



Science and Technology Resources on the Internet

E-learning Technologies

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Introduction

As information professionals, we have different reasons for focusing our attention on e-learning (learning online or through electronic media). Some of us struggle with a high demand for our services and seek alternatives to face-to-face teaching and one-on-one support. There are also expectations for digital just-in-time content, as individuals have an increasing number of educational opportunities to choose from. We may wish to take advantage of technologies to improve engagement and motivation, such as through gamification, the application of game design to different contexts.

Whatever the reasons, pursuing e-learning is challenging and requires time and effort to explore different tools and approaches. This webliography provides strategies and technologies for either building new content or translating current lesson plans for electronic settings. It began as an e-learning kit, a guide for collecting, organizing, and sharing discoveries (<https://libraryguides.mcgill.ca/eLkit>). In some ways, the guide is more extensive because it includes a greater number of resources. However, this webliography makes it possible to not only curate key tools, but also to offer guidance through annotations and more in-depth exploration. It is selective, but it also covers a broad array of e-learning categories, from learning environments to learning objects and activities.

Scope and Methods

The sources were identified from a combination of methods, including extensive searches of library and education literature to support a research project on rethinking instructional practices for an online environment. A bibliography of the readings is available on the e-learning kit (<https://libraryguides.mcgill.ca/eLkit/bibliography>).

Several sources were uncovered through exploration and continuing education or chosen because they have been tested and used successfully by the author and librarian colleagues. They were selected for the webliography because they are freely available, can be used on multiple operating systems, and have current or potential application in libraries.

The webliography does not attempt to be comprehensive, since there are new sites that are unveiled every day, some of which have questionable staying power. There are also topics that were not included in the webliography. For example, the author has little experience with app development, although this is one growing area of e-learning.

Organizational Structure

To avoid repetition, each selection occurs only once in the webliography and alternative uses are provided in the annotations. The sections are structured into options for choosing virtual learning environments, creating learning objects, activities, games & gamification, and the building of community. Within each section, the organization is by ease of use, beginning with web-based tools that do not necessitate software installation, to those that may require some technical skills to implement.

- Virtual learning environments
 - Learning management systems
 - Wikis
 - Blogs
 - Hosts
- Learning objects
 - Repositories
 - Videos
 - Podcasts
 - Graphics
 - Presentations
- Activities
 - Collaborative authoring
 - Blogging
 - Visualizations
 - Polls, quizzes & surveys
- Games and gamification
 - Developing games
 - Quests
 - Avatars
 - Open badges
- Building community
 - Scheduling
 - Group discussions
 - Conferencing

Virtual Learning Environments

These environments offer the ability to incorporate different course components, such as activities and assessment, in order to support student learning. They begin with learning management systems (LMS), which have a variety of course features, and end with simple hosting platforms. Library professionals may already be familiar with the use of LibGuides or Facebook as learning environments ([Manca & Ranieri 2013](#); [Webb & Hoover 2015](#); [Yelinek et al. 2010](#)). The options here are for those that do not have access to LibGuides or an LMS, or for those wishing to try something different.

Learning management systems

Google Classroom

<https://classroom.google.com/>

Anyone with a personal Google Account can start a class and provide the class code to individuals to join in via email. Classroom is accessible from all browsers, but there is also an app available for mobile devices. Assignments can be generated in different formats, such as Google Docs and Google Forms. Submitted assignments are filed in Google Drive folders, along with all course materials, for providing direct feedback. Classroom offers students control over email notifications and the opportunity to interact and share resources with each other.

Moodle

<https://moodle.org/>

Moodle may be the most widely used of the systems listed in this webliography. The software was released in 2001 by Martin Dougiamas and is now the project of Moodle Pty Ltd, based in Perth, Australia. The open-source platform can be downloaded for free and installed on a server. The company receives funds from the certified Moodle Partners program that supports those that are willing and able to pay for services. Moodle content can be searched in order to discover courses available to enroll in or download, by visiting moodle.net.

MoodleCloud

<https://moodlecloud.com/>

Moodle sites are free on MoodleCloud, the hosting service from Moodle Pty Ltd. The free plan offers unlimited courses and activities, along with many of the same attributes in a paid plan, but advertisements cannot be hidden from students.

