



EXPLORING 21ST CENTURY SKILLS

Online Collaborative Tools in Education

Executive Summary

Collaboration is essential in teaching 21st Century Skills. Research has shown that, in addition to demonstrating mastery of subject matter, students who collaborate also increase their skills in problem solving, creativity, and interpersonal relationships. When productivity tools and their associated data become cloud-based, these provide the opportunity for collaboration that cannot be realized using desktop applications.

This paper begins with four examples of educators who collaborate online using cloud-based tools. In the first scenario, students work with each other and a mentor to analyze data from their project. This example illustrates the power of online suites and demonstrates some of the safety and privacy precautions educators can take. Next is an example of a teacher who engages parents through a variety of social media sites. In the third scenario, two classes collaborate together and with other students in an international research project. Finally, teachers adapt their collaboration approaches as their needs change and new tools become available.

All of the educators, parents, and students in these scenarios incorporate tools used for personal and professional business into their classroom-driven collaboration with others. Until recently this meant installing and maintaining a version of email, calendar, word processing, spreadsheet, and presentation software on every device. The proliferation of cloud-based applications has removed this requirement. The second section of the paper presents an in-depth comparison among the top three cloud-based productivity suites to show how they perform on a variety of desktop, laptop, and tablet-based devices. While each of the services works well with keyboard-based devices using a full browser, each of the tablet-based apps was lacking in some collaboration features. If a tablet uses the same browser as the laptop version (e.g., a Windows 8-based tablet), then Microsoft Office Web Apps offer the best experience for touch screens.

In the third section of this white paper report, we provide a review of the research on collaboration in the classroom. The review begins with research that shows the value of collaboration in general and then moves to the specific benefits of using online collaboration. We conclude that section with a summary of best practices as reported in the professional journals.

The final section is an annotated listing of the online collaboration tools currently available. We chose to be inclusive in this compendium by listing online tools that would be helpful toward collaboration, including some tools, such as file sharing sites, that are not specifically designed to be collaborative. We have included the Web address and features for each site, as well as an indication of whether student privacy is maintained, the appropriateness for elementary students, whether there are ads displayed while using the tool, and whether there is a version specifically designed for educators.

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Using Cloud-based Collaboration: Four Scenarios

STUDENTS & MENTOR COLLABORATION

Sophia begins her day by checking Twitter, email, and Instagram for anything that happened while she slept. There's not much on any of the apps—just a few tweets from friends; a notification of assignments due over the next couple days; and an invitation from Jake, one of her partners in a social studies project, for an 8:00 p.m. group meeting. She checks her calendar to make sure she'll have Internet access at that time before accepting.

This meeting, with a local expert on data sampling, Ed Gregson, is one Sophia's been looking forward to. As a social studies project on surveys and data analysis, her team created an online survey to learn whether other students in their high school support a bill in the state legislature to decrease the alcohol limit for driving. While they were developing the survey, they struggled to word the questions in ways to elicit valid responses and data. When they asked their teacher, Mrs. Sanders, to weigh in on their draft Google Forms questionnaire, she suggested that they contact Ed Gregson, a retired market analyst who teaches at the community college. They gave Mr. Gregson access to their form, and he helped them edit it during an online conference. Now that they have moved the data into a Google spreadsheet, Mr. Gregson has agreed to meet with them to help them find meaningful and appropriate ways to summarize their data.

Thinking ahead to that evening's group meeting, Sophia remembers that they will need to keep a video record of it on the school's YouTube channel because the meeting involves someone from outside the school. She reminds Jake that they should meet on a Google Hangout On Air, and that they need to include their teacher in the invitation. Mrs. Sanders usually doesn't actually attend these meetings, but she often drops in to see if anything has come up that she can help with.

Sophia has been a bit concerned about her social studies team. As it turns out, there is nobody on the team with much experience working with spreadsheets, and she doesn't want Mr. Gregson to think that they are using him to do all the work. She sends an email to Mrs. Sanders to get the OK for adding Kerry, a friend of Sophia's who is strong in math, to the team. While Kerry isn't in the social studies class, she has agreed to help out because she wants to learn more about statistics and because she once used Sophia as an editor for her English essay.

At about 7:30 that evening, Sophia reviews the project spreadsheet. She finds that Kerry has added the mean and standard deviation for each response. She is also relieved that two of the four other team members are already signed into the meeting.

The meeting starts on time with the whole team and Mr. Gregson online both at the Hangout and the shared spreadsheet. Jake explains to everyone the school requirement that the meeting be recorded, and they agree to allow it (they have all done this before). He also introduces Kerry to the others and explains why she is on the team. She guides them through the changes she has made to their data and asks Mr. Gregson how she can determine whether women were

more likely to support the bill than men were. He explains the differences between ratio and interval data and suggests that they do a non-parametric comparison. While he talks her through it, Kerry sets up a chi-squared test to compare the gender groups. Mr. Gregson also talks with the team about how they should phrase their language to match what the test genuinely measured.

The meeting adjourns at 8:45 with the team thanking both Mr. Gregson and Kerry. Sophia immediately follows up with an email to each of them and copies Mrs. Sanders.

TEACHER & PARENTS COLLABORATION

Marco tried very hard to get parents involved in his students' learning. He created business cards with his email address and a Facebook page for his class. He used his Facebook page as a blog to describe what he was doing in the classroom and why. He updated it every Friday afternoon with a recap of the week and the plan for next week. With each post, he provided suggestions for activities at home that would reinforce the learning. He also included an outline of the homework that the students would be assigned.

Even though Marco always encouraged comments, it took a while before any of the comments were meaningful. While he was pleased with the "Likes" and an occasional "Nice job" comment, the parents weren't as engaged in the process as he hoped. One week he decided to include the rubric that the students would use to assess their peers on their current project. He suggested that each parent ask their child to explain exactly what he or she would be looking for when assessing each trait. Many of the parents did this and commented on how their child's explanation matched their expectations.

With this success, Marco started sending parents the rubrics using forms he created in Google Drive. Parents could do the actual assessment with their child, and Marco could review their input in his spreadsheet as part of his overall assessment of a project. He could also see where the wording of some of his assessment items could be improved if a parent's rating was significantly different from his own.

In his posts and during parent meetings, Marco continuously encouraged parents to join in the assessments. Finally, in the spring, he decided that there was enough of a "critical mass" to try involving the parents in his assessment of teams in a project. For each team of four he arranged a Skype meeting with the parents and the team. Before the meeting he shared the team documents with the parents using Google Drive. At their meeting, each team presented their project with a slide show and then walked through the documents and spreadsheets they produced. Marco then asked the parents to complete the assessment form collaboratively.

An unplanned benefit of his collaborative assessment was the reaction of the parents. As a result of the meeting, the parents seemed to feel more like collaborators with each other and with Marco. In Facebook comments they began reacting to each other's comments, and a few even began making their own posts on Marco's page. One parent, probably as a joke, posted a rubric to evaluate Marco's page and received over 30 comments.

STUDENT TO STUDENT COLLABORATION

Mae teaches a sixth-grade earth science class and an eighth-grade physical science course. She has decided to include both classes in an international project where students measure the boiling point of water, submit data to a database, and then analyze the global data. She begins by enrolling her school and reviewing the project activities. She wants all her students to be involved in the project; therefore, because each school can only submit one set of data, she arranges the curriculum for each class to incorporate the activity in the context of what they are covering.

The project involves measuring the boiling temperature of water along with the volume, the room temperature, the type of heating device, and the elevation. Mae decides to have the sixth-grade students develop a hypothesis concerning which dependent variable will affect the boiling temperature most and test that hypothesis once the worldwide data have been collected. The eighth-graders will do the same, but they will also analyze the data to construct a chart to predict the boiling point at any elevation.

Even though no personal information will ever be submitted, she sends a notice to all of the parents. She knows that some will be concerned about their children submitting information on the Internet, and she wants to assure the parents about the safety and privacy of the project.

When she begins the project in her classes, she explains the experiment and has each class brainstorm to predict the results. Each class gets to select a volume of water for the experiment and to choose between a Bunsen burner and a hot plate. She is relieved that the two classes make different choices. Next, teams from each class do the experiment. After a team gets its data, they submit it using a form the Mae created online. Each class then reviews the results and decides which measure of central tendency they will use to determine the class's average boiling temperature.

The next step is for the two classes to review the data from the other class to decide whether what effect the water volume and heating device had and to modify their hypotheses if they want. The eighth-grade class then repeated the experiment using the same conditions as the sixth-grade class so that they could submit a consistent school average.

Later in the year, Mae has teams from each class download the international data set and analyze it using a Web-based spreadsheet. Each team reviews the data and creates a scientific report including the hypothesis, experimental procedures, results, and discussion. The older students create a chart with the line of best fit to allow prediction of the boiling temperature for elevations that were not included in the data.

Finally, the teams from each class meet to decide what conclusions to submit to the international project. They also review the project forum to see if there are insights or questions they could add.

TEACHER TO TEACHER COLLABORATION

Lydia and Natalie met during a district training on incorporating technology into project-based learning. As part of the training, the participants worked as partners to develop a project to use later in their classrooms. The two teamed up because they both taught language arts at their middle schools. They not only worked well together, but they enjoyed each other's company and agreed to stay in touch after the training ended.

