



Creating educational multimedia projects

Creating educational multimedia projects

*A guide to creating multimedia education
experiences*

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About this book

The purpose of this eBook is to provide a framework for designing educational multimedia projects.

In addition this eBook provides an example of a multimedia project itself.

The primary audience for this eBook is instructional design students in the University of Massachusetts-Boston instructional design program. However, the content will be generic enough that it will fit within any instructional design or instructional technology program.

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Editor and primary author

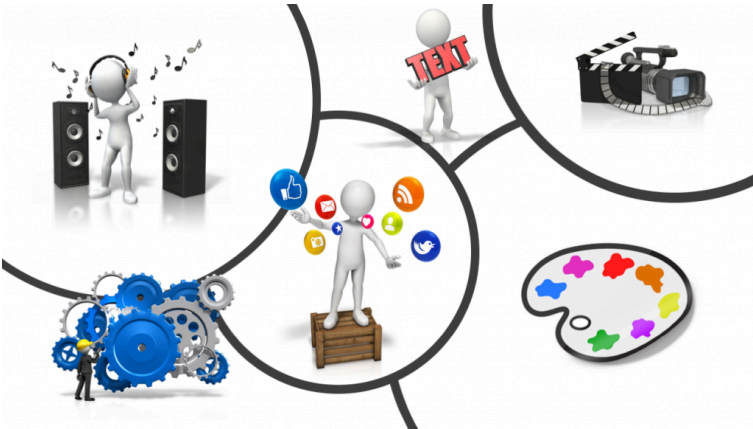
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CHAPTER I

Creating Educational Multimedia Projects

1.

What is a multimedia project?



Learning Objectives

After completing this chapter, you will be able to:

- Describe the characteristics of a multimedia project
- Describe two platforms that can host multimedia projects
- Describe the components of a multimedia project

This chapter introduces educational multimedia projects.

Characteristics of an educational multimedia project

Simply stated, multimedia projects are projects that bring together multiple forms of media. Further, educational multimedia projects bring together multiple forms of media in a pedagogically sound way.

Multimedia projects require some mechanisms for containing the multiple forms of media – which I call the **platform**. The two most common platforms are web pages and eBooks.

Each piece of multimedia is what I call an **asset**. Assets include text, hypertext, audio, video, and interactivity. Further sometimes social media is included into the multimedia asset mix.

As multimedia projects can quickly become complex, efficiently

creating effective educational multimedia projects requires following an instructional design process, such as [ADDIE](#).

Content platforms

Content platforms are the things that host multimedia projects. They are the glue that makes a project a cohesive learning experience. The two most common are the website and the eBook.

Both websites and eBooks have a variety of authoring tools to make creating your projects easier. We will explore these in more depth in the [Content Platforms](#) chapter of this book.

Components of multimedia projects

The first component of a multimedia project is the platform. The **platform** is the container that holds all the project parts. Examples of platforms are websites and eBooks.

Each of the items contained within the platform is known as an **asset**. Assets can be of different types.

Text and hypertext



Text uses written words to communicate the content.

Hypertext, a special kind of text, allows you to connect different parts of your project together, as well as allowing you to connect your material to Internet based resources.

Images



Images include diagrams like pie charts and infographics, as well as photographs.

Audio



Audio can be used to put voice to written words, such as in podcasts.

It can also be used to provide sound effects that enhance learning.

Audio is also a critical component of video.

Video

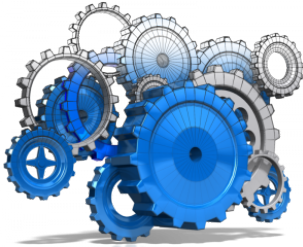


Video is a combination of moving images and audio.

Video can be a great way to tell a story, either with still images and an audio script or through filming scenarios.

A special type of video, called a screencast, can be used to demonstrate how to complete a task on your computer.

Interactivity



Interactivity requires that the learner do something in order to experience the multimedia.

Interactivity includes quizzes and images that you can mouse-over or click to gather further information.

Further, Social media can be considered a subset of interactivity.

The multimedia design team



How many people does it take to create a multimedia project? It really depends on the size of the project, the required quality, and the budget.

Instructional designers today can create decent multimedia projects, however, rarely does an instructional designer also

have professional level skills in graphic design, videography, and web programming. In addition, as for other instructional design projects, you need the same team members for educational multimedia, specifically instructional designers and subject matter experts.

Regardless of your project size, as an instructional designer you should have an appreciation for the types of work each person on the team does.

In the following sections I outline the different roles that might be involved in multimedia project design.

Instructional designer

The instructional designer is responsible for the pedagogical components of the site. They use an instructional design process to outline the goals and learning objectives, and work with subject matter experts to figure out the best way to address the learning objectives.

Subject matter expert

The subject matter expert is responsible for the content of the project, and is also responsible for ensuring the technical accuracy of any content that is produced.

Project manager

The project manager is responsible for managing the timelines

and deliverables for the project. They ensure that the right people have been brought onto the team and work with members of the team to coordinate the efforts of various team members. Since the instructional designer has the big picture understand of the project, the instructional design often is the project manager.

Graphic artist

Graphics and images are an important part of most multimedia projects. A graphic artist has special skills that allow for quality presentation of visual materials.

Videographer

If the project requires any new video to be produced, you may need a videographer. Videographers know how to film instructional content and then edit the filmed content into engaging instructional videos.

Developer/Programmer

The role of developer may also be called web developer or programmer. The developer/programmer is responsible for taking all the component parts and putting them together into a cohesive multimedia project. With the creation of rapid eLearning tools such as Adobe Captivate and Articulate Storyline, it has become more common for instructional designers to also be developers.

Producer/Publisher

The producer or publisher is responsible for taking the final project and distributing/publishing it. For example, an eBook producer would be responsible for setting up all the accounts necessary to publish to different content delivery platforms such as Kindle, iBooks, ePub, and PDF.

Examples of multimedia projects

Throughout my career as an instructional designer, I've had the opportunity to create several multimedia projects. In many cases, the role I played was that of programmer. That is, I worked with an instructional designer and graphic artist to create the project.

This eBook is itself an example of a multimedia project.

Caring for Persons with Spinal Cord Injury

The [Caring for Persons with Spinal Cord Injury](#) is a website based educational multimedia project. The project includes images and checklists, as well as formatted text. There is also mouse-over text.

This site was programmed using Adobe Dreamweaver, which is part of the Adobe Creative Cloud. It is one of the best tools for complex web page development.

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from this version of the text. You can view it online here: <https://id.rjhogue.name/multimedia/?p=30>

The team involved in creating this site include an advisory committee, subject matter experts, peer reviewers, instructional designer, medical illustrator and graphic designer, and programmer.

Faster Access, Better Care: A guide to establishing an eConsult Service

[Faster Access, Better Care: A guide to establishing an eConsult Service](#) is an eBook created specifically for the iPad.

The eBook contains a lot of hyperlinks to data sources, images and charts, and links to videos. We chose not to embed the videos because it makes the eBooks too large. This does mean that the reader needs to be online in order to watch the video.