Canvas

<https://www.instructure.com/canvas>

Instructure launched Canvas in 2011, and it is now widely used by universities and other institutions. They offer Free-for-Teacher accounts that are similar to the paid plan and include course modules, conferences, assignments, and quizzes.

Canvas Network

<https://www.canvas.net/>

Canvas Network was launched in 2012, and it hosts open, online courses powered by the LMS. They accept proposals from instructors that are interested in teaching an open course on the platform, using a course shell that they provide.

Sakai

<https://www.sakailms.org/>

Sakai (named after an Iron Chef) was released to the public in 2005. It was a collaboration between the University of Michigan, Indiana University, MIT, Stanford University, University of California, Berkeley and Foothill Community College, made viable by a Mellon Foundation grant. The java-based source code is available for download but can be tested first from a sandbox version hosted by one of their commercial affiliates. A unique feature of Sakai is the inclusion of project work sites, where student groups or planning teams and committees collaborate outside of the classroom.

Wikis

WikiMatrix

<https://www.wikimatrix.org/>

With WikiSpaces closing in 2018, this comparison tool may come in handy. German software company, CosmoCode, reviews wikis based on an extensive list of characteristics, including security, usability, statistics, output options and the handling of media and files. There are over 100 wikis covered, the vast majority of which are free and open source. WikiMatrix also offers a Choice Wizard with guiding questions. For example, it asks about the importance of a page history, WYSIWIG editor, commercial support and hosting services to help with finding the right wiki.

MediaWiki

<https://www.mediawiki.org/wiki/MediaWiki>

MediaWiki was produced for Wikipedia, undoubtedly the most recognizable wiki on the planet. It is an open-source server software written in PHP that can handle large projects. Among other websites, the Wikimedia Foundation uses it to power Wikimedia Commons

(https://commons.wikimedia.org/wiki/Main_Page), a popular source of free media files, and Wikispecies for taxonomic data (<https://meta.wikimedia.org/wiki/Wikispecies>).

Tiki

<https://tiki.org/>

Tiki is available for download as open-source software and from the Windows Web App Gallery. It is also known as TikiWiki for its wiki engine, but it can be used to construct a website, a blog, a content management system, and a slew of other web applications. It is written in PHP and has been continuously improved upon by a team of developers since 2002.

Blogs

Any of the blogging technologies described in the activities section could be used as learning environments. WordPress is highlighted here because, although it could not be easily used by individual students, it could be implemented at institutions for information professionals.

WordPress.org

<https://wordpress.org/>

There is strength in numbers and that is what you get with the WordPress open-source software. The community of support is extensive, with a network of developers, designers, and bloggers to offer advice and to help with getting started. There are also tens of thousands of plugins. They can be used for everything from themes to improving social sharing and gathering analytics. The self-hosting software is not to be confused with the free plan available from the WordPress.com hosting service (<https://www.wpbeginner.com/beginners-guide/self-hosted-wordpress-org-vs-free-wordpress-com-infograph>).

Hosts

One of the difficulties with online learning is finding the right way to make lessons available. The environments here can be used to host learning objects, activities, and games.

YouTube

<https://www.youtube.com/>

Everyone has come across a YouTube video, and likely also created one, but not everyone is familiar with their brand account options. Start a YouTube channel for a brand and have it managed by multiple people through their personal Google accounts. Playlists can be curated on a YouTube channel and these playlists can be embedded or shared via email and social media. It is also possible to indicate that a set of videos should be watched together by designating them as a series playlist.

Vimeo

<https://vimeo.com/>

Vimeo has been an advertisement-free option for hosting videos since 2004. There isn't a ton of storage available with the free basic plan, currently set at 500 MB per week and a maximum of 25 GB a year. However, simply replace a video with a more recent version without altering the URL and without losing any of the associated statistics. Videos can be exported or uploaded from one of the collaborators, like Camtasia, PowToon, Google Drive and Dropbox, and subsequently embedded into a webpage. There are different privacy settings for videos and also the option to enable or disable commenting. A community can be formed by inviting others to join a Vimeo group for sharing and discussing videos.

Google Drive

<https://www.google.com/drive>

Up to 15 GB of free online storage is available in the drive, and all file types can be uploaded. When using Google Drive for e-learning, folders and individual files can be shared with students, assigning them either viewing, commenting, or editing privileges. Activities and changes to documents can be recorded and displayed. With the revision history feature, a document can easily be restored to a previous version.

