complete a tutorial.
2. *Multiple means of representation:* In addition to building engagement so that learners finish a tutorial, this principle focuses on effectiveness of tutorials. Although the theory of learning styles has been shown to be little more than a myth,

learners may have preferences for how they wish to consume content.[9] Additionally, not all students will have access to the same technology or have the same technology skills. If using video or any type of interactivity in a tutorial, you will also want to include a text and images version or even a plain text version.

3. *Multiple means of action and expression:* Ideally this principle means students have the option to show what they have learned with and without the use of technology. For example, some learners may create a presentation with slides, others may want to write a paper, and others may want to give an oral presentation. With online tutorials, learners are limited by the tool the tutorial is created in. However, learners should be given the option to choose how they will be assessed. Many tools allow for a number of different interactive options and question forms, including text response boxes, multiple-choice questions, hot spots, and matching. Some learners may also prefer interacting with other students. Tools like Padlet allow users to see what others have written on a topic and add their own content in the form of virtual sticky notes.

*Padlet*
https://padlet.com/

## Making It Even More Universal

Bad navigation can render an otherwise great tutorial almost useless. Navigation should be intuitive, and the learner should not have to think about how they will move through a tutorial, answer a question, or exit the tutorial. They should readily know which parts of a tutorial are interactive, which text is hyperlinked, and what will happen when they click a particular element. Learners should always have a way to move back and forth through a tutorial and return to the beginning. Not allowing the learner to move back and forth can lead to decreased motivation. However, some learners may move through content too quickly and skip vital information. If possible, allow more advanced learners to move more freely through a tutorial while restricting the movements of novice learners. A common navigation issue is double navigation, where there are two different ways to move through a tutorial, such as a menu and an arrow, which can confuse learners. Any double navigation should be removed. If your tutorial is visually complex and includes some type of game that needs instructions, learners should be given the option to skip through the instructions. You should also include a Help or a Hint button where users can get extra help if needed. Again, as much as possible we want to avoid boring and frustrating the learner. If your course has several different parts that users must complete, include a road map or path so they can see what they have completed and what lies ahead.

Culturally inclusive teaching "is an approach to teaching that incorporates attributes and characteristics of, as well as knowledge from, students' cultural background into instructional strategies and course content to improve their academic achievement."[10] As librarians, we teach *all* students from traditional freshmen to first-generation immigrants to foreign graduate students. Additionally we build our tutorials without ever having met our learners. This makes it much harder to design tutorials that reflect who our students are, but it is possible to create tutorials that are more inclusive. Having created tutorials for students from across the globe, I have come up with the following best practices:

- Avoid any slang, lingo, or jargon, especially library jargon.
- Avoid references to popular culture, current events, US history, and other topics that are overly US-centric.
- If you are using images or characters, make sure they are racially, ethnically, and religiously diverse and represent different sexual orientations and gender identities.
- Avoid images that show stereotypical roles of women and men.
- Do not use topics that could be considered taboo in other cultures.
- Avoid topics that could cause stress based on past trauma.

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Chapter 4

# Getting Feedback

## Usability

For years, my library would create tutorials with the assumption that learners were completing the tutorials as designed, that they did not experience any problems, and that they were thoroughly understanding and grasping the content. We later implemented usability testing and found that our assumptions were entirely incorrect. We found that students were confused with most of the navigation, missed important directions and content, took twice the amount of time to complete a tutorial as we had expected, and did not fully learn what we thought they were learning. Most importantly, we learned that we should never create tutorials without conducting usability tests.

There are several definitions of usability, but the simplest and most straightforward is a "quality attribute that assesses how easy user interfaces are to use."[1] Usability testing, which is task-based in nature, should not be confused with testing for performance (Did the learner actually learn something?) or satisfaction (What did the learner think of the tutorial?). Yes, we are concerned with these aspects, but usability testing for e-learning helps to eliminate barriers that may impede learning. Along with irrelevant content and overly lengthy tutorials, "poor design and usability of e-learning applications" are two leading contributors to low tutorial completion rates.[2] In addition to helping you discover interface and navigation issues with your tutorials, usability testing can also help you learn about your learners' preferences and get suggestions from them on improvements. You can also learn a lot about design from usability testing and then later build these design elements into future tutorials. Because of the many benefits of usability testing, it should be built into your tutorial design and development process, and not treated as an afterthought.