The team involved in creating this eBook include: authors, editor and project manager (instructional designer), project coordinator (funding), eBook producer, and graphic designer.

Developing the CanMEDS Health Advocate

[Developing the CanMEDS Health Advocate](#) is an eBook created specifically for the iPad. This eBook includes hyperlinks, images, and videos. In addition, it has embedded quizzes (interactions), that were created using an iBooks Author plugin called Book Widgets.

The team involved in creating this eBook include: authors, project leader (funder), project manager, editor and educational consultant (instructional designer), eBook producer, videographer, and graphic designer.

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Test your learning

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2.

Planning multimedia projects

Learning Objectives

After completing this unit, you will be able to:

- Describe the steps involved in planning a multimedia project
- Write your project goals
- Write your project learning objectives
- Use the multimedia project instructional design document to create a project design

ADDIE for multimedia ~ Or should it be ADDEDIE?

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ADDIE is a generic instructional design process that stands for Analyze, Design, Develop, Implement, and Evaluate. The process needs to be defined for the type of project you are doing.

I have defined ADDIE for multimedia as:

Analysis – In this phase we look at what the project goal is, who the learners are, and what the context of the project is. We also look at any constraints that there might be, such as limitations on available technologies.

Design – In this phase we break the goal down into learning objectives and figure out what our project needs. We will look at the structure of the project and identify any multimedia assets that need to be developed and design the specific assets.

Develop – This is phase where our multimedia assets are created, for example, where you record audio and video, and build animations.

Implement – This is the phase where we put it all together ... pulling the multimedia assets together using a delivery mechanism such as a website or an eBook.

Evaluate – This is when we ask does the project meet the

learning goal? Do the media contribute to addressing the learning objectives? What needs to be improved?

Defining project purpose and goals

The first steps in creating the project is to define the project purpose and goals. The project purpose is typically written in the context of the organization – that is, what will be the organizations benefit when the project is complete?

Example purpose statement

The purpose of this project is to provide a framework for designing educational multimedia projects.

Once you understand the purpose, you are ready to create your project goals. Goals are stated from the perspective of someone who has already completed the task. I like to use the phrase “[this type of person] needs to be able to [task], [context], [tools].

Example instructional goal

Instructional designers wishing to create multimedia projects need to be able to create either an eBook or web site based project using their own web domain.

For a review on how to write instructional goals using the Dick & Carey method, watch the following short explainer video.

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Writing learning objectives

How to write learning objectives using ABCD as defined in Dick & Carey

Audience – Who will be doing the behavior?

Behavior – What should the learner be able to do?

Conditions – Under what conditions do you want the learner to be able to do it?

Degree – How well must it be done?

Example

Instructional design students will be able to write learning objectives with the aid of this document 100% of the time.

How to validate learning objectives using SMART

Specific – What do you want the learners to do? Is it observable?

Measurable – How will you know it is done successfully?

Achievable – Do the learners have the prior knowledge and skills necessary?

Relevant – Is the objective relevant to the course/lesson goal?

Time-bound – When will it be done?

Teachers in Education have created a great short video clip on how to write SMART learning objectives.

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Reference: Teachers in Education (2018, January 17). Writing Lesson Objectives for Classroom Teachers [Video file].

The multimedia project instructional design document

When creating multimedia projects, I like to start with a standard instructional design document with the following sections: context, learners, delivery mechanism, goal, content outline, and navigation.

[DesignDocTemplate](#) (A Word Design Document Template).

In this case, the **content outline** is a list that outlines the required content for the project. One way to create this outline is to do a task analysis, that I describe in the following video:

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For multimedia projects there is an opportunity to have multiple ways in which to navigate the material. For example, is the content is meant to be experienced in a linear fashion? Perhaps it is more references material that is searched? Or there is are multiple paths through the co

ntent that you want to setup to help the learner? This is specified in the **navigation** section of the document.

Following the navigation section, I use a table to outline the module or page details, including the learning objectives. For each module or page, I highlight any assets that might be

required and give each asset a specific name. I then have a final table that outlines the asset, its location, and provides a description of that asset.

Module / Page details

Use this table to complete your description of at least three modules / pages.

Module / Navigation Reference / Brief description	Learning objectives	Assets (give them specific names)
Module 1 – Page title Media This page contains references to media resources.	After reading this page learners will be able to identify at least five different types of media.	Introduction to multimedia (video) Types of media (infographic)

Assets

Use this table to describe at least nine assets that you plan to create.

Module/page	Type	Asset description
Title page	Image	Image that in some way says something about the content <note title page image can count as an asset but not as a content page>

3.

Content platforms

Learning Objectives

After completing this unit, you will be able to:

- Describe the features, advantages, and disadvantages of using a web site for your project
- Describe the features, advantages, and disadvantages of using eBooks for your project

Perhaps the most common way to deliver multimedia content is through a website. This can be achieved through a specialized

set of programmed web pages or built upon a content management system such as WordPress.

Web sites

Why use a web site?

- It is the most common way multimedia is access today
- Even if you choose to use an eBook format for your project, you will still need your own space on the Internet to distribute your content.

Why not use a website?

- Requires that the learner be online
- Can more technically challenging to implement

Web hosting

Regardless of whether you choose to use static web pages or a content management system, such as WordPress, you will still need to find a website hosting provider and to register for a domain name. Personally, I use [Reclaim Hosting](#) as my web hosting provider. I have no financial stake in this company. I recommend them because they are academic focused and they have excellent customer service. I usually get a response to tickets within hours, and they will back-out anything I break –

so if I install a bad WordPress plugin that breaks my site, they can go in and fix it for me.

Choosing a domain name

A creative domain name is always fun, but not always feasible. It can also be a challenge if your site speaks to different aspects of yourself. Personally, after using a subdomain of my travel blog, I finally moved my portfolio over to a blog with the .name high level domain. Now, you will find me online at <http://rjhogue.name>.

Google has a good page that talks about how to come up with a good domain name: <https://domains.google/learn/how-to-come-up-with-a-good-domain-name/#/>

I like the domains.google article in part because it talks about not stressing over the name too much. The name doesn't play a direct role in your searchability. You'll soon learn that most people just bookmark it or put it into something like Diigo or Feedly or subscribe to updates on things like Facebook or emails via WordPress.

You can change your domain name later for a small cost, but know that any work that you do to build yourself in one domain becomes an issue when you change – and you lose all your analytics (e.g. site visit history). I recently moved from rjh.goingeast.ca to rjhogue.name. The new site looks more like an ePortfolio than the old one does. The original was a place to blog and that was its purpose. I've now moved, but had to be

careful to put a forwarder in place so that people who knew my old blog can find my new one.

The first step in the ePortfolio is to determine your domain name. You may want to have a couple of options as you cannot use a name that is already taken. Also, you may want to try googling common misspellings of your domain name, as that may happen – although really, most people find you via search or links you share on other social media profiles (e.g. LinkedIn, Twitter, Facebook).