SoundCloud

<https://soundcloud.com/>

Podcasts and audio files can be hosted on SoundCloud and distributed via RSS. The free upload allowance is 180 minutes in total, but older tracks may be deleted to make room for new content. Tracks can be private or public and embedded into webpages using the SoundCloud player. Listeners will be able to follow individuals and comment on tracks. The free plan does have ads and does not support offline listening, but it integrates well with social media.

Apple Podcasts – iTunes Connect

<https://itunesconnect.apple.com/login?module=PodcastsConnect>

Apple began moving much of the content that was in iTunes U over to Apple Podcasts in 2017, making it the go-to place for podcast discovery. It is available on iOS devices and Apple TV, as well as via iTunes on macOS and PC. The majority of the offerings in Apple Podcasts are audio recordings, but they can also be video or text. The following file formats are supported: M4A, MP3, MOV, MP4, M4V, and PDF. You must create an RSS feed for your online podcast. The RSS feed is submitted along with cover artwork to their podcast management system for review.

Learning Objects

Wiley's (2000, p. 7) broad definition of a learning object as "any digital resource that can be reused to support learning" is used here.

Repositories

These repositories are not only where you can find learning objects, but also where you might consider sharing in future.

PRIMO

<http://primodb.org/>

The Peer-Reviewed Instructional Materials Online Database highlights information literacy tutorials, virtual tours, and other examples of library instruction, that are publicly available online. Materials are reviewed for inclusion in the database by the PRIMO Committee of the ACRL Instruction Section. It is a place to learn about and be inspired by e-learning technologies currently in use.

MERLOT

<https://www.merlot.org/merlot/index.htm>

The MERLOT (Multimedia Educational Resource for Learning and Online Teaching) search engine identifies learning objects across multiple disciplines and collections. One of the collections is the MERLOT database from California State University System and its educational, professional and industry partners. Others include general libraries of open education resources, as well as those specific to science and engineering, such as comPADRE (physics collection) and IEEE Computer Society Digital Library. Membership in the Merlot community is free and includes over two thousand librarians and the Library and Information Services Community Portal. Members may submit and review materials and gain access to a content builder for creating and hosting websites.

Videos

Jing

<https://www.techsmith.com/jing-tool.html>

Jing is from TechSmith, the same company that markets Camtasia. Unfortunately, Jing may not be around for much longer, although TechSmith has committed to replacing it with another free screencasting tool. It allows you to narrate video recordings, up to five minutes in length, that can be saved locally and edited in a program that supports SWF files. They can also be uploaded as is to Screencast.com (2 GB of free storage) to obtain a unique URL and the HTML embed code. In order to promote discussion around groups of videos, they can be organized into playlists and with associated files to have them available to students. Commenting may also be enabled in Jing. Once downloaded, a Jing sun symbol stays around the edges of the screen, but it can be hidden away or confined to the menu bar.

Guide on the Side

<https://ualibraries.github.io/Guide-on-the-Side>

There are plenty of examples, from a quick Google search, of library tutorials using Guide on the Side. University of Arizona Libraries offers this tool to promote active student engagement with resources. Once installed and up and running, individual tutorials can be produced. Each begins with a webpage selected for the right-side frame, with text and images added to appear on the left. Individual questions can be incorporated as a tutorial progresses, with the option to include a graded quiz.

Opencast

<https://opencast.org>

If plans are to set up scheduled recordings of presenters and/or computer screens for specific classrooms, Opencast may be just the thing. Founded at UC Berkley in 2008, the open source program automates the capturing of video. The same platform also allows for video processing and distribution, and it includes a standalone player.

Podcasts

Inside Higher Ed's (2016) technology podcast, The Pulse, aired a Podcasting 101 episode that provides useful recommendations for getting started.

Audacity

<https://www.audacityteam.org/>

Audacity was developed at Carnegie Mellon in 1999, for recording and editing audio. It was released soon afterwards as open-source software at SourceForge.net. It handles multiple audio tracks, making it ideal for podcasts with both narration and background music. Audacity is continuously updated and is accompanied by an extensive online manual.