Natalie sent Lydia an email later that year when she was halfway through the project with two of her classrooms. She had discovered that she needed to alter the assessment a bit to align with district standards, and she thought that Lydia would have faced the same problem. They met one day at a Starbucks to come up with ways to change the assessment to meet their district requirements. While they worked, Natalie connected to the standards online and they copied the language directly into the document that they were revising. When they finished their changes to the assessments, Natalie emailed a copy of the new document to Lydia. Before parting, they began planning a second collaborative project.

For the second project, the teachers collaborated mostly by telephone and email. When Lydia made changes to any of the documents, she would turn on "track changes" and send the saved document to Natalie. Natalie would do the same, and the collaborative document went through 15 iterations before its final version.

For their third project together, the two agreed to involve other language arts teachers at their schools. They were concerned that passing documents around a group of seven teachers would be confusing because no one would know which version was the latest. Since Lydia already used a wiki for some of her assignments, she set the project up as a new wiki page and sent the group links to both the page and a tutorial on how to use the site. She started the new page with the learning goals of the project, the essential questions that would be addressed, and an outline of the project that she and Natalie used in their earlier training. Within a few days, most of the teachers had figured everything out, and they completed the new project using only the wiki and the occasional Skype meeting.

Now Lydia and Natalie are beginning work on a new project. Because they hope to publish this one, they are developing not only project plan documents, but also a set of materials for teachers to use with their students when they teach the unit. For this project, they agreed that the final products must be compatible with Microsoft Office, so they are using the apps in Office 365 as they collaborate. They have been accepted to present the project at a regional language arts convention, so they have a much shorter production timeline than they had in previous projects. They talk by phone three nights each week as they both make edits in real time to shared versions of the documents online. As soon as Natalie makes a change, Lydia can react and make any desired edits to that change. By the end of the project, they have the project plan in a document, scoring guides in Microsoft Excel, and the conference presentation in Microsoft PowerPoint.

A Comparison of Online Collaborative Productivity Suites

In this section, we compare the features and capabilities of collaborative, cloud-based suites of the tools that comprise a typical office suite: word processing, spreadsheet, and presentation applications. Our criteria dictate that a suite must:

- Have collaborative features
- Include word processing, spreadsheet, and presentation software
- Have an interface for mobile devices
- Be free

Two products that fulfill these requirements currently dominate: Google Drive¹ and Microsoft Office Web Apps². A third provider included in our analysis, Zoho Docs, also has a suite that meets the criteria. A fourth suite, iCloud, offers cloud-based versions of iWorks but was not included in this analysis because it is still in beta, and the current version does not include collaboration features.

Each of the three suites reviewed offers free, cloud-based storage and a variety of additional tools. Each has the capability to import and export documents, but the fidelity of those documents was not a part of this review. Each also can be viewed using any modern browser (i.e., a browser that complies with the HTML5 standards) and the fidelity of documents from browser to browser was noted. Each of the suites requires students to have email addresses. The email address does not need to be associated with the provider's email service, however.

Each suite was reviewed using the following browsers and devices:

- Internet Explorer 10 on Windows 8 (mouse and touch)
- Chrome on Windows 8
- Firefox on Windows 8
- Chrome on Mac OS X 10.8
- Firefox on Mac OS X 10.8
- Safari on Mac OS X 10.8
- An Android app on a Samsung Galaxy Tab 2 10.1 (touch)
- A iOS app on an iPad 3 (touch)
- Chrome on an Acer Chromebook
- Internet Explorer 10 on a Microsoft Surface RT (keypad and touch)

GOOGLE DRIVE

BROWSERS

Google Drive is both a file storage site and a suite of collaborative productivity tools. The site offers 15MB of storage but documents that are stored as one of their collaborative documents do not count against that storage limit. The suite includes Document (word processing), Spreadsheet, Presentation, Form (an interactive survey tool), and Draw (a vector drawing canvas). No differences were found when using these browsers on a desktop or laptop device with a keyboard and mouse. When used on with a Windows 8 touchscreen device it was difficult to distinguish among gestures such as tapping to select an item, touching the screen to begin a swipe, and dragging to select a range.

A user may add to this suite by installing Google Drive apps, including such collaborative apps as project management and flow chart diagramming. Costs of these apps vary, with many offering both free and paid versions. The descriptions below do not include these add-on apps.

Editing

Editing in Document is very similar to editing in a stand-alone word processing application. The user may insert and format images and tables, and the app includes the basic commands to format text, paragraphs, and tables. It also includes buttons to undo, redo, add a hyperlink, remove formatting, and copy formatting. Advanced word processing features include footnoting, spell checking, an equation editor, a drawing editor, word count, translation, and the ability to write and run scripts in JavaScript.

Spreadsheet editing is also similar to editing in a stand-alone application. A user may change text (font, size, bold, italic, strikethrough, color) and cells (background color, borders, number format, merging, horizontal and vertical alignment, and text wrapping). Like the Document app, it includes buttons to undo, redo and copy formatting. There are 315 functions available for manipulating data and either columns or ranges may be sorted. A user may insert an image or form or create a drawing or chart. The Spreadsheet app includes the ability to write and run scripts in JavaScript along with a selection of pre-written scripts.

The Presentation app allows the user to create or import slides and to insert text, images, video, lines, shapes, or tables. Slides may be customized with a variety of themes and layouts, and text can be formatted with buttons for font, size, bold, italic, underline, and background color. Paragraphs may be formatted by changing the justification, line spacing, bulleting, numbering, indent and outdent. The app can also be used as a slide show presentation with customized transitions and linking.

The Drawing app has the same insert, text, and paragraph options as the Presentation app. In addition, there are buttons to set or change line color, fill color, line type, and line dash.

The Form app provides options for setting or changing the type of response (text, paragraph text, multiple choice, checkbox, choose from a list, scale, grid, date or time), adding questions, and adding response options.

Collaboration

All edits from each collaborator are displayed to all other collaborators immediately. While the document is being edited by others, the name of each collaborator and his or her cursor position is displayed.

History

The full history of revisions may be viewed within any type of document except forms. The history includes the person editing, the time, and the changes that were made. Versions can be viewed as individual changes or grouped into sessions. Any revision may be restored.

Comments

In each of the apps, selecting a word, phrase, or cursor location, and then selecting the “Comment” button will open the comment popup. If the select already has a comment then the history of that popup will include the history of comments.

Chat

Chat can be initiated by selecting a button whenever another collaborator has the document open. The chat window appears as a popup.

Performance

The complex test word processing document took only a few seconds to finish loading. Changes updated in each collaborator’s view almost immediately. The only noticeable differences in performance were in how fast shapes (especially “scribble lines”) were rendered, with Firefox rendering more slowly than other browsers.

Fidelity

Files from each app appear the same no matter which desktop/laptop browser is used to open them. Documents that were created in stand-alone office applications must be converted to Google Drive formats. The conversion is usually accurate, but some Excel formulas are not supported in Google Spreadsheets.

ANDROID APP

While Google Drive documents can be edited in the browser window on an Android tablet, the experience is unsatisfying because the Web applications are not optimized for touch screen. When open, a document or spreadsheet is shown in the mobile view that does not include collaborative features such as commenting, chatting, and updating. For collaborative uses, the free Google Drive Android app should be installed and used.

Editing

The document editor includes buttons to undo, redo, change font, bold, italic, underline, strikethrough change justification, numbered list, bulleted list, indent and outdent. The

spreadsheet editor includes buttons to undo, change fonts, change cell characteristics, bold, italic underline, strikethrough, horizontal align, and vertical align.

The standard touch features to select text are implemented. Voice recognition is available as an alternative to keyboard entry with acceptable performance and integrity.

Tables may be edited but may not be created.

Sheet editing allows changes to cells, formulas, and formatting. Sorting may only be done by column and hiding or showing columns and rows is not possible.

Collaboration

All edits from each collaborator are displayed to all other collaborators immediately. While the document is being edited by others, the name of each collaborator and his or her cursor position is displayed.

History

The revision history is not available using this app.

Comments

In a document, comments are available by selecting a comment button. Note however, that the comment display is modal: text may not be edited while comments are displayed and vice versa. Comments may be added by selecting a word, phrase, or cursor position, and then selecting the comment button. The user may also reply to any existing comment. The voice recognition feature works well for comments.

In a spreadsheet, comments may not be added and existing comments do not display either the comment or any indicator that a comment exists.

Chat

Chat is not available.

Performance

Relatively slow to load. While it took only a few seconds to open with the first page display, the complete test document took 58 seconds to finish loading. On occasion, after opening the initial page, the loading would fail before completing.

Fidelity

In the word processing document, all text, formatting, comments, and images were preserved in the word processing document, while in the spreadsheet, formulas, numbers, and formatting are preserved but charts, images, and comments are not.

Types of documents

Word processing and spreadsheets may be edited. Other document types may be viewed.

IPAD APP

Editing

Documents and spreadsheets open in a view mode but switch to editing when the user taps anywhere in the document. The document editor includes buttons to undo, change font, bold, italic, underline, change justification, numbered list, bulleted list, indent and outdent. The spreadsheet editor includes buttons to undo, change fonts, change cell characteristics, bold, italic underline, strikethrough, horizontal align, and vertical align.