Website

You can use a tool like Dreamweaver to create a website that is coded directly with HTML/CSS. This approach works well when you want a complex design that isn't easily created using a WordPress theme. It does require that you know how to do some coding directly in HTML and CSS.

W3School.com provide free [HTML](#) and [CSS](#) tutorials. I highly recommend that you learn enough HTML and CSS to be able to read existing code and make small edits, such as fixing a list or changing a font color.

WordPress

WordPress isn't just for blogging. WordPress can be considered a “content management system” as it has a database and provides tools to manage webpages in addition to blog posts.

WordPress provides a way for those with less technical skills to create web pages that look great.

WordPress that is hosted on your own domain is not the same as WordPress that is hosted on WordPress.com. WordPress.com provides free and freemium (that is, you pay for extra functionality) hosting, however, you are very limited in what you are able to do. It does not take long for the cost of “features” on WordPress.com to become more expensive than hosting WordPress on your own domain.

Note that since WordPress is the most common website content management system out there, there are a lot of free themes and plugins that extend the functionality of WordPress. It is also constantly under attack from hackers. Fortunately, if your WordPress site is hosted at Reclaim Hosting, you can allow them to manage the update of your site to ensure that you always have the latest secure release.

eBooks

eBooks are a special kind of media that typically can be read both online or offline. With advances in eBook technology and protocols, it is becoming more common to create educational multimedia eBooks like this one.

Why use an eBook?

- eBooks can typically be accessed while offline
- The book format is a familiar way to deliver

educational content

Why not use an eBook?

- You need a complicated navigation structure that doesn't lend itself well to the more typically linear model of a book
- Can be technically difficult if they need to work on multiple platforms
- You need a way to publish/distribute your eBook, which can get complicated

eBook authoring tools

There are a variety of tools that can be used to make eBooks – some more flexible than others. For example:

- [PressBooks](#). Pressbooks is a WordPress multi-site based content authoring platform. This version of this book was created in a self-hosted instance of Pressbooks on WordPress.
- [Scalar](#). Scalar is a multimedia eBook platform that does not have a paper-based equivalent. It is intended for content that is born digital.
- [iBooks Author](#). iBooks Author is free eBook authoring software that requires a Mac. It creates nicely formatted eBooks that can be published for the iBooks app. Alternatively, eBooks can be published as PDF files.

- [Sigil](#). Sigil is an free tool that allows you to create eBooks in a variety of platforms such as ePub and Kindle.

In addition to the freely available tools, [Adobe InDesign](#) (which is part of Adobe Creative Cloud) and [Literature & Latte's Scrivener](#) are two professional publishing products that can be used to create eBooks for multiple platforms.

CHAPTER II

Designing and developing assets

In this section of the book, we look at how to design and develop the different types of assets that you might have in your multimedia projects.

4.

Text and hypertext

Text and hypertext



Learning Objectives

After completing this unit, you will be able to:

- Describe the purpose of text and hypertext in multimedia projects.
- Describe tools for creating text and hypertext.

This chapter explores the use of text and hypertext within multimedia projects. When text is spoken aloud, it becomes audio and will be discussed further in the [audio chapter](#) of this book. This chapter explores only written text and hypertext.

Using text

Guidelines when using written text within your multimedia projects:

- Spellcheck!
- Use correct grammar. Draft using a tool like Microsoft Word with grammar checking turned on.
- Avoid colloquialism. If your project will be used by people from different cultures, then colloquialisms will not have any meaning, as they often do not translate outside of the cultural context.

- Use informal language and write as if you are speaking directly to the learner – recall Mayer’s Personalization principle.
- Avoid the use of underline for non-linked text. Underline has become synonymous with hyperlink.

Here is a short video that summarizes Mayer’s Personalization Principle:

An interactive or media element has been excluded from this version of the text. You can view it online here: <https://id.rjhogue.name/multimedia/?p=35>

What makes hypertext hyper?

Hypertext is text that contains a link to another location.

Guidelines when using hypertext within your multimedia:

- Hypertext the name of where the content goes, rather than the URL itself. When someone is using a screen reader to access content, they are able to navigate to different links by the names of the links. If you name the link with the URL, it is much more difficult for people navigating via screen reader to follow your site.
- It is poor practice to say “click here”.
- If the link is to something that is not on your site, then you want to set it up to open in a new window or

new tab.

What are HTML, CSS, Javascript and SQL?

HTML stands for hypertext markup language. It is the language for building web pages. HTML5 is version 5 of the HTML standard.

CSS stands for cascading style sheets. CSS is the language that is used to determine how content is displayed.

You can think of HTML as a way to include the content of on a webpage, and CSS as the way to determine how the content is displayed (e.g. which font, what color).

Javascript is a scripting language that allows for the programming of web pages. It is often used to provide interactivity based upon information that is input by the reader of the webpage.

SQL is a database language. SQL queries are used to get data out of a website or database.

In general, instructional designers should know how to read and edit existing HTML and CSS. The ability to program Javascript or SQL is not frequently required.

One good way to learn the basics of HTML and CSS is with the tutorials provided free by [W3C Schools](https://www.w3schools.com/).

HTML and CSS Tutorials

There are a lot of tutorials on the W3C Schools website. I've listed the ones that I think you need to get started. I find that when I want to know how to do something, I just look it up rather than memorizing the detailed syntax for each command.

HTML

1. https://www.w3schools.com/html/html_intro.asp
2. https://www.w3schools.com/html/html_editors.asp
3. https://www.w3schools.com/html/html_basic.asp
4. https://www.w3schools.com/html/html_elements.asp
5. https://www.w3schools.com/html/html_attributes.asp
6. https://www.w3schools.com/html/html_headings.asp
7. https://www.w3schools.com/html/html_paragraphs.asp
8. https://www.w3schools.com/html/html_styles.asp
9. https://www.w3schools.com/html/html_links.asp
10. https://www.w3schools.com/html/html_lists.asp

CSS

1. https://www.w3schools.com/html/html_css.asp
2. https://www.w3schools.com/css/css_intro.asp
3. https://www.w3schools.com/css/css_syntax.asp

4. https://www.w3schools.com/css/css_selectors.asp
5. https://www.w3schools.com/css/css_howto.asp
6. https://www.w3schools.com/css/css_colors.asp
7. https://www.w3schools.com/css/css_text.asp

Tools for creating hypertext

Since hypertext, HTML, and CSS are just text, you could use a plain text editor to create web pages; however, this is not efficient and often tedious. There are a plethora of free HTML and CSS editors to help you. Two of the most useful features are a WYSIWYG (What-you-see-is-what-you-get) editor that generates the HTML and CSS based upon the content you put in the editor, and a preview window that shows you what your final web page will look like.

Microsoft Word allows you to save your content in HTML, why not use it? Because Microsoft Word is notorious for creating poorly written HTML and is overly complex and difficult to edit.