To conduct effective usability testing, you don't need sophisticated tools or expensive software. Nor do you need a dedicated space or a lot of participants. Guerrilla usability testing is a quick and low-cost way of getting feedback from users. It can be done in any public place, including heavily trafficked areas like the library lobby. It is defined as "a low-cost, lean, and agile method of collecting data for testing and validating a hypothesis in a short session focused on specific tasks."[3] Many UX practitioners believe you need only five users to discover the majority of interface problems, but others argue that more are needed. Spillers, for example, advises having from eight to twenty users depending on the number of iterations.[4] In our usability testing, we found that five users did not suffice and that different user segments (second language learners, nontraditional students) had different difficulties with the interface and the wording than did traditional freshman students. Although it is not always possible, you should aim to recruit users who are representative of your student population. Although usability testing is often conducted only with a finished product, you should conduct it throughout the development process. Here wireframes can help. Wireframes are simplified versions of your tutorial, and they can be digital or analog. Analog versions, known as paper wireframes, are sketches of your tutorial with all the navigation elements. Users complete tasks by pointing to different elements on the screen. Wireframes should not include any colors, only black and white, or any images and styling elements but should include all content and all navigation. Using wireframes allows you to gain a better understanding of how the user will experience the tutorial because they are not focused on how the tutorial looks.

Here are some tips for conducting usability and testing on tutorials:

- If possible, recruit students from across campus and not just the library. This way you are not introducing bias into your testing by speaking only with library users.
- Don't go it alone. Have at least two people conduct the testing: one person gives directions while the other observes and takes notes.

- Introduce yourself to the user, explain the tasks, and explain everyone's roles. Make sure to emphasize that you are testing the tutorial and not judging the user.
- Encourage users to think aloud as they complete tasks. However, do not require it, as some users do not feel comfortable thinking aloud.
- Let the user know that they can quit at any time, and let them know how long the testing will take.
- Ask and record any demographic information that is relevant to the testing. Gender identity is likely not relevant, but major can be. Because you are not conducting human subjects research nor gathering any personally identifiable information, usability testing does not require institutional review board approval.
- Remain objective and do not offer help with any task. It is your job to observe and take notes.
- Keep it short. This type of testing should take minutes, not hours, to complete. Aim for less than ten minutes.
- Even though testing takes a short amount of time, it is free labor and users should be compensated in some way. Gift cards are best, but healthy snacks can help too.
- Test for tutorial tasks such as
  - Can the learner start the tutorial?
  - Do they know where to get help?
  - Can they exit the tutorial?
  - Can they easily move through the tutorial?
  - Do they understand what they will learn in the tutorial?
  - Do they know how to answer question types?
  - Do they understand what is being asked in a question?
  - Can they easily adjust the volume if there is audio?
  - Do they know how to use all buttons and other elements on the screen?
- Set time limits for tasks. If you notice a student struggling with a particular question, move on to the next task or question.
- After completing the testing, thank the student for their time. Ask learners for feedback about areas they struggled with and suggestions for improvement. Often our learners know what will work best. Also, make sure to answer any questions the user may have.
- It is rare to have such one-on-one time with our learners, so make the most of this time and ask them a question or two on the content, usefulness, or their satisfaction with the tutorial.
- Make sure you use the feedback from the testing to make changes to your tutorial.
- If needed and you have the time and resources, repeat with the new changes.

## Satisfaction Surveys

In addition to usability, surveys are another way to get feedback about tutorials from learners. Surveys can provide you with a greater understanding of what your learners think of your tutorials and what they feel they learned from them. Most often, a survey is our only opportunity to get feedback from our learners. However, since surveys and feedback forms are not required, learners often skip them, but there are several ways to ensure greater motivation to complete them. The following tips can be applied to different types of surveys but are focused on satisfaction type surveys.

- First, keep surveys short. Nobody wants to complete a long survey. Aim for a survey that will take only a few minutes to complete. For many of our tutorials, we include only one to three questions.
- To keep surveys short, avoid asking demographic questions. It may be interesting to know how different learner segments feel about tutorials, but if it is not necessary, do not ask for demographic information. If you do ask for demographic information, make sure it is inclusive in terms of race, gender, and ethnicity.
- You should be able to articulate the aim of your survey in one succinct sentence: for example, "I want to know if learners found the tutorial helpful," or "I want to know if learners enjoyed the tutorial."
- Use simple question forms. You don't want the learner to think too much about how to answer a question. Rather you want them to reflect on their experience and opinion.
- Don't feel the need to use different question types in order to not bore the user or to mix things up. Use the best question format for each question.
- When using multiple-choice questions, include an Other option with a free response text box. It is likely that you have not exhausted all options.
- For Likert scale questions, use a five-point scale. A three-point scale will not provide you with sufficient information.
- If asking a question about frequency, use specific time periods and not terms that may be unclear, such as "regularly." Instead use terms such as "weekly" and "monthly."
- Avoid any library jargon, slang, and any other terms your learners may not be familiar with.
- If asking potentially sensitive questions like age and income, use a range and not a specific number.
- Pilot your survey with different user groups before publishing it. What is clear and straightforward to you may not be to others.
- If your survey is more lengthy, in order to increase