Ardour

<https://ardour.org/>

When directly compared to Audacity, Ardour often comes out on top. It is a powerful digital workstation for recording and manipulating audio and is seen as having a cleaner interface. It may not be as easy to use, for those not in need of the added level of complexity. Advanced features include a video timeline with frame-by-frame display.

Graphics

Canva

<https://www.canva.com/>

Canva is a program for planning graphs and graphics for social media posts, blogs, e-books, presentations, event announcements, and other marketing materials. There are templates, layouts, images and other elements to choose from for free, as well as a set of stock images currently priced at one dollar each. Others can be invited to view or edit drafts. Graphics can be downloaded and shared on social media or made public and embedded into webpages.

GIMP

<https://www.gimp.org/>

GNU Image Manipulation Program (GIMP) is an open-source image editor, so if you want to you can make changes to the code and share those changes with others. The program is written in C, but it does support several other programming languages. It began as a school project for a computer science class at UC Berkeley in the 1990s. It is often referred to as the free alternative to Adobe Photoshop, given the number of features available, but the learning curve may be a little steeper. GIMP is an advanced tool for those who need to work with different image layers, filters, and animations.

Presentations

There are websites, like Storify, that have recently announced that they are closing down so be sure to transition or archive published presentations often.

Prezi

<https://prezi.com/>

Founded in 2009, Prezi is a popular alternative to delivering traditional PowerPoint presentations. The free basic account does not put a limit on the number of presentations that can be made and stored, but it does not come with privacy controls and offline access to Prezis. Since it offers an open canvas space, presentations done with Prezi offer teachers and learners a big picture view over the content and the ability to interact with different elements.

Google Slides with Q&A

<https://slides.google.com/>

Google Slides has everything that one would expect from a presentation software, including a template gallery and the ability to insert video and other media into slides, but there are some unique features as well. Presentations can be published online and embedded using a customized auto-advance option. However, there is an added bonus for synchronous delivery of slides that turns it into a conferencing tool: audience Q&A. When starting a presentation from a browser, or from Google Hangout via the Slides app, Q&A can be enabled so that participants can ask questions in real time and vote other questions up or down. The speaker has the ability to display selected questions to the audience. All questions are saved in the Q&A history to be shared and revisited at any time.

PowToon

<https://www.powtoon.com/>

This in-browser software, born in 2012, can be used to create and host animated presentations. There is a free account option that, like most free accounts, comes with limited storage (100 Mb) and access to a subset of functions, mainly scores, styles and animations. According to their website, a PowToon can be made in 20 minutes, since they walk you through ready-made templates, but it may be best to spend that time playing with character and object settings. Presentations can be embedded into webpages or downloaded as PowerPoint and PDF files.

Activities

These can be used to promote active student engagement in e-learning. In addition, students can be encouraged to create, curate, and share lessons with the learning-object websites and programs described above.

Collaborative authoring

Google Docs

<https://docs.google.com/>

Many students have a Google account, so it isn't a stretch to make the move to working collaboratively on Google Docs. There are plenty of templates in the gallery, including spreadsheets and presentation slides, but anything made using a Microsoft Office program will need to be converted before editing. Up to 100 people can be given permission to make changes to a document simultaneously, such as working on a Google drawing, but files can also be open to comments only, closing them off to edits.

Dropbox Paper

<https://www.dropbox.com/paper>

The basic (free) Dropbox plan comes with 2 GB of storage and access to Dropbox Paper.

Students can share files and folders as they might normally via Dropbox in a browser, but they can also work collaboratively by signing up for Paper. It has templates for brainstorming, creating project plans and taking meeting notes. Permissions can be set on folders, so that they can be used as collaborative or group spaces. Files can be shown in a classroom setting directly from Paper using the present option.

Box, with Box Notes

<https://www.box.com/>

Box is a browser tool, but it can also be downloaded for the desktop or mobile devices. It comes with 10 GB of free storage and allows for the sharing of documents with others who do not have a Box account. Security features include file locking, expiration dates on links, and password protection. Collaborative authoring is available through Office 365 integration and Box Notes. Documents can be co-edited in real-time in Word and other Microsoft programs, or in the Box Notes editor.

Blogging

Students can have their own blog, or post to a shared blog, with one of these free platforms. They come with ample documentation and tutorials that can be utilized to provide necessary training for those that are new to blogging or to a particular tool.