[Adobe Dreamweaver](#) is the most common tool used by professional developers. However, there are several [open source HTML alternatives](#) that you can use for your eLearning projects. These editors will likely have many more features than you need. These products are known as IDEs – that is “integrated development environments” as they provide the ability to fully develop your site as well as test it and upload the files to your web host.

5.

Images

Learning Objectives

After completing this unit, you will be able to:

- Describe the types of educational uses for images.
- Describe technical considerations when using images.
- Describe copyright and creative

Vector	Raster
WEB USES	
SOURCE files for logos, charts, icons, or any hard-edged graphics	OUTPUT files for most web graphics displayed on the screen
PRINT USES	
SOURCE files to be sent to the printer	HI-RES files can be printed at 300dpi
FILE TYPES	
.ai .eps .pdf .svg	.jpg .gif .png .tif

MODassic (n.d.). Vector, Raster, JPG, EPS, PNG – What’s the difference? Available from <https://modassicmarketing.com/understanding-image-file-types>

commons licensing and how they apply to re-use of images in educational multimedia projects.

- Describe sources for images and image parts.
- Describe tools for composing images.

For a great overview of the technical differences in various digital image formats see: MODassic (n.d.). [Vector, Raster, JPG, EPS, PNG – What’s the difference?](https://modassicmarketing.com/understanding-image-file-types) Available from <https://modassicmarketing.com/understanding-image-file-types>



Images used in educational multimedia projects need to include alt-text that describes the image or identifies it as decorative. In formal educational settings, this is required by law. For a good description on how to write alt-text, see [Alt Text](https://moz.com/learn/seo/alt-text) by Moz at <https://moz.com/learn/seo/alt-text>.

How images are used in education

Ruth and Mayer (2011) highlight that images should

be used to support learning. They categorize images as:

1. **Decorative** graphics serve to decorate the page without enhancing the message of the lesson, such as photo or a video of person riding a bicycle in a lesson on how bicycle tire pumps work.
2. **Representational** graphics portray a single element, such as photo of the bicycle tire pump along with a caption, "Bicycle Tire Pump."
3. **Relational** graphics portray a quantitative relationship among two or more variables, such as a line graph showing the relation between years of age on the x-axis and probability of being in a bicycle accident on the y-axis.
4. **Organizational** graphics depict the relations among elements, such as a diagram of a bicycle tire pump with each part labeled or a matrix giving a definition and example of each of three different kinds of pumps.
5. **Transformational** graphics depict changes in an object over

time, such as a video showing how to fix a flat tire, or a series of annotated frames showing stages of how a bicycle tire pump works.

6. ***Interpretive*** graphics illustrate invisible relationships such as an animation of the bicycle pump that includes small dots to show the flow of air into and out of the pump.

(p. 72).

Some examples of images used in education are for (1) illustrations of complex topics, (2) conceptual frameworks, (3) infographics, and (4) decorations (i.e. decorative images).

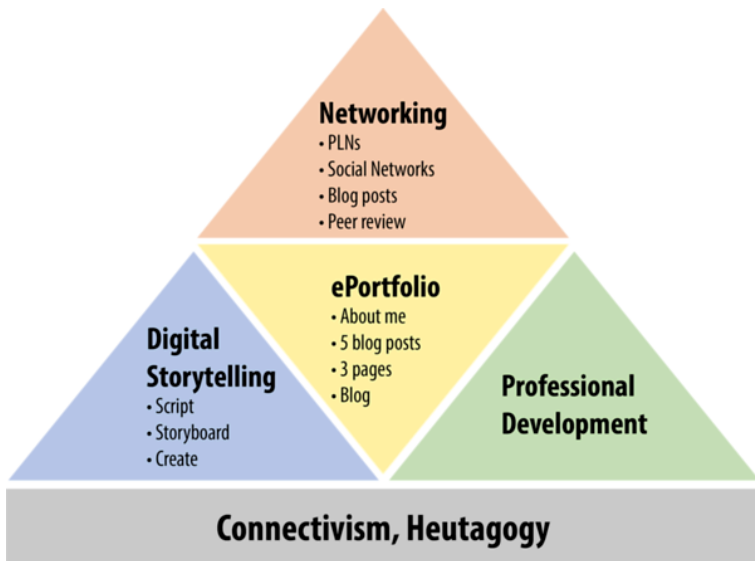
Illustrations

Illustrations are images that help to explain complex topics or procedures.

For example, Ikea provides all of their [installation instructions](#) using images. It is extra impressive that the only “text” involved is the name of the product and the numbers associated with the quantity of a given part and the step within the procedure.

Conceptual frameworks

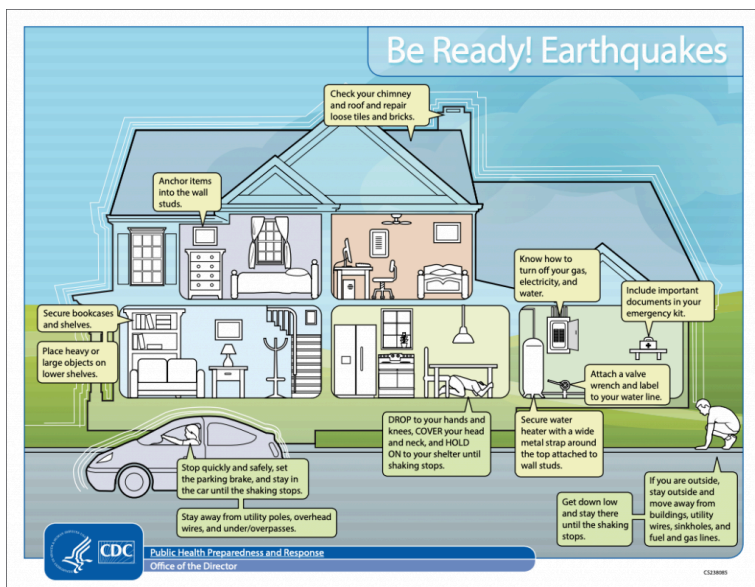
Conceptual frameworks are images that provide a visual organization of information. I use conceptual frameworks when designing courses to help describe how the different components of a course are related to one another. For example, a course that I teach on Designing on online professional presence uses this conceptual framework.



Conceptual framework example.

Infographics

Infographics are images that have been created to share an idea. Conceptual frameworks as an example of an infographic. Infographics are also very common as a way to explain statistical information to people in a visual manner.



Source: https://www.cdc.gov/cpr/documents/BeReady_Earthquakes.pdf

The CDC website contains a lot of great examples of infographics. Here is one that describes what to do to prepare for an earthquake.

Decorations

Decorative text should not include alt-text descriptions, rather, the image should be marked as “decorative”. This allows screen readers for visually impaired readers to skip over images that are included strictly for the benefit of site or page cosmetics.