The standard touch features to select text are implemented. Voice recognition is available as an alternative to keyboard entry with acceptable performance and integrity.

A serious drawback to this app is the inability to edit tables. Existing tables may be viewed by switching to a read-only "Preview" mode.

Spreadsheet editing allows changes to cells, formulas, and formatting. Sorting may only be done by column, and hiding or showing columns and rows is not possible.

History

The revision history is not available using this app. While the document is being edited by someone else the name of that editor and his or her cursor position is displayed.

Comments

Selecting a word, phase, or cursor location, and then selecting the "Comment" button will open the comment popup. If the select already has a comment, then the history of that popup will include the history of comments. Comments may not be deleted. The voice recognition feature works well for comments.

In a spreadsheet, comments may not be added and existing comments do not display either the comment or any indicator that a comment exists.

Chat

Chat is not available.

Performance

The complex test document took 32 seconds to finish loading. Since the loaded document does not display tables, an additional 25 seconds was required to switch to the preview mode to review the entire document. Each change between the editing mode and the preview mode took approximately 30 seconds.

Fidelity

All text, formatting, comments, and images were preserved in the document. While tables are preserved, they are only viewable in a special mode. Spreadsheet formulas, numbers, and formatting are preserved but charts, images, and comments are not.

Types of documents

Word processing and spreadsheets may be edited. Other document types may be viewed.

MICROSOFT OFFICE 365

BROWSERS

Microsoft Office Web Apps is a comprehensive site that combines file storage (Sky Drive) and a suite of collaborative productivity tools. The free version of the site includes 7GB of storage. The suite includes Web versions of Word (word processing), Excel, PowerPoint (presentation), OneNote (notes), and Excel survey (online forms). No differences were found when using browsers on a desktop or laptop device with a keyboard and mouse. The Office Web Apps are particularly well adapted to touch interactions.

Editing

To edit a Word app document, the user must first enter the editing view. While in the editing view, there are tabs that reveal a ribbon toolbar similar to the one in Word on the desktop. The general tab allows text and paragraph formatting as well as a selection of style. While the styles are similar to those that are standard in the desktop version, they cannot be added to or modified. The insert tab includes options to insert a table, picture, hyperlinks, or clip art from the Microsoft online collection. The page setup tab allows the user to set or change the margins, orientation, size, paragraph indents, or line spacing. A final tab changes the view between editing view and reading view. Buttons to save, undo, redo, and toggle between touch mode and mouse mode are always available in a top toolbar. Many advanced word processing features are not available, including footnotes and endnotes, spell checking, an equation editor, a vector drawing editor, word count, thesaurus, and mail merge. There is a search function but not replace.

Editing in the Excel app is also similar to editing with the desktop version of Excel. A user may change the content and formatting of text and cells. Like the Word app, it includes buttons to undo, redo, and copy formatting. There are approximately the same functions for manipulating data in the Excel app as in the desktop version, but some functions from the installed application do not work in the app. Most spreadsheet functions are available in the Excel app, including: sorting, filtering, and creating charts, more advanced features such as pivot tables, pivot charts, mail merge. Conditional formatting can be viewed but not edited. There is a search function but not replace.

Like the Word app, the PowerPoint app has a reading view and an editing view. While in the editing view, the user may create or import slides and insert or modify text, formats, images, lines, or shapes. Slides may be customized using one of 21 built-in themes but the themes may not be edited. A limited number of animations and transitions are available. There is a slide show view to run the presentation in full screen.

Collaboration

If any paragraph of a Word app document is edited by one collaborator, it is locked for editing by all other collaborators until the editor saves the document. Updates do not appear in the documents of other collaborators until each saves their current edits. At that point changed items are shown with the entire paragraph highlighted to indicate the change.

Collaboration in the Excel app and the PowerPoint app is much more immediate. Cells or slides that are being edited are not locked, but rather, any edit overwrites previous edits. Changes are displayed immediately on each collaborator's sheets and presentations.

History

The history of revisions is not available in the Microsoft Office Web Apps. It is possible to view these changes in Word documents only if the document is opened in a version of MS Office installed on the desktop or laptop.

Comments

Comments may be added and viewed in the Word app, but only from the reading view. Any collaborator who is editing a document will be unaware of comments by the other collaborators until leaving the editing view. Commenting in the PowerPoint app is much more collaborative. Users may add and view comments while editing and updates on all collaborators' versions are immediate. Comments may not be added or viewed in the Excel app.

Chat

None of the Microsoft Office Web Apps has a chat feature.

Performance

The complex word processing test document took only a few seconds to finish loading. Changes updated in each collaborator's view almost immediately in the Excel app and the PowerPoint app.

Fidelity

Documents created in a Microsoft Office Web App appear the same from browser to browser. Documents created or edited in a desktop version of Office appear the same in the reading pane but may have significantly different formatting in the editing view. Editing these documents in the Web app will change the formatting in both views.

Excel documents were unchanged when switching between reading view and editing view. Presentations were also unchanged.

IPAD

The iPad SkyDrive Pro app allows viewing documents but not editing. Documents can be opened as Web apps using an iPad browser, and the Microsoft Office Web Apps function the same as they do with desktop browsers. This option is appealing for Microsoft Office Web Apps because they incorporate touch gestures well.

ANDROID

The Android SkyDrive app has the same features and limitations described above for the iPad SkyDrive app.

ZOHO DOCS

BROWSERS

Zoho Docs is both a file storage site and a suite of collaborative productivity tools. The free version of the site includes 5MB of storage along with the ability to synchronize with a Dropbox account. The suite includes Zoho Writer (word processing), Zoho Sheet, and Zoho Show (presentation). No differences were found when using these browsers on a desktop or laptop device with a keyboard and mouse. When used on a Windows 8 touchscreen device it was difficult to distinguish among gestures such as tapping to select an item, touching the screen to begin a swipe, and dragging to select a range.

Other file types may be viewed and shared within the site, but editing is not supported.

Note that registration is restricted to people 13 years or older, so this suite is not appropriate for elementary student.

Editing

Editing in Zoho Writer will be intuitive to any user of word processing applications. The user may insert and format images and tables and the app includes the basic commands to format text, paragraphs and tables. It also includes buttons to undo, redo, add a hyperlink, remove formatting and copy formatting. Advanced word processing features include footnotes and endnotes, spell checking, an equation editor, a vector drawing editor, word count, thesaurus, page layout, and mail merge.

Zoho Sheet editing is also similar to editing in a stand-alone application. A user may change the formatting of text and cells. Like the Zoho Writer app, it includes buttons to undo, redo and copy formatting. There are 315 functions available for manipulating data, and either columns or ranges may be sorted. A user may insert an image or form or create a button or chart. Zoho Sheet also includes the ability to record and run macros and a VBA (Microsoft Visual Basic for Applications) editor to edit existing macros.

With the presentation app, Zoho Show, the user may create or import slides and insert text, images, lines, shapes, or tables. Only videos from select sites may be embedded into a presentation. Slides may be customized with a variety of themes and layouts, and both text and paragraphs may be formatted for either one slide or for all slides in the master view. The app can also be used as a slide show presentation with customized transitions and linking.

Collaboration

All edits from each collaborator are displayed to all other collaborators immediately. While the document is being edited by others, the name of each collaborator and his or her cursor position is displayed.

History

The full history of revisions may be viewed within any type of document except forms. The history includes the person editing, the changes that were made, and the time. Versions can be viewed as individual changes or grouped into sessions. Any revision may be restored.

Comments

In each of the apps, selecting a word, phrase, or cursor location and then selecting the “Comment” button will open the comment popup. If the selected text already has a comment, then the history of that popup will include the history of comments.

Chat

Chat can be initiated by selecting a button whenever another collaborator has the document open. The chat window appears as a popup.

Performance

The complex word processing test document took only a few seconds to finish loading. Changes updated in each collaborator's view almost immediately. The only noticeable differences in performance were in how fast shapes (especially “scribble lines”) were rendered, with Firefox rendering more slowly than other browsers.

Fidelity

Documents that were created in all Zoho apps appear the same from browser to browser. Documents that were created in stand-alone office applications can be opened directly Zoho Docs and those documents are usually accurate. Some Excel formulas are not supported in Zoho Sheet.

ANDROID APP

The Zoho Docs Android app provides file management for the Zoho Docs and includes viewers for documents. It does not allow editing or collaboration: updates are not synchronized in real time, there is no chat, and comments are not shown.

Performance

The complex word processing document took 18 seconds to load.

Fidelity

All text, formatting, and images were preserved in the documents.

IPAD APP

The Zoho Docs Android app provides file management for the Zoho Docx and includes viewers for documents. It does not allow editing or collaboration: updates are not synchronized in real time, there is no chat, and comments are not shown.

Performance

The complex test document took only 13 seconds to load.

Fidelity

All text and images were preserved in the document. While tables are preserved, they are only viewable in a special mode. Spreadsheet formulas, numbers, and formatting are preserved but charts, images and comments are not.