WordPress.com

<https://wordpress.com/>

One of the co-founders of WordPress.org is responsible for this hosting service, but the two are quite different offerings. The popular WordPress.org software is self-hosting and may not be an option for many. However, the free WordPress.com plan can be used by students to quickly generate online spaces. It does not require any technical know-how to start a blog, and all updates and backups are done automatically. WordPress.com offers 3 GB of storage space. There will be ads present on all websites, and there are limited themes and plugins available to free plan users.

Edublogs

<https://edublogs.org/>

Edublogs is powered by WordPress, but there are additional attributes that are specific for educational use. For example, there is a My Class option on the dashboard. My Class allows teachers to start a blog and invite students to either post in the class blog, or to create their own linked blogs. There is a password privacy option, so that only teachers and students can visit the blog. Edublogs also comes with a community of librarians, educators, researchers and students that are blogging on the platform. Unlike the WordPress.com hosting service, there are no ads for users of the free blogging tool. However, the free version does not support embedded videos and HTML, or the use of custom domains. It also only provides 1 GB of storage space.

Blogger

<https://www.blogger.com/>

Blogger blogs come with free blogspot.com domains, and they do not have ads on them. There is a help forum, as expected with a Google product, and blogs easily connect with Google+ and Google Analytics. Permissions settings include a private option, so that only specified individuals can read posts, but there is also the option to set up multiple authors and only allow authors to access a blog. When they are no longer in use, blogs are easily removed from Blogger,

and content can be download before deleting it. An interesting feature for mobile devices is the ability to select a mobile version of the current blog theme.

Tumblr

<https://www.tumblr.com/>

Students can quickly post on Tumblr to share websites, videos, images, and more. One of the benefits of Tumblr is that it is easy to follow other people and have their posts appear on a dashboard. Posts can be re-blogged and commented upon, promoting collaboration and cooperation among students.

Visualizations

Periodic Table of Visualization Methods

http://www.visual-literacy.org/periodic_table/periodic_table.html

Chemistry librarians will appreciate this periodic table. It aids in the teaching of visualization methods and in their selection for student activities. It identifies and organizes 100 visualization methods as the periodic table of elements, a form that will undoubtedly be familiar to science and engineering students. The table's vertical groups divide methods used to graphically represent data, information, concepts, strategies, metaphors, and compound knowledge. Above each method's symbol are pictorial representations of additional dimensions, such as whether they are overview or detail visualization methods, in homage to the periodic table ([Lengler & Eppler 2007](#)).

Google Charts

<https://developers.google.com/chart/>

Google charts are easy to use and could be ideal for activities that translate to real-world data visualization. There are over two dozen interactive charts to choose from, all of which can be embedded into a webpage. For example, one chart that could be used in a library activity is a timeline, depicting events over time, such as a project timeline. The Gantt chart is one type of timeline that can be made with Google Charts to show the division of a project into tasks. Google Charts can extract data out of Google Spreadsheets and other sources.

TimelineJS

<https://timeline.knightlab.com/>

TimelineJS is an open-source product from a team of technologists and journalists at the Northwestern University Knight Lab. It offers a Google spreadsheet template that can be populated and published as a timeline to the Web, in a collection of interactive slides. It works best for stories that can be told chronologically. Students can use it to embed media from the sites that they are already using. For example, pasting in the URL of a Wikipedia article will automatically add an excerpt to a timeline slide. They can also embed sound clips from SoundCloud, videos from YouTube, images from Flickr, Google maps, tweets, etc.

CmapTools

<https://cmap.ihmc.us/cmaptools/>

The CmapTools software, from the Florida Institute for Human and Machine Cognition (IHMC), has been in use in schools around the world since the 1990s, allowing students from all age groups to construct concept maps (Cmaps). It is employed at McGill Library to teach concept mapping to graduate students in physical sciences and engineering. Students are asked to build graphical representations of their research projects to explore their own understanding and misconceptions of the core concepts and relationships. IHMC offers public server space so that

Cmaps can be viewed and shared as webpages. Individual concepts can include web links, documents, and connections to other Cmaps. Maps can also be edited simultaneously with partners or groups in CmapTools during collaborative activities.