Technical considerations when using images

When adding images to eBooks and Websites, you need to consider:

1. The kind of file: The most common export type for vector based images is **png**. The most common export type for photographs is **jpg**. Today's mobile devices can read each of these types of files.
2. The size of the file. When exporting your image from the creation tool into a .png or .jpg check the file size. If the size is larger, chances are you have incorrect dimensions or resolution.
3. The dimension of the image. Some WordPress plugins and eBook editors make it easy for you to adjust the displayed size of your image. This is important because your image needs to resize for different screen sizes. Embedding your images (see comment below), gives you the most flexibility.
4. The resolution of the image. Check the resolution of your images. If your image is likely to be printed, then you want 300dpi. If you are only displaying your image on screen, then 72 dpi is good enough and will make your images a smaller filesize.



When resizing images make sure you do not distort them. If you need to change the dimensions of an image, you will want to “crop” it rather than resize it. You may need to do a combination of both to make your image fit your design. It is better to do this in your image creation tool rather than on your website or within your eBook.

In addition, you need to consider whether or not to **embed** the image or **copy** the image. When you embed an image it is stored someplace outside of the website or eBooks. For websites, you want to embed if you are concerned about the amount of disk space quota you have. For my websites, I use [Smugmug](#) to store all my photos and images and I embed them. This allows me to not worry about the file size of the images. [Flickr](#) offers a free version that provides similar functionality.



When using images that you did not create, it is best to embed the image rather than copy it. In addition, you should include image attributions. Images should never be copied without permission.

Don't forget to check the copyright

Images cannot simply be re-used. This is especially the case for photographs. By default images are copyrighted. Don't get yourself into trouble by illegally copying images. Education use will not protect you.

Because your projects are likely to be used in your portfolios, you should stick to images that you are allowed to freely use. There are many sources for royalty free images that you can use. I recommend when searching that you select only images that you are free to use for commercial purposes, as you never know how you will use your project in the future. In addition, it is considered good practice to credit the source of your images, even when it is not technically required.

Creative Commons provides the most robust and common licensing mechanism for web resources that you are able to use in your projects. They provide a good overview on [how Creative Commons licenses work](#). Consider how you want to license each element that you create as well as your overall project. Be aware that some items that you use may be licensed as “share alike” such that you cannot copyright them, rather you must use a similar license on your derived product.

See the next section for sources of royalty free images that you can use for your projects.

Sources for images and image components

Image components

Image components are the elements, such as icons, that you may wish to include in your image compositions, such as infographics and conceptual frameworks. Here are some sources for image components.

- [The noun project](#) – The noun project has icons for almost everything. It is a great course of icons for infographics. For \$20/year (educational discounted price) you can get access to the icons without their branding, and this also helps pay the creators of the icons. With a paid account you can change the colors of the icons to align with your color scheme.
- [Pixabay](#) – Pixabay contains images (both photographs and vector graphics) that are free to use in your presentations. Although not required, it is considered a good practice to credit the creator of the image.
- [Presentermedia](#) – Presenter Media is a paid option for icons and templates. For example, I use Presenter Media for my PowerPoint templates and many of the icons in my eBooks and on my websites.

Photographs

When using photographs, ensure you have permission from the copyright holder to use the image. In addition, validate whether or not you are permitted to make derivatives. Since header images often crop images to fit the theme, you need images that you have permission for derivatives.

Sources for free photographs that can be used for feature images and other decorations on your websites and eBooks include:

- [Unsplash](#) – Unsplash gives you royalty free images that you can use. Once you select and download an image, it provides the text you can copy and paste

directly onto your site to attribute the image correctly.

- [Flickr](#) – You need to search for images you can use. Make sure you check to ensure you are attributing images correctly.
- [Google image search](#) – You can use Google image search to specifically search for images that you can use in your project. I do find, however, that sometimes the images that show up are not free to use. Re-check the permission from the image source.
- [Pixabay](#) – Pixabay contains images (both photographs and vector graphics) that are free to use in your presentations. Although not required, it is considered a good practice to credit the creator of the image.

Tools for creating and storing images

Image composition tools (vector)

Image composition tools are tools that you use to build more complex images. Most educational images require some form of composition. In addition, image composition tools can be used to resize your images for your projects.

- PowerPoint – often overlooked, PowerPoint is a great tool for creating things like infographics and conceptual frameworks. Tip: Use custom page size to change the size of the canvas you are working on.
- [Google Slides](#) – a free variant on PowerPoint. Google

slides can be a little clunky, but it will work for creating infographics and conceptual frameworks. Similar to PowerPoint, use File >> Page Setup and select Custom to make the canvas the size you want for your graphic.

- [Adobe Illustrator](#) – Illustrator is a professional grade vector image editing software. If you are looking for more complex features (like layering and the ability to turn on/off layers for export), then Illustrator is a good choice. Adobe Illustrator is part of Adobe Creative Suite.
- Free options for vector graphics tool change all the time. Techradar has a list of what they consider the [best free alternatives to Adobe Illustrator](#).

Image composition tools (bitmap)

Bitmap image tools are typically used for editing photographs. These tools have become synonymous with Photoshop, however, there are other options:

- [Adobe Photoshop](#) – this is the professional grade photo editing software. It has become synonymous with photo editing, such that people will often say an image has been “photoshopped” which does not necessarily mean that the tool used was Photoshop. Photoshop is included in Adobe Creative Suite.
- [Gimp](#) – this is a free full featured photo editing software by GNU (the original open source software

organization).

- Free options for photo editors change all the time. Techradar has a list of what they consider [the best free alternatives to Photoshop](#).

Storing images

Feature images need to be loaded directly onto your site. For the remainder of your images, you will save hosting space if you use an image specific hosting site.

- [Flickr](#) – most common one
- [Smugmug](#) – a professional grade image site that allows for selling of images.

6.

Audio



Learning Objectives

After completing this unit you will be able to:

- Describe how audio is used in educational multimedia.
- Describe the technical considerations when using audio in your projects.
- Describe the process for creating audio assets.
- Identify sources for free audio.
- Describe tools for creating audio recordings.
- Describe tools for producing audio.



Audio used in educational multimedia projects should include transcripts. This benefits both learners who are not able to hear the audio and learners who might not speak the language with the same accent or are language learners. Producing audio transcripts is a good practice.

Services such as [Descript](#) provide audio transcription (Descript gives you 3 hours free). If you are producing content for a school or organization, they may have accessibility tools that you can use to have your audio transcribed for free.

How audio is used in education

Audio is not only used as a stand-alone media, rather, it is more frequently used in combination with static or moving images, and with interactivities. For example (1) voiceovers for presentations, (2) sound effects, (3) podcasts, (4) sound for video, and (5) sound for eLearning.

Voiceovers for presentations

[I don't lecture, I used VoiceThread](#). I wrote a blog post where I describe the process I use for creating the audio for VoiceThread presentations. One thing I like about the tool is that it has an autocaption feature, so if I record ad-hoc audio, it will automatically create closed captions. For example:

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Podcasts

Podcasts are great ways to use audio in educational settings. They can be used by students who are commuting. They are especially useful when the content does not require visuals in order to understand. Video versions of podcasts are known as Vodcasts.

In this example podcast, I interview Terry Greene, who himself has a podcast about Open Education called [Gettin' Air](#).