RECOMMENDATIONS

- Using a device with a full browser gives the best user experience when using any of the online suites. Laptops, desktops, or tablets that incorporate a full browser are necessary to utilize all of the features in each online collaborative suite.
- Any of the suites reviewed would be an excellent choice if your needs are for a browser-based system on a desktop or laptop using a mouse. Zoho Docs is the suite with the most useful features, best collaboration, and the most possibilities for expansion. However, its use is restricted to students at least 13 years old, so it is not an option for elementary schools or for school districts wishing to standardize software across all schools.
- If your school uses touchscreen laptops, then Microsoft Office 365 is the only full browser product that is adapted to a touch interface, and that adaptation works well. However, its collaboration features, especially for word processing documents, fell short of the others.
- If you use tablets with an Android or iOS operating system then Google Drive is the only product that will allow editing and collaboration on the tablet. However, some important features such as accessing the file history are not implemented in the app versions.
- If you already subscribe to Google Apps then Google Drive can be expanded with hundreds of apps. Registration restrictions do not apply if the students are registered under school-managed accounts.
- If you already subscribe to Office 365 then Microsoft Office Web Apps will work seamlessly with installed versions of Microsoft Office.

Review of Research on Collaboration in the Classroom

COLLABORATIVE LEARNING

While the incorporation of small groups into the teaching process has its roots in education theory (Dewey 1943, Vygotsky 1978), researchers and teachers now accept collaboration as an effective tool in K-12 education. In fact, in his introduction to a meta-analysis of educational collaboration research Slavin (1996) called the empirical support for collaboration “one of the great success stories in the history of educational research.” Student collaboration is a proven factor in improving such higher-order traits as student motivation (e.g., Nastasi 1993), problem solving (e.g., Barnes & Todd 1977), inter-personal and inter-racial relationships (Sharan 1980), and creativity (e.g., Giguere 2011), while also improving academic outcomes (see Springer, Stanne & Donovan, 1999, for a review and meta-analysis).

The vast majority of the research focuses on how an individual makes gains by learning as part of a group but doesn’t distinguish between cooperation and collaboration. Cooperation is usually characterized as students sharing roles in the completion of a task with the product of a task being a collection of the individual contributions of the group. In a collaborative environment, students “negotiate and share meanings relevant to the task at hand” (Rochelle & Teasdale, 1995) and a completed task is the product of those negotiations.

CLOUD-BASED TECHNOLOGY

The current tools for online collaboration evolved from standard Internet tools and services. Threaded discussions have been used most often in conjunction with the online instructional delivery or as a place where teams could discuss traditional class content. Sull (2012) lists best practices for using threaded discussions effectively. While these discussions remain an important tool in group learning, they are not, in themselves, collaborative.

Similarly, blogs have played an important role in collaborative learning. Because they are public and editable, they provide an actual or implied audience for student work, especially writing. While teams can easily co-create and co-edit a blog, the medium is not inherently collaborative in that there is usually no history or attribution for individuals or documentation of group ownership of heavily edited work.

Much of the collaboration research has been on the use of wikis because they have been widely used in education, especially higher education. Wikis can be considered collaborative because they allow co-ownership of a document, they retain a history of changes, and they can often provide attribution for the author of both original material and edits. While they usually lack WYSIWIG editing, they often provide basic formatting options. Duffy and Burns (2006) list a wide range of educational uses for wikis:

- Students can use a wiki to develop research projects, with the wiki acting as ongoing documentation of their work.
- Wikis can be used for students to add summaries of their thoughts from the prescribed

readings, building a collaborative annotated bibliography.

- Wikis can be used as a knowledge base for teachers, enabling them to share reflections and thoughts regarding teaching practices and allowing for versioning and documentation; essential to the usability of such a resource is that it is searchable, has easy navigation and categorization, and file management, all of which current wiki environments provide.
- Wikis can be used to map concepts: they are useful for brainstorming, and authoring a wiki on a given topic produces a linked network of resources.
- Wikis are tools for group authoring: often groups collaborate on a document by sending it on to each member of the group in turn, emailing a file that each person edits on their computer, and some attempt is then made to coordinate the edits so that everyone's work is equally represented; using a wiki pulls the group members together and enables them to build and edit the document on a single, central wiki page.

Cloud-based productivity applications provide an environment where true collaboration can occur across disciplines. They usually have a word processing application that has the history and attribution features of a wiki but allow students to work in a familiar WYSIWIG environment. Editing tools are usually a robust subset of those found in stand-alone applications, and documents are often transportable between offline and online applications.

In addition to word processors, cloud-based tool collections usually include a spreadsheet and a presentation development tool. They will often include collaborative drawing space and a form generator. These are also similar to their stand-alone counterparts.

IMPACT ON LEARNING

Because cloud-based word processing is relatively new, the research on collaboration using computer-mediated communication has focused on collaborative writing using wikis. However, the findings from these studies are instructive in understanding how students will interact with these more flexible tools.

When students use wikis, they tend to do so more cooperatively than collaboratively. Students enjoy adding to a document (Witney & Smallbone 2011), but they are reluctant to edit the work of another student (e.g. Da Lio, Fraboni & Leo 2005). Fortunately, however, Meishar-Tal & Gorsky (2010) found that the issue is perceived as less of a problem when using Google Docs than when using a wiki because the document is considered less public. Even so, for the students they studied only 25% of edits to existing content was to change wording or meaning, with the rest of the changes to add links or to fix formatting or grammar. The public nature of wikis concerns some students enough that they are reluctant to contribute draft or partial work (Da Lio, Fraboni & Leo 2005), preferring to polish the work before committing it to the wiki.

Wikis are effective in improving reading and writing achievement scores at both the elementary level (Andes & Claggett 2011) and the secondary level (McGrail & Davis 2011). To the extent that they enhance collaborative learning, they can be important factors in improving reflection, critical thinking, and problem solving (Slavin 1996). Both wikis and online discussions are helpful for English language learners because they have more time to interpret their reading and

compose their responses (Gerbic 2010).

In a case study on the use of Google Docs in a high school history class, Roberts (2013) noted that while the online collaboration was richer than face-to-face discussions and more students contributed, the time required for a discussion was much longer. Bonham (2013) reported the successful use of a Google Docs spreadsheet to allow his whole class to contribute their lab data and analyze it in real time.

BEST PRACTICES

Teachers with experience with collaborative use of wikis and Google Docs, including Sull (2002), Roberts (2013), Kharbach (2012), and Gerbic (2010), have reported their suggestions at various phases:

AT THE BEGINNING

- Most of the collaborative cloud-based tools require that each student have an email address, and many of them require one with the tool provider (for example, a gmail address is required for students who use Google Docs). Once you have determined the best site to use, begin the process of registering the students. Some have suggested creating new accounts to avoid the project email from mixing with the students' personal email. You may need to obtain parental permission before creating the accounts. Wikis usually allow you to create an account on the site.
- Collaboration is a skill that should be taught. Demonstrate what a good collaborative session would look like by editing an entry then making comments about that edit. Show examples of a finished document and that document's history so that students can see the evolution (many Wikipedia articles are good examples of the collaborative process).
- Make sure that privacy settings include only class members and yourself, and then explain these settings to the class. This will help overcome the reluctance to post draft material publicly.
- Walk through all of the features of the tools that the students will use. Create an FAQ or handout to remind them as they work.
- Discuss how the product will be assessed. Make sure to include points for giving feedback and participating in discussions.
- Show how individual contributions can be tracked to avoid the common student concern that they will not be recognized for their contributions.
- Decide whether to require a particular level of participation. Remind your students that participation includes not only helping to create the product, but also giving feedback to peers.
- Plan your unit with the expectation that online collaboration can be asynchronous, so interactions take longer to complete.
- During the collaboration

- Be an active participant. Respond to posts and help guide the discussions if they seem to be off track.
- Use class time to demonstrate particularly effective contributions. If possible, find a section of the product that has had particularly wide participation.
- Allow class time to discuss technical or other issues that students have experienced.
- Address all team questions within 24 hours.

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Listing of Online Collaborative Tools

In this listing, we have looked at a wide variety of online tools that would be helpful in facilitating collaboration, including some tools, such as file sharing sites, that are not specifically designed to be collaborative. We have included the Web address and features for each site, as well as an indication of whether student privacy is maintained, whether there are ads displayed while using the tool, and whether there is a version specifically designed for educators.

Teachers and parents should be especially aware of the fact that most sites require some sort of registration by the user. It is very common to require that the user be at least 13 years old or that he or she is able to enter a binding contract. In the final column we have noted the restrictions under the sites' terms of use agreements.

Online collaborative tools can be organized into eight main categories. Click a category or tool type to access links and information about sample tools and resources.

CATEGORY	TOOL TYPE	CLASSROOM USE
Research & Search	<ul style="list-style-type: none"> • Bookmarking • File sharing • Photo sharing • Source citation 	Teachers and students save, comment on, organize, and share research resources.
Collaborative Writing	<ul style="list-style-type: none"> • Blogs • Collaborative documents (word processing, spreadsheets, charts, databases, graphs, presentations, and so on) • Wikis 	Teachers and students write, share, and collaboratively create online content.
Communication & Messaging	<ul style="list-style-type: none"> • Instant messaging (IM) • Microblogging • Video & web conferencing • Screensharing & whiteboarding 	Teachers and students communicate with each other, other classrooms, community members, and experts.