motivation to complete it, compensate users with a monetary incentive such as a gift card.
- Use skip logic so that users can skip questions that are not relevant to them or that they don't feel comfortable answering.
- Avoid leading questions. Leading questions are written so that users are forced to answer in a certain way. For example, the question "How much do you enjoy the tutorial?" implies the user enjoyed the tutorial. "Rate your experience using the tutorial" is more neutral.
- Use at least one open-ended question. Although more taxing on the user to answer, open-ended questions allow you to gain additional insights into the user's experience.
- Use the responses from the survey to make changes in your tutorials.

## Notes


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Chapter 5

# All You Need Is a Few Good Tools

Many information literacy tutorials you find online are created in LibGuides. LibGuides are used to "curate knowledge and share information, organize class and subject specific resources, and to create and manage websites."[1] They are not intended to be used to create tutorials as they don't have the pedagogical features needed to create effective and engaging learning experiences. There are hundreds of online sources that list and review the latest and most popular e-learning tools. Here I have included those that librarians will find most helpful in teaching information literacy skills via online tutorials. One thing to remember when choosing a tool is that no one tool can do it all, and depending on your content and your learning objectives, you will most likely need more than one.

## Arist

Arist is the newest e-learning tool described in this chapter and is by far the most mobile-friendly. Arist is an e-learning platform tool that allows you to develop content delivered via text messages. In addition to text messages over phones, content can also be delivered via What's App, Teams, and Slack. Arist is easy to use and has almost no learning curve. Content types include text, images, and questions. There are three types of questions: multiple-choice, open-ended, and one-word answer, and question feedback can be customized at the answer level. A typical course will consist of some text followed by a question. The learner replies to the text message with their own message and receives a reply back with feedback followed by more snippets of new content. The content is organized around days, and a typical course takes about five to seven days to complete. A learner has twenty-four hours to complete a day's content, including answering all the questions. Once a learner completes a course, you are able to look at several analytics, including number of completions and answer accuracy, and you can also see each learner's response to a question. Arist has a lot of potential, especially for reaching learners whose only access to technology is via a cell phone. My library recently used Arist to create a six-day course on using primary resources. Preliminary survey data indicates that learners were overwhelmingly satisfied with the text message–based course. Arist is on the pricey side and charges anywhere between $1.00 to $5.00 per learner, but the company will work with customers, especially educational institutions and libraries, on pricing. Arist also offers a free version with limited features and a limit of fifty learners. Arist is best used to teach more conceptual aspects of information literacy. It will not work well with development of skills that need practice, as students will need to toggle back and forth between the course and website or application, which can lead to extraneous cognitive overload.

*Arist*
https://www.arist.co/

## Sidecar Learning

Sidecar Learning is a web-based application that employs the side-by-side method to teach students how to use databases and other online resources. When the student opens a tutorial, two windows automatically open side by side. The narrower window contains directions, while the other larger window contains the database or website. Learners are given directions as they interact with the live website or database. Learners can also answer different question types, including multiple-choice and short-answer, and are provided with customized feedback. Upon completion of a tutorial, the learner receives a certificate of completion.

Sidecar Learning was developed by two University of Arizona Library librarians after the well-known Guide on the Side software program lost support and funding. Sidecar is 508-compliant and can be used with any database or website. One unique feature of Sidecar Learning is the automatic setup of the windows. The user does not need to adjust the windows, and no window disappears behind another window. Sidecar Learning has different plans that range from $99 to $399 per year per creator/license. The $99 plan allows a maximum of three tutorials, while the $399 plan allows unlimited tutorials. There is also a free thirty-day trial. Sidecar Learning also offers custom pricing for larger organizations. Sidecar Learning works best with the development of information literacy skills and teaching how to use a website, use a database, and fill out a complicated form. It should be noted that the author, Yvonne Mery, is co-owner of Sidecar Learning.

*Sidecar Learning*
https://www.sidecarlearning.com/

## LibWizard

Like Sidecar Learning, LibWizard is specifically aimed at libraries and uses a similar side-by-side method. Learners work with two side-by-side windows, one with textual information and the other with the content (website, database, catalog, and more). In addition to text, you can also include images, PDFs, widgets, and many different question types with customized feedback. In addition to side-by-side tutorials, LibWizard also allows you to create forms, surveys, and quizzes and includes advanced reporting and analytics. LibWizard is a product of Springshare, which also makes LibGuides and LibAnswers. LibWizard does not provide any pricing information on its website, but it does offer a free trial. LibWizard works best for developing information skills and database skills and for quizzing and getting feedback from students.