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I also now podcast at [Demystifying Instructional Design](#).

Sound for Video

One of the most important aspects to successful educational video is good quality audio. In educational video, audio is actually more important than the images. Poor audio will mean that the learner will stop watching and will cause them to be greatly frustrated.

In this example, I created a digital story about myself as a Lecturer. I used audio to tell the story and still images to provide visual support to the story. Notice also that there is quiet background music to help set the emotional tone for the video; however, the background music is very quiet so as not to distract from the dialog.

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Technical considerations when using audio

Audio files can be created in a variety of digital formats, however, for most eLearning MP3 is the best choice as the file size is not too large and can be played on most, if not all, devices. Joel Lee (December 2, 2019) wrote a great article that explains the differences: [The 10 most common audio formats: Which one should you use?](#)

Audio files can either be ***streamed*** or ***downloaded***.

Streamed audio files are played by the device as they are downloaded and are not typically stored locally on the device. The advantage to streamed audio is that it is available to the learner a lot quicker as they do not need to wait until it is downloaded. Streamed audio also does not take up space on the device; however, streaming audio requires more server side processing power. The streamed audio is not available on the

device after it has been played and is not available if connection is lost.

Downloaded audio files must be completely downloaded to the device before they can be played. They require space on the local device for storage. The advantage to downloaded audio is that it can be played even when the learner is not online.

For the most part, eLearning audio is streamed.

Process for creating audio assets

The creation of audio assets typically involves four phases: (1) planning, (2) recording, (3) post processing, (4) production and distribution.

Planning

Planning is perhaps the most important part of creating quality audio. What is involved in planning differs based upon the type of audio you are preparing. For example, when doing an interview for a podcast, the preparation involved collecting a list of leading questions, and becoming familiar with the work of the person I'm interviewing. This allows me to ask questions, but also link the responses to specific work that the person has done. When creating presentations, I script the audio, that is, I write it out and practice it before recording.

One tip for scripting is to use the voice to text functionality of your computer. In this way, you can talk as if you were

presenting, and the computer captures the key ideas as text. You can then go through the text and edit it. One advantage to scripting audio is that it helps avoid the use of ‘umm’ when you are speaking. One disadvantage to scripting is that when you record, you can sound like you are reading the text.

Recording

Once you have a plan, it is time to record your audio. It is always better to record more than you need. If possible, when recording leave extra long pauses between segments. This makes editing a lot easier. It is easy to remove empty air, but it is not easy to remove a portion of a segment without it being obvious to the listener.

When recording from script, your goal is to sound as authentic as you can. You want to speak clearly but also try to overemphasize emotions and tones in your voice. You may wish to record while standing, and that causes you to project your voice and speak with great tone variance, making for a better quality and more natural sounding recording.

See the section below for suggested tools for creating audio recordings.

Post processing

Post processing is what you do after you have recorded your audio – this is the phase where you put it all together. In post production, you edit out the parts you don’t want, and add in

anything that is missing. If you record with a tool that separates the speakers into different digital files, it is easier to clean up or edit one audio file without it affecting the other. In post process you can also add background sounds and sound effects.

Note: Use background music sparingly as it can make your audio more difficult to hear.

See the section on *Tools for producing audio* for suggestions for audio post production software.

Production and distribution

The final phase of the process is production and distribution. Production refers to the process of creating a single audio file out of the edited components. This is usually done by exporting the audio from Audio editing software. Once you have a single audio file, you need to figure out how to store or distribute the file.

Sources for audio

As with images, be careful about who owns the copyright to the audio tracks you are using. There are several sources for royalty free (does not cost money) audio that you may use either without or with attribution. Check the license.

- [Incompetech](#) – Contain a variety of different types of free music. With the free option, you are required to attribute the creator.

- [FreeSound](#) – Contains a variety of sound effects and loop tracks (tracks that repeat over and over and are good for background sound of undetermined length).
- [Bensound](#) – Contains a variety of free background tracks, some which will seem familiar. Look closely at the usage rights as many specifically say no eBooks or podcasts, but are OK in multimedia projects as long as the creator is credited.
- [Purple Planet Music](#) – Again another site that contains a bunch of music tracks. Check the usage rights. They have a fee version if you want higher quality audio.

Tools for creating audio recordings

Tools are changing all the time. What I have provided here are some examples of the different types of tools you may wish to consider for producing quality audio. This is not an exhaustive list and is not meant to be an endorsement of any of the tools listed.

Hardware

You can record audio on nothing more than your phone or computer, but the quality of the audio may not be that good. Investing in a good quality microphone is the first step to improving your audio quality.

Software

When doing interviews, it is handy to be able to record each person within their own audio file. This allows you better control when editing – especially if one person has poor quality sound or the volume is not equivalent.

- [Zencastr](#) – A great tool for doing interviews over the web. It records each side of the conversation on a separate channel, which you can then use when editing (e.g. you can easily edit out background noise from one channel. The free version is often enough unless you are trying to produce a lot in a short period of time.
- [Zoom](#) – Zoom has the ability to record the audio of each person separately. This is especially useful when you have more than two people in a conversation. The video file provides you a reference as to the flow of conversation, but you can also extract the specific audio.

Tools for producing audio

Audio editing

Once your audio files have been recorded, you will need software that allows you to edit and produce the files.

- [Ocenaudio](#) – Free audio editing software that is less complicated than Audacity. It is a great choice for

quick edits when you don't need all the extra features.

- [Audacity](#) – Free audio editing software that provides all the bells and whistles of any complex audio editing software.
- [Adobe Audition](#) – Part of the Adobe Creative Suite of products, provides professional level audio editing features.

Sharing audio

Once your audio has been produced, you may wish to use an audio sharing platform. This is not strictly required but it is a good way to reduce the size of your website or eBook. The most common file format for audio transmission is MP3. For more options see [Best free music and cloud storage & audio files sharing service \[2020\]](#)

- [Soundcloud](#) – Offers a free plan with a limited number of uploads. If you choose to make your audio files private, only those with the link can access them. For example: <https://soundcloud.com/user-638640511/2020-01-terry-greene/s-OGB7S>
- [pCloud](#) – Similar to Soundcloud but gives you more space on their free plan.

7.

Video

Learning Objectives



After completing this unit you will be able to:

- Describe how video is used in educational multimedia.
- Describe the technical considerations when using video in your projects.
- Describe the process for creating video assets.
- Identify sources for free video.
- Describe tools for creating video recordings.
- Describe tools for producing video.

How to use video in educational multimedia

All of Mayer's principles apply when creating educational multimedia projects; however, the following Mayer Principles apply specifically to the creation of video for educational multimedia:

- **Redundancy principle:** People learn better from graphics and narration than from graphics, narration and on-screen text.
- **Voice principle:** People learn better when the narration in multimedia lessons is spoken in a friendly human voice rather than a machine voice.
- **Image principle:** People do not necessarily learn better from a multimedia lesson when the speaker's

image is added to the screen.