VUE

<https://vue.tufts.edu/index.cfm>

Visual Understanding Environment (VUE) is open-source software written in Java and available for download from Tufts University. Much like CmapTools, it allows for the visual representation of complex ideas into concept maps. It also allows for the connection to digital objects, but with an additional annotation function. Unlike CmapTools it does not prompt for the linking phrases between concepts, leaving concepts connected, but without the defined relationships. However, it does have the ability to generate annotated trails throughout the map, with a slide mode for presenting pathways. It also has advanced analytical tools for the comparison between different concept maps.

Polls, quizzes, and surveys

Google Forms

<https://docs.google.com/forms>

The usual question types are available from Google Forms: short answer, paragraph, multiple choice, checkboxes, dropdown, linear scales, date and time, along with the more complex multiple choice or checkbox grids. However, there is also the ability to allow respondents to upload files using Google Drive. File upload quiz questions require respondents to sign in to Google.

Socrative

<https://socrative.com/>

Socrative has been used by a colleague at the author's institution to engage undergraduate engineering students. The platform is web-based, and the free plan comes with a public room that accommodates 50 logins at a time. In order to participate in quizzes, quick questions, or team races, students enter the name of the room where the activities will be launched, either in a browser or via the Socrative student mobile app.

Poll Everywhere

<https://www.polleverywhere.com/>

The free higher-education plan at Poll Everywhere allows for 25 responses per poll. There are over twenty question options to choose from when creating a poll, including adding clickable images, surveys, open-ended questions, and competitions. Polls can be set to unlock at a specific date and time. Once activated you are given a URL to share, but text messaging of responses is possible. Poll Everywhere can also be added to presentations in PowerPoint, Keynote, and Google Slides, after downloading the presenter app.

Kahoot!

<https://kahoot.com/>

Kahoot! was released in 2013 by a group of entrepreneurs, in partnership with the Norwegian University of Technology. Their numbers are impressive, with more than 50 million 'kahoot!'ers' and over 20 million 'kahoots' available to the public. These learning games can be copied and adapted to a particular audience. Kahoots are meant to be played live. Questions are displayed on a screen in either a multiple-choice quiz format or as a jumble, with answers that need to be ordered correctly.

Students enter the corresponding game PIN at kahoot.it on their devices. If turned on, points and podium positions are assigned to the students' chosen nicknames. Games can also be made available to be played anytime.

Games and Gamification

Gamification is defined by Deterding et al. (2011) as the use of game elements in non-game contexts. There are free courses on Coursera and EdX on game design and gamification that are great for continuing education in these areas. This section has picks for producing games and more game-like learning objects and incorporating game elements, such as quests, choice, narratives, characters, and rewards. Taking the time to play games is also important. A list of active and retired library games can be found in the e-learning kit online (<http://libraryguides.mcgill.ca/eLkit/gaming#games>).

Developing games

Bitsy

<https://ledoux.itch.io/bitsy>

This game editor is a perfect tool for anyone looking to build their first game. In a single sitting with Bitsy, it is possible to make a one-room game that allows the player, through an avatar, to move around an environment and interact with characters (sprites). At the same time, even game designers will be impressed by the possibilities. Rooms consist of 16x16 boards that can be connected to each other with exits and entries. Each tile or sprite takes up one square in a room but has an 8x8 drawing grid. It allows for creativity in drawing backgrounds and characters. Games can be downloaded as HTML files and uploaded for continuous editing.

Twine

<https://twinery.org/>

Twine is a program for producing interactive learning objects, activities, and even games that are published as branched stories directly to HTML. It is simple enough to use but has advanced functionality, like using scripting to add role-playing battles or randomness, for those who are looking to take it further. Twine has been around since 2009 and is supported with a wiki and a community forum available from the website. It is open source and can be downloaded for Windows, Mac OS, and Linux. With the latest version (Twine 2), stories can also be done entirely online. Example of a game made with Twine: Hodges Library APA Game (it has zombies): http://library.hodges.edu/ld.php?content_id=22059312.

Scratch

<https://scratch.mit.edu/>

As a project of MIT Media Lab's Lifelong Kindergarten Group, the Scratch programming language was first launched in 2007 for children ages 8 to 16. However, it is being used by people of all ages. It is fun and painless to get started with Scratch online, thanks to the step-by-step walk-through on getting a sprite (flat object) moving and talking with sound. Existing projects can also be remixed, for example, with the addition of recorded sound. It is not only for games but also for sharing interactive stories and tutorials, simulations, tours, and other products of the imagination.