Visual Creation	<ul style="list-style-type: none"> • Drawing • Graphics creation & image editing • Mind mapping & graphic organizers • Vodcasting & video editing 	Teachers and students design, share, and collaboratively create online visual content.
Audio Creation	<ul style="list-style-type: none"> • Audio creation & editing • Podcasting • Voiceovers 	Teachers and students design, share, and collaboratively create online audio content.
Project Management	<ul style="list-style-type: none"> • Calendars • Task & milestone tracking • To-do lists & task management 	Student teams manage and organize their projects.
Data Collection	<ul style="list-style-type: none"> • Forms, polls & surveys • Social geographical mapping 	Teachers and students collect and analyze data from a wide variety of sources.
Teacher Productivity	<ul style="list-style-type: none"> • Assessment resources • Calendar • Lesson plan builders • Notetaking & Assignments 	Teacher-specific resources assist in classroom organization and management.

Research & Search

BOOKMARKING

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Delicious*	http://delicious.com	<ul style="list-style-type: none"> • Share and tag bookmarks, and create custom link collections. • Access popular or valued bookmarks on a subject. • Includes a “bookmarklet”, a browser button that allows users to save links with a click. 		x		Must be at least 13 years old.
Digg*	http://digg.com	<ul style="list-style-type: none"> • Submit links, or tag bookmarks to create custom collections. • Driven by social media, features popular links on its front page according to the number of “Diggs” the story has received. 		x		Must be at least 13 years old.

Diigo*	www.diigo.com	<ul style="list-style-type: none"> • Submit links, or tag bookmarks to create custom collections. • Driven by social media, features popular links on its front page according to the number of “Diggs” the story has received. 	Educator version: ads presented to student account users are limited to education-related sponsors.	x	x	<p>Appropriate for elementary aged students.</p> <p>Registration can be by</p>
Pinterest	http://pinterest.com	<ul style="list-style-type: none"> • A “bookmarlet” to pin things to a Web site or blog. • Pin an image or video to add to Pinterest. • Organize your pins by topic. • Boards can be secret or public. • Follow someone’s Pinterest home feed. 				<p>Must be at least 13 years old.</p>

FILE SHARING

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
4Shared Free File Sharing*	www.4shared.com	<ul style="list-style-type: none"> • 15 GB of free storage. • Available for all file formats. • Files can be shared with anyone, including nonregistered through a link. • Share a read-only version or a file others can edit. • Allows others to upload to the account. • Intuitive to use; similar to an e-mail program interface. • Mobile application available. 	x	x		Must be at least 13 years old.
Dropbox*	www.dropbox.com	<ul style="list-style-type: none"> • 2 GB of free storage. • Available for all file formats. • Integrates and syncs with Windows or Mac file storage. • Work on files when offline. • Create shareable, online photo galleries. • 30 days of undo history. • Shared folders viewable by invited users. • Mobile applications available. 	x	x		Not directed to persons under 13.

Google Drive*	http://drive.google.com	<ul style="list-style-type: none"> Includes both a Web version and a downloadable version to create, share, and sync documents, forms, drawings, spreadsheets, and presentations. 5 GB of free online storage; additional storage available for purchase. 	x	x		Any age if you are using a Google Apps for Education account managed by a school.
MediaFire	www.mediafire.com	<ul style="list-style-type: none"> 50 GB of free storage. Available for all file formats. FileDrops allow collaborators to upload files into account. Bulk download feature allows users to download multiple files or entire folders with a single click. Individual files and folders can be password-protected. Mobile application available. 	x	x		Must be at least 13 years old.
Microsoft SkyDrive	http://windows.microsoft.com/en-us/skydrive/download	<ul style="list-style-type: none"> 7 GB of free storage. Free Word, Excel, PowerPoint, and OneNote Can give other Windows apps permission to sync, access, and save files to your SkyDrive. Integrates and syncs with Windows or Mac file storage. Mobile apps for Windows 8, iPhone, iPad, and Android. 	x	x	Included with Microsoft Office 365 for Education.	Must be 18 years old or have parents register as a "child account." No age restriction if the school manages student accounts through Microsoft Office 365.

PHOTO SHARING

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Flickr*	www.flickr.com	<ul style="list-style-type: none"> • Photos and videos can be mapped to a location. • Millions of photos to search without having an account. • Photos can be annotated. • Can upload video. Videos limited to 90 seconds in length and 150 MB in file size. 	x	x		Of “legal age to form a binding contract”; under 13 allowed under a “family account.”
Picasa Web Album*	http://picasa.google.com	<ul style="list-style-type: none"> • 1 GB of free storage. • Built-in editor. • Can upload to friends’ albums. • Tag photos using Google Maps* or Google Earth*. 	x	x		Any age if you are using a Google Apps for Education account managed by a school.
Foki	http://www.fotki.com	<ul style="list-style-type: none"> • 3 GB of free storage • Back-up, store, and share photos. • Galleries to exhibit photos • Video hosting 	x	x		Must be at least 13 years old.
Photo Bucket	http://beta.photobucket.com	<ul style="list-style-type: none"> • Cloud back-up means photos are on all your devices • Easy photo editing • Collaborative tools 		x		Need to be at least 14 years old.

SOURCE CITATION

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
BibMe*	www.bibme.org	<ul style="list-style-type: none"> • Download bibliography in MLA, APA, Chicago, or Turabian formats. • Can create citations without registering—or register for an account to save citations for each project. 		x	x Designed for education.	Appropriate for elementary aged students
EasyBib*	www.easybib.com	<ul style="list-style-type: none"> • Create citations in MLA format for free. • Can create citations without registering—or register for an account to save citations for each project. 		x	x Designed for education.	Appropriate for elementary aged students
NoodleTools*	www.noodletools.com	<ul style="list-style-type: none"> • One-time citation creator for MLA, APA, or Chicago. • Extensive list of citation types from which to choose. 	x	x	x Designed for education.	Students under age 13 required to have parents register for them.

Collaborative Writing

BLOGS

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Blogger*	www.blogger.com/start	<ul style="list-style-type: none"> • Free, customizable templates and layouts. • Requires a Google account. • Supports multiple authors. • Public or private settings. • 1 GB of free storage • Photos automatically synced to a Picasa account. 	x	x		Must be at least 13 years old.
Edublogs*	http://edublogs.org	<ul style="list-style-type: none"> • Designed for educators and students. • Privacy and access controlled. • Post videos, podcasts, and documents. • 20 MB of free storage, small in comparison to other sites. 	Ad-free on paid version only.	x	x Designed for education.	Appropriate for elementary aged students.

LiveJournal*	www.livejournal.com	<ul style="list-style-type: none"> • Can create posts that are friends-only, private, or public. • Can post to blog from cell phone. • Can turn the journal into a bookstore-quality book with cost. • Can create and join specific communities. • Can record a “voice” post and create a podcast. • Can create photo galleries and “scrapbooks.” • 1 GB of free storage. 	Ads are said to be appropriate for all ages.	x		Users under 13 years old are required to have a parent or guardian review and complete the registration process.
WordPress*	http://wordpress.com	<ul style="list-style-type: none"> • Build a blog or Web site using design templates. • Supports images, audio, and video files. • Public and private sharing options. • Free version limited to 3 GB of space; paid upgrades available. • Statistics about the number and location of readers displayed with built-in maps and graphs. • Mobile application available. 	Ad-free on paid version only.	x		Must be at least 13 years old.

Mixed Link	www.mixedink.com	<ul style="list-style-type: none"> • Write, edit, remix • Comment and evaluate features • Discussions • Geared towards educators • Accommodates unlimited number of students at once • Authorship tracked and color-coded 		x		No specific minimum age.
Ficly	http://ficly.com	<ul style="list-style-type: none"> • Word limit – 1,024 characters • Focus on creativity • Collaborative • Add to other users' stories 		x		Uses sign-in from other sites which have varying minimum age requirements.

COLLABORATIVE DOCUMENTS

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Google Drive*	http://drive.google.com	<ul style="list-style-type: none"> • Includes both a Web version and a downloadable version to create, share, and sync documents, forms, drawings, spreadsheets, and presentations. • 5 GB of free online storage; additional storage available for purchase. • Project and task areas. • No concurrent editing. • Document collaborators must provide valid e-mail addresses. 	X	X		Any age if you are using a Google Apps for Education account managed by a school.

j2e*	www.j2e.com	<ul style="list-style-type: none"> • An online creativity tool designed for education. • Share and collaborate on documents in real time. • Designed so children can create, share, and learn in a safe environment. • Supports the integration of animation, audio, and video. • Security settings determine if documents are private, password-protected, or public. • Teachers can moderate students' work before being published. • Paid subscription only. 	X	X	X Designed for education	Appropriate for elementary aged students.
Microsoft SkyDrive	http://windows.microsoft.com/en-us/skydrive/download	<ul style="list-style-type: none"> • 7 GB of free storage. • Free Word, Excel, PowerPoint, and OneNote • Can give other Windows apps permission to sync, access, and save files to your SkyDrive. • Integrates and syncs with Windows or Mac file storage. • Mobile apps for Windows 8, iPhone, iPad, and Android. 	X	X	Included with Office 365 for Education	Must be 18 years old or have parents register as a "child account." No age restriction if the school manages student accounts through Office 365.