Recall from the [audio](#) chapter, that audio is used as part of video creation. Quality audio is more important than quality images. If the learner cannot understand the audio, the video is not useful.

There are a various ways and types of video that can be used in multimedia projects. Some examples include: (1) screencasts, (2) explainers, (3) task demonstrations, and (4) digital stories.

Screencasts

Screencasts are video recordings of your computer screen. They are typically used when you are teaching the learner how to do something with the computer. For example, I use screencasts to show students how to access the learning management system, but also, I have a series of screencasts on how to use Microsoft Word. For example:

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Explainers

Explainers are short video animations that describe how something. They typically involve the a hand or a pen writing text or drawing images that align with the narration. For example,

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Task Demonstrations

Task demonstrations are videos that show the learner how to perform a specific task. They are similar to screencasts, except they involve filming of a task rather than recording a computer screen. For example:

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Digital stories

Telling stories of a learners experience help set context. Stories are a particularly useful educational tool when your course goal involves changing attitudes. Bernard Robin provides [examples of different uses of digital storytelling](#) on his Educational uses of digital storytelling website.

Technical considerations when using video in your projects

The biggest technical consideration when using video in your project is where will the video be hosted. Video needs to be

rendered in different formats for different devices. A good video hosting service such as [YouTube](#) or [Vimeo](#), automatically render the video in the correct format for the viewer. As a result, you should avoid directly uploading videos to your projects, and instead upload them to a host site and embed them. However, this means that the learner must be online to access the video content.

Video files can get large quickly. This can be an issue if you are developing an eBook and host the video directly in the book. Again, the answer is to use a video hosting service.

A process for creating video assets

I describe my process for creating video in the following video:

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In addition, here is an infographic that outlines the steps in the process:

Video Creation Process

By Rebecca J. Hogue



1 - Ideate



2- Script



3 - Storyboard



4 - Film



5 – Collect and Construct



6 – Publish and Distribute



CC-BY - By Rebecca J. Hogue – March 2020
Icons via The Noun Project

Storyboard examples

Storyboarding is the most efficient way to design video. I don't find I need to use specific templates for storyboarding, rather I typically use either tables in a Microsoft Word document or PowerPoint. Note that when I storyboard, I sometimes don't

include visuals that I know I'll be getting from PresenterMedia – as I tend to search for them at the time I'm building, which isn't necessarily a good practice. Here are some examples of my storyboards:

- [Microsoft Word document with script for ADDIE for multimedia design](#). In this case, I wrote the script but did not include the visuals in the document.
- [PowerPoint template for the video Designing and Developing Video Assets](#) shown above.
- [Sample storyboard template in Microsoft Word](#) that can be adapted and used to meet your requirements.

Sources of free video

By far the most common place to find video that you can embed within your projects is YouTube. Note that you cannot download and copy YouTube videos, it is against the license agreement. You can, however, embed videos into your projects.

YouTube has two license options: YouTube standard license and Creative Commons Attribution. The standard YouTube license does not allow you to download and edit the videos, for more details see the [Permissions and Restrictions section of the YouTube terms of service](#). The creative commons licenses does. You are required to attribute the creator when editing someone else's YouTube video.

By marking your original video with a Creative

Commons license, you're granting the entire YouTube community the right to reuse and edit that video. ([YouTube Help >> Creative Commons](#)).

If you are looking at using portions of YouTube videos, or you are thinking of downloading and remixing YouTube videos, review [YouTube's What is Fair Use?](#) page.

If you only want to show a portion of a YouTube video, you can set the start time within the embed code. Begin by finding the point you want to start at, and then click the share button and select embed. The embed window will allow you to select "start at" that aligns with the time you set.

Tools for creating video recordings

Different types of tools are used depending on the type of video record. In general, you do not need a complicated setup to record video, but remember, you need good quality audio. You can use your webcam or your SmartPhone camera to record video. If using your SmartPhone you may wish to purchase an inexpensive tripod.

Creating screencasts

Baidhurya Mani has a good post that compares [7 different screencasting software options](#).

- [Screencast-o-matic](#) – One of the cheapest and easiest ways of creating screencasts. They also do picture-in-

picture, however, remember the Mayer Image Principle.

- [Camtasia](#) – As instructional designers, Camtasia is one of the tools of the trade. If your screencasts need to be professional quality or are demonstrating complex procedures, Camtasia is a more appropriate tool.

Tools for producing video

Editing video

TechRadar has listed the best [free video editing software](#), I do find it interesting that Davinci Resolve is not included in their list. In addition, they have a post listing the [best premium video editors](#).

- [Camtasia](#) – In addition to screencasting, Camtasia provides some basic video editing features. It is easy to use and a great place to start with video editing.
- [Davinci Resolve](#) – This is a free full featured video editing tool, comparable to Adobe Premiere Pro.
- [Adobe Premiere Pro](#) – Adobe's full features professional video editing software. Premiere Pro is included in the Adobe Creative Cloud suite.
- [Final Cut Pro](#) – Apple's full featured professional video editing software. Final Cut Pro is a one time purchase rather than a monthly fee, and may be more

affordable than Adobe Premiere Pro, however, it is a Mac only product.

Storing and Sharing Video

Video files can get large and need to be streamed on a server that can handle the extra load. It is best to use a service to store and share your videos.

- [YouTube](#) – your videos cannot be private, they must be either “unlisted” or “public”. Linking from your site to your YouTube channel helps with your YouTube subscribers. When uploading your videos to YouTube consider whether you want the default YouTube standard licence or the Creative Commons Attribution license. If you want to allow others to remix your video, ensure you set your license to Creative Commons Attribution.
- [Vimeo](#) – Vimeo is a video storing and sharing site that is geared towards professionals. It does have a basic plan that is free and provides similar features to YouTube.
- [Google Drive](#) – You can share your videos using your Google Drive folder, however, there it requires more manual setup if you want features like tracking the number of times the video has been viewed.

8.

Interactivity



Learning Objectives

After completing this unit, you will be able to:

- Describe the purpose of interactivity in educational multimedia projects.
- State considerations for including interactivity in multimedia projects.
- Identify tools used to generate interactive elements for multimedia projects.

Purpose of interactivity

In the early days of eLearning, interactivity meant that the learner had to click a button to turn the page. When the tools got slightly more advanced, interactivity meant multiple choice quizzes and hot spots on the screen. It used to be very expensive to include interactivity in eLearning because you needed programmers to implement it. Today, interactivity is easier than ever to include in eLearning, as many of the tools can be used directly by the instructional designer, rather than requiring programmers.

Why include interactivity in your eLearning modules?

Interactivity can be used to help learners pay attention. Without interactivity, the learner is passively digesting the information that is presented to them. The interactivity causes the learner to pay attention. This in turn, helps learners retain more of the

information that is presented. Further, interactivity can be used to increase motivation by adding an element of gamification to the eLearning experience.

Interactivity can be used for assessment, that is, it can be used as a way to validate the learning that has occurred. This can be used as a formative assessment such as learner self-tests, which learners can re-take as many times as needed, or can be a summative assessment which is submitted to a learning management system to provide a demonstration of learner accomplishment.