Gameblox

<https://gameblox.org/>

Gameblox is found in the Education Arcade as an outcome of MIT Scheller Teacher Education Program. Similar to Scratch, the game editor uses block-based programming that can be mastered with some experimentation using a web browser. Gameblox can also be used in the development phase of a more advanced game. There are getting started tutorials available, from the basics of object properties, such as gravity and responding to collisions, to the more advanced options, including enemies, multiple levels and multiplayer mode. These extras set it apart from Scratch, along with more of a focus on gaming.

Unity

<https://unity.com/>

For the information professional that is skilled at programming, or is committed to learning, there is Unity. Unity offers a free personal plan on their platform with all of the game engine bells and whistles. It supports C# and its own UnityScript for the design of 2D and 3D games that can be deployed on most platforms. Unity comes with a large community of users and an extensive manual that is supported by tutorials.

Quests

WebQuest.org

<http://webquest.org/>

According to this site, the WebQuest model has been around for over 20 years. As the name implies, students are presented with a challenge and go on a quest for answers using online sources. WebQuest.org hosts a database of quests, called the QuestGarden. There is an information literacy and library curriculum area in QuestGarden with options to search by grade level from kindergarten through adult. The site also offers technology recommendations, templates and advice needed to build WebQuests.

Quandry

<http://www.halfbakedsoftware.com/quandary.php>

Quandry is an action maze software that is only available for download for Windows machines and is no longer being supported, but it is worth visiting this website for the examples alone. It is necessary to interact with a few action mazes in order to gain an understanding of how they work. Action mazes promote problem solving by offering up a scenario and allowing others to drive the story forward with a list of different actions to take, in the style of old 'choose your own adventure' books. Action mazes can be built on institutional websites or with free hypermedia programs, such as Google Sites (<https://sites.google.com/>).

Avatars

DoppleMe

<http://doppelme.com/>

This is an uncomplicated tool for customizing avatars for online spaces and social media. There are different expressions, clothes, and accessories to choose from. Certain selections require DoppelMe coins that can be accumulated with frequent use. Avatars can be downloaded as GIF and PNG images, or they can be embedded into pages to display the latest versions.

GIFMaker.me

<https://gifmaker.me/>

Animated GIFs and video animations are made online in just a few steps, with no need for registration. For example, avatars can be animated by first uploading multiple JPG, PNG, or GIF images that represent the avatars with changing facial expressions. The canvas size and animation speed can be experimented with before exporting the end result.

Open badges

An institution's LMS may have choices for badges and other reward types, but those found here are specific to Open Badges (<https://openbadges.org/>). Open Badges, supported by Mozilla and the MacArthur Foundation, are digital badges that include metadata based on a standard so that they can be shared, verified, and well understood.

BadgeOS

<https://badgeos.org/>

For those using WordPress, this is a plugin for issuing Mozilla Open Badges. Students earn badges through achievements, which they can in turn share via multiple avenues such as through social media platforms or on their resumes. To go along with the plugin, there are a number of related extensions with added functionality.

Openbadges.me

<https://app.openbadges.me/>

This platform makes issuing badges that conform to the Open Badges standard from scratch attainable. It breaks down the process into easy steps. The first is to choose a graphic for the badge by deciding on the background, shapes, icons, and text. Next is to define the issuer, followed by the description of what the badge will represent. Last is to send it out to recipients with a custom email message. Once received, badges can be downloaded as an image file, or added to a free myshowcase.me account (<https://myshowcase.me/>) or the Mozilla Backpack (below).

Badgr

<https://badgr.com>

Mozilla is retiring its Backpack platform and supporting the use of Badgr. It is a free open source platform to store and display badges from different sources that use the Open Badges standard, including OpenBadges.me described above. It facilitates the organization of badges from different places into collections, while conserving the data on when, why, and by whom they were issued. In addition to functioning as a backpack, individuals and institutions can also issue badges with Badgr.

Building Community

It is important to incorporate community into e-learning and these can help, from scheduling and discussion sites for groups to web conferencing systems.