ThinkFree*	http://member.thinkfree.com/member/goLandingPage.action	<ul style="list-style-type: none"> • Allows for viewing, editing, and sharing of documents from anywhere using cloud-based software. • Provides 1 GB of online storage. • Includes project and task areas. 	X	X		Must be at least 13 years old.
Zoho*	www.zoho.com	<ul style="list-style-type: none"> • Share folders and invite users to view, edit, and add documents. • Word processor, spreadsheet, presentation, note taker, and other applications. • Free version limited to 1 workspace and 1 GB storage. • Share and concurrently edit files. • Integrate chat in Zoho Show* (presentations) to enhance participation with collaborators and audiences. 	X	X		Must be at least 13 years old.

WIKIS

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Google Sites*	http://sites.google.com	<ul style="list-style-type: none"> • Create a wiki from dozens of prebuilt design templates. • Integrated with other Google tools, such as Google Calendar*. • Public and private sharing options. • 100 MB maximum site size. • Unlimited pages. • Requires e-mail addresses. 	X	X		Any age if you using a Google Apps for Education account managed by school.
PBworks*	http://pbworks.com	<ul style="list-style-type: none"> • Classroom accounts allow student accounts without e-mail. • Public and private. sharing • Create as many workspaces (wikis) as needed. • 2 GB of free storage. 	X	X	X	Appropriate for elementary aged students.

Wikispaces*	www.wikispaces.com/site/for/teachers	<ul style="list-style-type: none"> • A single educational wiki free for classroom use. • Unlimited number of members. • Tools to integrate video, calendars, discussion forums, and visitor counters. • Set permissions for who can view the wiki, as well as individual pages or files. • Wiki tools let users organize members into project-related teams, each with its own pages, files, and permissions. 	X Ad-free when signing up for the free "K-12 teacher" account.	X	X	Appropriate for elementary aged students.
Zoho Wiki*	http://wiki.zoho.com	<ul style="list-style-type: none"> • Free wiki limited to 3 members and 50 MB storage. • Public and private sharing options. • Wiki collaborators must provide e-mail addresses. 	X	X		Must be at least 13 years old.

Communication & Messaging

INSTANT MESSAGING (IM)

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Chatzy*	www.chatzy.com	<ul style="list-style-type: none"> • No registration steps—collaborators can join instantly. • Does not require any installation on your computer. • Works on all major browsers, with any language and through firewalls. • Simple and easy to use. • A “Virtual Room” can be used as an active blog or message board. • Teacher can “invite” him- or herself and then provide the URL to the students; otherwise, e-mail is required. 	x	x		No specific minimum age. Appropriate for elementary aged students.
Google Hangouts*	www.google.com/hangouts	<ul style="list-style-type: none"> • If a user already has a Google account, no extra registration is necessary. • Instant messaging and voice over internet protocol (VOIP) • Send and receive files. • Can chat directly from the Gmail interface. 	x	x		Any age if you are using a Google Apps for Education account managed by a school.

Skype Chat*	www.skype.com	<ul style="list-style-type: none"> • Provides simple chat capabilities. • Mobile app. • Can bookmark and save group chats (chats with more than 2 people in it). 	x	x		Of "legal age to form a binding contract"
Yahoo! Messenger*	http://messenger.yahoo.com	<ul style="list-style-type: none"> • Besides chat, can also provide video calling with full video and voice. • Mobile app available. • No downloaded software necessary when using it on the Web. • Can IM in any language. 		x		Of "legal age to form a binding contract"; under 13 allowed under a "family account."
Twiducate*	http://twiducate.com	<ul style="list-style-type: none"> • Designed for classrooms. • Teacher controls a private network of invited participants. • Separate teacher and student log ins. • Mobile applications available. • Can add dates and class bookmarks to discussion page. • All conversations can be archived. • Free for educators 	x	x	x Designed for education.	No minimum age. Teacher manages student accounts. Appropriate for elementary aged students.

Twitter*	http://twitter.com	<ul style="list-style-type: none"> • An online social networking and microblogging service. • Users can send and receive text-based posts of up to 140 characters. • Useful for professional development and networking. • Can “protect” messages so only accepted users receive them. • Free; requires registration. 	x No ads currently, but terms of use state they could be used in the future.	x As long as the account is set up as “protected.”		Must be able to form a binding contract.
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VIDEO & WEB CONFERENCING

NAME	URL	FEATURES	AD FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
AnyMeeting	www.anymeeting.com	<ul style="list-style-type: none"> • Free, web-based platform for hosting videoconferences, webinars, and Web conferences. • Supports video, audio, screen sharing, recording, and instant messaging. • Does not require software download. • Unlimited meetings, with up to 200 attendees. 	Pay monthly for ad free Web conferences.	x		Must be at least 13 years old.

Big Marker	www.bigmarker.com	<ul style="list-style-type: none"> • Free, cloud-based software for hosting Web conferences. • Supports video, audio, screen sharing, document sharing, interactive whiteboard, live chat, and instant messaging. • Create a community with unlimited members. • Conference rooms allow 50 people and 3 hosts to start. • Free version provides 8 GB of storage. 		x	E-mail the company for educator pricing.	Must be at least 13 years old.
Blackboard Collaborate	www.blackboard.com/Platforms/Collaborate/Overview.aspx	<ul style="list-style-type: none"> • Advanced Web conferencing and mobile collaboration. • Seamless integration with Blackboard products. • Supports video, audio, screen and application sharing, voice authoring, whiteboard, and instant messaging. • Teachers control the content with moderator tools. • Free 30-day trial available. 	x	x	x Designed for education.	School manages user accounts.

Google Hangouts	www.google.com/+learnmore/hangouts	<ul style="list-style-type: none"> • Video chat application with screen and document sharing tools. • Maximum of 10 participants in a hangout. • Requires Google+ accounts. • Mobile application available. 		x		Any age if you are using a Google Apps for Education account managed by a school.
Skype	www.skype.com http://education.skype.com	<ul style="list-style-type: none"> • Features group calling, screen sharing, and file sharing tools. • Group video calling requires Skype Premium account with a monthly charge; maximum of 10 participants. • Requires free Skype accounts. 	x	x	x Skype in the Classroom feature.	Must be at least 13 years old.

SCREENSHARING & WHITEBOARDING

NAME	URL	FEATURES	AD FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Google Hangouts	www.google.com/+learnmore/hangouts	<ul style="list-style-type: none"> • Video chat application with screen and document sharing. • Maximum 10 participants. • Requires Google+ accounts. • Mobile application available. 		x		Any age if you are using a Google Apps for Education account managed by a school.
IDroo with Skype	www.idroo.com	<ul style="list-style-type: none"> • Whiteboard collaboration. • Unlimited number of meeting participants. • Math symbol typing tool. • Drag and drop images onto whiteboard window, or use the provided drawing and text tools. • Requires Skype accounts. • Free for non-commercial use. 		x		Uses Skype which requires users to be at least 13 years old.

Join.Me	https://join.me	<ul style="list-style-type: none"> • Instantly share computer screen with up to 250 viewers. • Free version includes instant messaging and file sharing tools. • Pro version includes advanced meeting tools, unified audio, and a desktop application. • Mobile application available. 	x	x		Must be 18 years old to register.
ScreenLeap	www.screenleap.com	<ul style="list-style-type: none"> • Free screen sharing to any device with a browser. • No downloads, installs, or sign ups. • Unlimited number of participants; not required to have an account. • Viewers cannot become presenters. • Does not support audio, video, or recording. 	x	x No registration required.		Must be at least 13 years old.
Scribblar	www.scribblar.com	<ul style="list-style-type: none"> • Real-time multiuser whiteboard application with live audio. • Image collaboration and instant messaging. • All participants must sign up for a Scribblar account. 		x		Must be at least 13 years old.

Tokbox*	http://tokbox.com	<ul style="list-style-type: none"> • Does not require download. • Allows creator of a video chat to invite unregistered users to the call via e-mail, IM, or URL. • Free education version allows video chat with up to 20 people. • Can also prerecord a video message and send by e-mail. • Does not require student email. • Does not offer a way to communicate via text in the event problems arise with the video or audio. 	x	x	x	Must be at least 13 years old.
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Twiddla	www.twiddla.com	<ul style="list-style-type: none"> • Web conference tool with screen sharing, audio, chat, and file sharing. • Free version allows users to create and attend screen share meetings with audio. • Tools to draw and type on Web sites, graphics, and photos—or start with a blank canvas. • Integrated browser button. • Free pro-level subscription for educational use. 	x	x	x Free pro-level subscription for educators.	No specific age minimum.
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Yahoo! Messenger*	http://messenger.yahoo.com	<ul style="list-style-type: none"> • In addition to chat, offers video calling with full video and voice. • Can be used through the Web, mobile phones, and iPhones. • No download necessary when using it on the Web. • Creates an e-mail account at time of Yahoo! registration. • Chat rooms are also available in Yahoo! Messenger, which may be distracting and/or dangerous to students. • Yahoo makes it easy for people to pinpoint the location of someone if using Yahoo Messenger on their cell phone 	x			Of "legal age to form a binding contract"; under 13 allowed under a "family account."
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Visual Creation

DRAWING

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
NGA Kids: BRUSHster*	www.nga.gov/kids/zone/brushster.htm	<ul style="list-style-type: none"> • Full drawing program. • Offers over 40 brushes and customizable size, transparency, texture, and stroke options. • Offers a rainbow palette and a toolbox of special effects • No registration required. • Does not require student email. • Can only save a drawing by creating a PDF or taking a screenshot. 	x	x	x Designed for education.	Appropriate for elementary aged students.