Interactivity can be used to help provide an emotional attachment to the learning. For example, interactivity can be used to tell the story in a problem based learning module or case-based learning module.

Interactivity can be used to help organize information. For example, interactivity can divide information into different tabs which are revealed when learners click the tabs.

Reference: Pappas, C. (2015, April 18). [eLearning interactivity: The ultimate guide for eLearning professionals](#).

Interactivity examples

I've created a few examples of interactivity as a way to review Mayer's Multimedia principles. These interactivity examples were created using a tool called [H5P](#) which was installed on a self-hosted WordPress website.

Accordion

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Drag-and-drop words

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Interactive Video quiz

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Interactivity considerations

Is there a pedagogical reason for it?

The first question to ask when considering adding interactive elements to your multimedia project is, what is the pedagogical reason for the interact. Sometimes, the pedagogical reason is simply to gain or regain learners attention. There may also be a need to use interactivity for assessment. Start by asking yourself what the pedagogical reason is for the interactivity, and follow

that question with what is the learning objective associated with the interactivity?

Who will maintain it?

What technical skills are needed to create and maintain the project. Often instructional designers or developers are hired to create interactive eLearning, however, what is not considered is how the project will be updated or maintained? Often clients do not have the inhouse skillsets nor software to update complex eLearning interactions.

Who will host it?

Interactivity can be difficult to implement for offline use. When implemented for online use, the interactive elements need to be hosted someplace. For example, H5P is free use, however, you are not permitted to use their server for more than demonstrating the functionality. One way to host H5P is to install it on a self-hosted WordPress site. H5P can also be integrated with various learning management systems for a fee.

If you create your eLearning using Captivate or Storyline, you will need to export it and save the files somewhere. Having a place to host it on the Internet, such as a personal website, makes it easier when doing portfolio projects.

Does it need to be mobile friendly?

Different tools provide different levels of interoperability with mobile devices. When designing and developing, consider

testing your interactions on multiple types of devices including Mac, PC, Android phone, iPhone, and tablet.

Does it need to be accessible?

If you are creating eLearning for formal education, such as colleges or universities, then it needs to be accessible. Some tools are better than others at generating accessible interactive content – although this is becoming more commonly available.

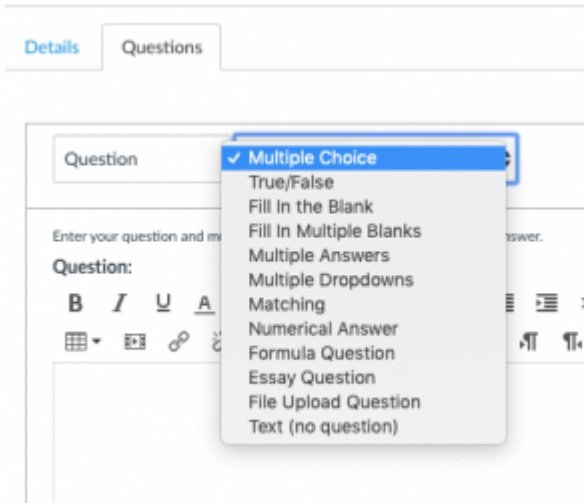
Interactivity tools

Tools for creating interactivity vary from stand alone applications specifically for designing interactivities, to interactivity functions built into tools intended for a different purpose. Tools are either web-based or stand alone. Generally speaking, the web-base tools are more likely to be mobile responsive and accessible. The industry is moving in that direction, with the stand alone Adobe Captivate and Adobe Storyline tools being replaced with yearly subscription versions that offer perpetual updates. Some tools for creating interactivity include:

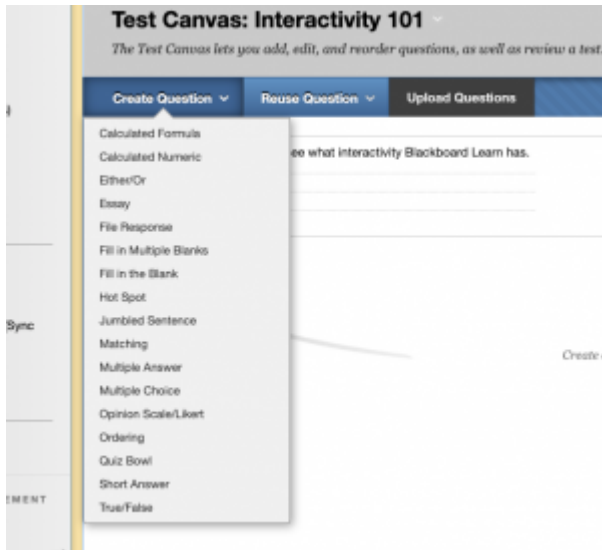
Learning management systems (LMS)

Learning management systems (also known as learning experience platforms) have built in functions that allow you to add interactivity into your learning modules. These vary from very rudimentary multiple choice questions, to more complex interactive video and drag-and-drop type interactions.

For example, in Canvas the following interactivities are available:



In Blackboard Learn the following interactivities are available:



H5P

[H5P](#) is an open source platform that can be integrated into an LMS or installed in a self-housed WordPress website. It comes with access to a library of different interactivities that is changing on a regular bases. The features are comparable to those available in Blackboard Learn or Canvas.

H5P is a web-based platform, and runs through your web-browser. It is not installed locally on your machine.

Articulate 360

[Articulate 360](#) is a web-based platform that provides professional grade rapid eLearning tools. This is Articulate's software-as-a-service solution which means it is sold as a yearly subscription.

Adobe Captivate

[Adobe Captivate](#) is a full featured rapid eLearning tool, that always you to create stand-alone eLearning courses as well as short modules that can be imported into Learning Management systems using the SCORM protocols.

Adobe Captivate is now available for Mac OS as well as Windows. It can be purchased as a standalone application or via a monthly subscription. Note that Captivate is not part of Adobe Creative Suite. Captivate does offer educational pricing (\$399 USD at time of writing).

Articulate Storyline 3

Articulate Storyline 3 is Articulate's stand alone one-time purchase rapid eLearning tool. It requires Microsoft Windows, although will run on a Mac under Parallels or VMWare. Articulate seems to be promoting their Articulate 360 product, such that I am not how much longer they will support the stand alone Storyline tool.

This is where you can add appendices or other back matter.

- Clark, R. C., & Mayer, R. E. (2012). e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning: Third Edition. In *e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning: Third Edition* (4th ed.). Wiley. <https://doi.org/10.1002/9781118255971>
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- Hessler, B., & Lambert, J. (2017). *Digital Storytelling in Higher Education* (G. Jamissen, P. Hardy, Y. Nordkvelle, & H. Pleasants (eds.)). Springer International Publishing. <https://doi.org/10.1007/978-3-319-51058-3>
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test stuff...

An interactive or media element has been excluded from this version of the text. You can view it online here:

<https://id.rjhogue.name/multimedia/?p=65>