Scheduling

Doodle

<https://doodle.com>

This scheduler is nice for students to use for group meetings, since it is not necessary to register to begin or to participate in a poll. Everyone votes on their preferred times from a selection of dates, and Doodle presents the results. There are advantages to registration, such as the synchronization with personal and work calendars and the ability to set up a MeetMe page. MeetMe makes it easy to share availability and invite others to request appointments.

YouCanBook.me (YCBM)

<https://youcanbook.me/>

The free account comes with the basic online scheduling features and functionality. In return, the 'powered for free' branding will be present on booking pages and notifications or reminder emails. It necessitates that students and teachers keep at least one personal calendar up to date (Google, Microsoft, or iCloud) in order to sync with YCBM and share availabilities for bookings.

Group discussions

These options for creating groups in order to facilitate discussions are similar to each other, so it is important to take preferences into account. The selection might depend on whether or not students are already registered users of Google, LinkedIn, or Facebook. It is necessary to review privacy settings with students beforehand, since there may be differences for individuals and groups. Twitter is also included in this list, since it is a popular social networking site.

Slack

<https://slack.com/>

Workspaces can easily be created in Slack, either via the website or a desktop or mobile app. Channels are used to organize posts and discussion threads on a topic or project within a workspace. They can be set as public or limited to invited members. Apps can be added to channels so that popular tools like Google Scholar, Dropbox, and Box can be integrated with Slack. The free version also allows for one-on-one video calls.

Google Groups

<https://groups.google.com/>

There are four different types of groups to choose from: 1) Email lists that accept web and email posts; 2) Web forums for interactive discussions with moderation functionalities; 3) Question and answer forums, where questions can be rated and organized into categories; and 4) Collaborative in-boxes, where individuals are assigned tasks for completion. Each new group is given a URL and an email address. Permissions can be changed to allow only invited users to join.

Facebook

<https://www.facebook.com/>

Like Google Groups, Facebook groups can also receive a customized web and email address. Members can post and comment on posts through email. They can be set as public, closed, or secret and can be archived when terminated. As long as a group is closed or secret, only new and invited members can see posts. However, anyone can see a group name, description, and its members, unless it is set as secret. Group settings allow for messages to require approval before they are posted.

LinkedIn

<https://www.linkedin.com/groups>

Standard groups can be found when searching LinkedIn or Google, but conversations are available only to their members. Once a standard group is launched, it can be changed to unlisted and hidden from search engines. Anyone who knows the group URL will be able to request access, otherwise membership is by invitation only. Daily or weekly digests of activity happening in the group can be enabled.

Twitter

<https://twitter.com/>

Twitter does not have a group option, much to the dismay of users, but one substitute is to curate a group of Twitter accounts into a list that others can subscribe to. An alternative is to involve students in the creation of a unique hashtag that can be used to associate tweets to the particular learning experience.

Conferencing

BigBlueButton: Greenlight

<https://bigbluebutton.org/>

Greenlight is the front-end version of BigBlueButton that anyone can use. It is easy to start and join a meeting without having to log in or register. Meetings can be recorded and saved by first logging in to Greenlight with a Twitter or Google account. It is possible to upload presentations, use the whiteboard, or allow others to take control, start a poll, and open breakout rooms. BigBlueButton is actually an open-source web conferencing system that began in 2007 at Carleton University in Ontario, Canada. It runs on Ubuntu and can also be integrated into an LMS. More information on installation can be found at <https://demo.bigbluebutton.org/gl>.

Google Hangouts

<https://hangouts.google.com/>

Chat and video call are both available from Google Hangout. All that is needed is a Google account to access the service from the website, Gmail, or through the Chrome extension. Group chats can be launched for up to 150 people, while video calls are limited to 10. Messages can be sent out to individuals who are offline.

YouTube Live events

https://www.youtube.com/my_live_events

Stream live video by enabling the option on a YouTube channel, either on the desktop or via the mobile app. It is only available from the app if the channel has at least 100 subscribers. There is an encoder to download to compress audio and video while setting up the live stream. The stream can be previewed beforehand, started, and stopped whenever necessary. Questions can be received and addressed from the live chat. Streams and their archives can be set as public, unlisted, or private. Videos that are shorter than one hour can be edited on YouTube.

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