NGA Kids: Faces and Places*	www.nga.gov/kids/zone/facesplaces.htm	<ul style="list-style-type: none"> • Can create portraits or landscapes featuring characters and elements from over 100 famous paintings. • Also includes traditional folk music and surprising animations. • Does not require student email. • No actual drawing—just selection of elements to place in a picture. • Can only save a drawing by creating a PDF or taking a screenshot 	x	x	x Designed for education.	Appropriate for elementary aged students.
NGA Kids: Jungle*	www.nga.gov/kids/zone/jungle.htm	<ul style="list-style-type: none"> • Can create an imaginary landscape with animals, flowers, trees, and plants—many of which can be significantly modified for creative use • Inspired by the paintings of French artist, Henri Rousseau. • No registration required • Does not require student email. • Can only save a drawing by creating a PDF or taking a screenshot. 	x	x	x Designed for education.	Appropriate for elementary aged students.

NGA Kids: SwatchBox*	www.nga.gov/kids/zone/swatchbox.htm	<ul style="list-style-type: none"> • Mix and draw with a full palette of millions of colors • Does not require student email. • Can only save a drawing by creating a PDF or taking a screenshot. 	x	x	x Designed for education.	Appropriate for elementary aged students.
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GRAPHICS CREATION & IMAGE EDITING

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAIN- TAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Aviary*	http://aviary.com	<ul style="list-style-type: none"> • A suite of powerful creative applications. • Image editor offers layers, masks, and effects. • Visual effects editor allows pixel-based images. • Vector editor allows creation of scalable vector art. • Image markup can be used to capture, edit, and mark up images and screenshots. • Color palette analyzer can be used to create and analyze colors. • Audio editor can be used to create and edit remixes, sound effects, and other audio recordings. • “Powerful” can also mean complicated. • Full-featured tools, not for novices. • Offers many tutorials. 	x	x Can select how artwork will be shared		Must be at least 13 years old unless supervised by parents or guardian. If under 18, may only use the site with the consent of a guardian.

FotoFlexer	http://fotoflexer.com	<ul style="list-style-type: none"> • Can import photos from a variety of online photo storage sites or upload files from a device. • Variety of special effects as well as basic editing tools. • Optional registration. 	x	x		Must be at least 13 years old.
NGA Kids: 3-D Twirler*	www.nga.gov/kids/zone/3dtwirler.htm	<ul style="list-style-type: none"> • Can design a shape and then see how it looks in 3-D • Does not require student email. • Limited use, but interesting for spatial understanding. • Can only save drawings by creating a PDF or taking a screenshot. 	x	x	x Designed for education.	Appropriate for elementary aged students.
NGA Kids: Collage Machine and Collage Machine II*	www.nga.gov/kids/zone/collagemachine.htm	<ul style="list-style-type: none"> • Can create a collage of shapes, pictures, and objects • Does not require student email. • Can only save a drawing by creating a PDF or taking a screenshot. 	x	x	x Designed for education.	Appropriate for elementary aged students.
NGA Kids: PaintBox and Wallovers*	www.nga.gov/kids/zone/paintbox.htm www.nga.gov/kids/zone/wallovers.htm	<ul style="list-style-type: none"> • Can create designs with symmetrical patterns. • Does not require student email. • Can only save a drawing by creating a PDF or taking a screenshot. 	x	x	x Designed for education.	Appropriate for elementary aged students.

Pixlr	www.pixlr.com	<ul style="list-style-type: none"> • Advanced photo editing features. • Edits photos directly in a browser; does not require uploading. • No registration required. • May be challenging for novice users. 	x Ad free once in the editor	x		Must be at least 13 years old.
SumoPaint*	www.sumopaint.com/app	<ul style="list-style-type: none"> • Includes standard editing tools. • Offers unique shape drawing tools, a large variety of brushes and brush styles, and transformation tools • Registration optional. • Available in 52 languages. • Student email required for registration. • May be too difficult for novice users. • Registered account holders can see other users' artwork and photos, some of which may not be appropriate for students. 	x	x		Must be legal age to form a contract for optional registration.

MIND MAPPING & GRAPHIC ORGANIZERS

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
bubbl.us*	www.bubbl.us	<ul style="list-style-type: none"> • Brainstorming tool. • Can create and share colorful mind maps, and embed them in blogs or Web sites. • Can e-mail, print, or save a map as an image. • Offers quick and “automatic” formatting and entering of points and subpoints around a core idea. • Limited tools are easy to use with embedded instructions. • Registration optional • Student email required for registration. • Very basic brainstorming tool—no graphics or tools included to create other types of flow charts or graphic organizers. 	x	x		No specific age minimum to register.

Cacoo*	http://cacoo.com	<ul style="list-style-type: none"> • Concept map tool. • Can create layouts, diagrams, and flowcharts. • Offers many stencils and layouts. • Can upload images up to 512 KB. • Can “chat” with collaborators in the tool. • Collaborators can edit maps concurrently. • Available in English and Japanese • Can use account immediately without responding to an email confirmation. • Tool can be used for many purposes—the amount of tool and formatting choices may be overwhelming for young students. 	x	x		No specific age minimum to register.
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Exploratree*	www.exploratree.org.uk	<ul style="list-style-type: none"> • Concept map tool. • Offers many preformatted concept maps (“thinking guides”) based on the type of brainstorming or problem-solving desired. • Offers a fair amount of shapes. • Can create customized thinking guides and share with. • Can share maps with others. • Can submit maps for comments • Must confirm email before use. • No concurrent editing. • Text boxes are created with existing text and have to be deleted, which can be time consuming. 	x	x	x Designed for education.	No specific age minimum to register.
Mindmeister*	www.mindmeister.com	<ul style="list-style-type: none"> • Brainstorming tool. • Automatically formats points and sub-points around a core idea. • Provides mobile and offline use. • Collaborators can edit maps concurrently. • Can export maps as an image, PDF file, or RTF file, or publish to a Web site. • Available in nine languages • All collaborators must have an email address. • Free version only allows three maps. 	x	x		No specific age minimum to register.

Mindomo*	www.mindomo.com	<ul style="list-style-type: none"> • Brainstorming and causal map tool. • Automatically formats points and sub-points around a core idea. • Offers a variety of shapes, images, and formatting. • Can attach comments and create notes using a separate panel. • Can embed video and audio files. • Uncomplicated, and offers a full set of tools. • Free version limited to seven maps. 	x	x		For persons with legal age.
Seeing Reason*	http://educate.intel.com/en/thinkingtools/seeingreason	<ul style="list-style-type: none"> • Causal map tool. • Provides a way to investigate a system or problem involving cause and effect. • Designed to target higher-order thinking skills. • Easy to use • Does not require student email. • Requires teachers to set up projects and create student accounts. 	x	x	x Designed for education.	No minimum age. Teacher manages student accounts. Appropriate for elementary aged students.

Showing Evidence*	http://educate.intel.com/en/ThinkingTools/ShowingEvidence	<ul style="list-style-type: none"> • Argumentation tool. • Provides a way to present a claim or position, identify evidence, evaluate the quality of the evidence, evaluate how the evidence supports or weakens the claims, and reach conclusions. • Includes a full-version tool and a simplified tool for younger students. • Does not require student email. • Requires teachers to set up projects and create student accounts. 	x	x	x Designed for education.	No minimum age. Teacher manages student accounts. Appropriate for elementary aged students.
Webspiration*	www.mywebspiration.com	<ul style="list-style-type: none"> • Brainstorming and concept map. • Can create outlines and diagrams. • Can switch between outline and diagram views. • Offers predesigned templates. • Includes many graphics categorized by topics. • Offers a variety of shapes, images, and formatting options. • Allows unlimited number of users to collaborate concurrently. • Includes a chat feature in the map. • Web-based version of Inspiration*. • Can download as a document for Microsoft Word* or Inspiration or transfer directly to Google Docs*. 	x	x	x Designed for education.	Must be at least 13 years old.