*LibWizard*
https://springshare.com/libwizard/

## Articulate

Articulate has several popular products including Rise and Storyline. With Rise you can create sleek web pages (Articulate calls these pages courses). They are courses as opposed to static web pages because you can easily add interactive options and quizzes. Content is presented modularly, and users can easily move through the different modules. You can also restrict movement between modules until the learner completes a task or answers a question. Content is primarily presented via text and images. Storyline is more customizable than Rise and includes more interactivity and many more question types. Storyline can also be used to create screencasts, animations, and simulations. Both Storyline and Rise are mobile-friendly, and content automatically adjusts to any screen, and both have course/learner management system integration. Rise 360, which includes Storyline, also features an extensive library of assets including images, characters, and templates. It also includes collaboration and review tools with which teams can work together. All Articulate products are easy to use, have a very low learning curve, and come with excellent customer service. Articulate has different pricing structures from $499 to $649 annually for nonprofits including academic institutions. Rise is an excellent tool to present information on a variety of topics in a fun, engaging, and interactive way. Storyline works best with simulations and practicing skills.

*Rise*
https://articulate.com/360/rise/

*Storyline*
https://articulate.com/perpetual/storyline-3/

## Adobe Captivate

Adobe Captivate is often mistaken for a simple screencasting software program, but it is much more and can be used to create highly interactive mobile-ready tutorials. Captivate has a plethora of features including quizzes, templates, conversion from PowerPoint slides to interactive videos, and access to Adobe Stock assets. Captivate can be integrated with an LMS. Captivate has different pricing structures, which start at $33.99 a month for an individual plan. Team and enterprise plans are also available upon request. Captivate works best with simulations and practicing skills.

*Adobe Captivate*
https://www.adobe.com/products/captivate.html

## Vyond and Powtoon

Thanks to YouTube and TikTok, video is everywhere, and it is the way students access all types of

information today. Vyond and Powtoon are two of the most popular video animation creation software platforms. Both offer a variety of customizable templates, characters, and other assets. Vyond has three different types of characters: contemporary, business-friendly, and whiteboard animation. Powtoon also has whiteboard doodling, screen capturing, and video templates for specific social media such as LinkedIn, Twitter, and Instagram. Both support voice-overs, music, and lip synching of characters. Both also offer a number of pricing structures starting at $228 per year. Video tutorials are best used to teach information literacy concepts and theories.

*Vyond*
https://www.vyond.com/

*Powtoon*
https://www.powtoon.com/

## Actionbound

Of course, students still visit our physical spaces and need to learn what they offer and how to use them. An engaging and digital way to do this is via scavenger hunts delivered on students' phones. There are several scavenger hunt apps on the market with a wide range of pricing. One of the most affordable is Actionbound. With Actionbound you can create interactive digital tours around your library. Students download the Actionbound app, then scan a QR code. Then, they are given directions to different areas of the library and interact with the app by answering multiple-choice or short-answer questions or taking and uploading a picture. Actionbound also has a GPS feature where students need to find a specific spot. When students answer a question correctly or find a spot, they move on to the next step. There are also reporting features with which you can view results and how students rated the tour. Actionbound prices vary by type of institution and size; library-specific plans start at around $60 per year. Note that Actionbound is based in Germany and lists prices in euros.

*Actionbound*
https://en.actionbound.com/

## Jotform

Like the better-known Google Forms, Jotform allows you to create forms for a number of different purposes, including getting feedback from students via ratings and surveys and having students answer open-ended questions. Unlike Google Forms, Jotform integrates seamlessly with tools like Rise. Jotform also allows you to run different types of reports to analyze student responses. Jotform has different pricing plans, including a free version with limited features, and plans from $12 to $39.50 per month. There is also enterprise pricing upon request.

*Jotform*
https://www.jotform.com/

## Playposit

Although popular and effective, videos are passive. Playposit allows you to add interactivity to any video. Videos can be imported from platforms like YouTube, TEDed, Vimeo, and Khan Academy, or you can upload your own. You can pause a video at any point and add interactivity in the form of a multiple-choice question, a short-answer question, a discussion forum, and summative quizzes. Playposit integrates with any LMS, and as soon as a student completes a tutorial, you can see how they performed on the questions. Playposit has several pricing structures, including an individual subscription that costs $144 a year.

*Playposit*
https://go.playposit.com/

## Note

1. "LibGuides," Springshare, accessed August 30, 2021, https://www.springshare.com/libguides/.

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