VODCASTING & VIDEO EDITING

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Animoto	http://animoto.com http://animoto.com/education	<ul style="list-style-type: none"> • Educators can apply for a free Animoto Plus account with unlimited videos. • Combine photos, video clips, words, and music to create a video. • Easy video sharing to popular social media sites, e-mail, or DVD. • Built-in video styles for a professional look. 	x Plus and Pro Plans available.	x	x Free; includes unlimited videos.	Must be at least 13 years old.
Flickr*	www.flickr.com	<ul style="list-style-type: none"> • Videos are limited to 90 seconds in length, and 150 MB in file size. • Videos can be mapped to a location. • Once uploaded, videos can easily be embedded in other Web pages or blogs. • Creates an email account at the time of Yahoo!* registration. • Members are limited to two video uploads per month. • Any member can upload high definition video, but only members with paid accounts can view videos in high definition. • Must have a Yahoo!* account to get a Flickr account. 	x	x		Must be of "legal age to form a binding contract"; under 13 allowed under a "family account."

iTunes*: Creating Video Podcasts	http://www.apple.com/itunes/podcasts/specs.html Windows: www.apple.com/quicktime/tutorials/videopodcasts_win.html Mac: http://www.apple.com/quicktime/tutorials/videopodcasts.html	<ul style="list-style-type: none"> • Best known interface with which to subscribe to video and audio podcasts. • Unlimited size and length of videos because iTunes copies the location of a video feed (URL) to subscribers' iTunes libraries instead of hosting files. • Free software needs to be installed on a computer submitting a vodcast to the iTunes store and on subscribers' computers. • All episodes in a video podcast must be available as .m4v, .mp4, or .mov video file formats. • iTunes does not host video files. 	x	x		Must be at least 13 years old.
One True Media*	www.onetruemedia.com	<ul style="list-style-type: none"> • Can upload 100 MB per month. • Offers easy connections to Flickr* and Photobucket*. • Can combine photos and video into montages. • Includes transitions, free music backgrounds, and text. • Allows frame-by-frame editing of a video. • Logo appears in the bottom corner of videos or montages in the free version. 	x	x		Must be at least 13 years old.

Pixorial	www.pixorial.com www.pixorial.com/pixorial/educators	<ul style="list-style-type: none"> • Free one-year Premium account for educators, with 25 GB storage and video editing. • Students receive free Basic accounts with 1 GB of storage. • Upload digital video from any device, then edit and share online with intuitive tools. • No software installation. • Easy video sharing to blogs, social media sites, and e-mail. 	x	x	x Free; includes a Premium account for 1 year.	<p>Must be at least 13 years old.</p> <p>Students receive a Basic account.</p>
School Tube*	www.schooltube.com	<ul style="list-style-type: none"> • Uploaded content is moderated. • Can upload files up to 100 MB each. • Only members can rate and leave select comments on videos. • School name required during registration. • Must wait for a moderator to approve a video before it is available on the site. 		x Videos can be searched for by school name.	x Designed for education.	Must be at least 13 years old.
Zamzar*	www.zamzar.com	<ul style="list-style-type: none"> • Quick conversion of video (and other) file formats. • E-mail address required to receive a link to download a new file. • Must download converted file within 24 hours—after which time the file is deleted from the server. 		x		No specific age minimum.

Audio Creation

AUDIO CREATION & EDITING

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Audacity*	http://audacity.sourceforge.net	<ul style="list-style-type: none"> • Easy to record and edit files. • Can cut, copy, splice, or mix sounds together. • Can change recording speed and pitch. • Can create multitrack recordings. • Level meters can monitor volume levels. • Provides noise-canceling and other effects. • Free software developed by a group of volunteers and distributed under the GNU General Public License (GPL). • Available in 26 languages • Does not require student email. • Must download software, but available for most platforms. • Must install a special add-in to export MP3 files 		x		<p>Appropriate for elementary aged students.</p> <p>Must be installed by user with Admin. rights.</p>

AudioBoo	http://audioboo.fm	<ul style="list-style-type: none"> • Import sound files or record audio. • 3 minute recording limit for the free plan. • Optional registration. • Mobile and web platforms available. 		x Optional registration		Must be at least 13 years old.
SoundCloud	http://soundcloud.com	<ul style="list-style-type: none"> • Upload audio files or record new audio. • Mobile and web applications. • Easily to export sound files to popular sites and social networks. • Free version limited to 120 upload minutes. • Built-in sharing tools to send podcasts to contacts (free version limited to 20 contacts). 	x	x		Must be at least 13 years old.
Vocaroo*	http://vocaroo.com	<ul style="list-style-type: none"> • Easy voice recording • No limit on audio length. • Can be saved as an audio file through a link in a sent message. • No registration necessary, but is available to access past recordings. • Student email required only if product is registered. • Audio files/messages cannot be deleted except by contacting the company. 	x	x		Appropriate for elementary aged students.

Zamzar*	www.zamzar.com	<ul style="list-style-type: none"> • Provides quick conversion of audio (and other) file formats. • E-mail address needed to receive link to download the new file. • Must download converted file within 24 hours—after which time it will be deleted from the server. 		x		No specific age minimum.
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PODCASTING

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
iTunes*: Making a Podcast	www.apple.com/itunes/podcasts/specs.html	<ul style="list-style-type: none"> • Best known interface with which to subscribe to video and audio podcasts. • No limits to size or length of audio podcasts because iTunes simply copies the location of an audio feed (URL) to subscribers' iTunes libraries. • Free software needs to be installed on the computer submitting a podcast to the iTunes store and on subscribers' computers. • All episodes in a podcast must be available in .m4v, .mp4, or .mov video file formats. • Does not host audio files. • Only supports subscriptions to podcasts. 	x	x		Must be at least 13 years old.

PodcastPeople	www.podcastpeople.com	<ul style="list-style-type: none"> • Cloud-based software, nothing to download or install. • Access podcasts from any device with an Internet connection. • Includes a personal Web site to post audio files. • Fee-based; personal plans range from \$5 to \$40 per month. • Monthly storage plans range from 100 MB to 1.5 GB. 	x	x		No specific age minimum.
Podomatic*	www.podomatic.com/user/create	<ul style="list-style-type: none"> • Basic free account provides podcast publication tools. • 500 MB of free storage. • 15 GB of bandwidth per month. • Ability to share podcasts. 				Must be at least 13 years old.
Skype* MP3 Skype Recorder*	www.skype.com http://voipcallrecording.com	<ul style="list-style-type: none"> • Can be used to record conversations for podcasts with additional plug-ins. • Requires download and installation of software. • Students must be informed to not put personal information in their public user profile and to update settings so only their identified contacts can contact them. 	x	x		For Skype: Of "legal age to form a binding contract"

VOICEOVERS

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
VoiceThread*	http://voicethread.com/home	<ul style="list-style-type: none"> • Can participate in a conversation around a visual item by leaving comments using voice (with a microphone or telephone), text, audio file, or video (via a webcam). • VoiceThreads can be embedded to show and receive comments on other Web sites and exported to MP3 players or DVDs to play as archival movies. • Free version offers 250 MB storage and up to 50 VoiceThreads. • No emails are needed in paid version. • Designed to talk about and view a specific piece of work (presentation, picture, doodle)—not a standalone conversation tool. 	x	x	x Designed for education.	Must be at least 13 years old.

Project Management

CALENDARS

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Google Calendar*	http://calendar.google.com	<ul style="list-style-type: none"> • Features • Can schedule one-time or recurrent events with reminders. • Can create multiple calendars. • Can add events, tasks, and appointments. • Can add file attachments. • Can invite others to view or edit the calendar. 	x	x		Any age if you are using a Google Apps for Education account managed by a school.
HiTask*	http://hitask.com	<ul style="list-style-type: none"> • Free version provides only an individual calendar. • Can assign tasks and receive notification when done. • Premium and Business Services are offered at a cost and offer the most collaborative options. 	x	x		Must be at least 13 years old.

Yahoo! Calendar*	http://calendar.yahoo.com	<ul style="list-style-type: none"> • Offers an integrated calendar, notepad, e-mail, and contacts. • Standard features include ability to have reminders sent to e-mail, Yahoo! Messenger, and mobile device. • Creates an email account at the time of Yahoo! registration. • Cannot attach documents to calendar events. 		x		Must be of "legal age to form a binding contract"; under 13 allowed under a "family account."
Zoho Calendar*	http://calendar.zoho.com/mycalendar	<ul style="list-style-type: none"> • Can schedule one-time or recurrent events with reminders. • Can create multiple calendars. • Can add events, tasks, and appointments. • Can invite others to events. • Can associate appointments with tasks. • Cannot attach documents to calendar events 	x	x		Must be at least 13 years old.

TASK & MILESTONE TRACKING

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Basecamp	http://basecamp.com	<ul style="list-style-type: none"> • Manage an entire team project on one page with to-do lists, due dates, assignments, discussions, and file sharing. • See group progress at a glance by viewing summaries. • Online calendar integration. • Set options to have full control over who can access each project and files. • Text docs allow group members to write together in real-time. • Free 45-day trial available. 	x	x		Must be at least 13 years old.
Easy Projects	www.easyprompts.net	<ul style="list-style-type: none"> • Web-based software to manage teams and track projects. • Interactive planning charts allow teams to visually plan projects. • Message boards, file sharing, and online conferences available for team members to collaborate in real-time. • Free 15-day trial available. 	x	x		Must be at least 13 years old.

Comindwork*	www.comindwork.com	<ul style="list-style-type: none"> • Unlimited number of users. • 20 MB of file storage. • Includes to-do lists, milestones, discussions, time tracking, RSS, and reminders. • Offers a wiki and blog, file storage, and tagging. • Includes charts, reports, and video tools. • Integrates with Project*, Basecamp*, Facebook*, Gmail*, Google Docs*, Yahoo!*, and Twitter*. • Supports multiple time zones and 29 languages. • Provides a custom project URL. • Can only have one active project at a time on a free account. • Designed for business, so some directions are business-focused. 	x	x		Must be at least 13 years old.
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Project Foundry	www.projectfoundry.org	<ul style="list-style-type: none"> • An online learning management system designed for educators. • Tools for tracking student group projects, tasks, due dates, and timelines. • Students can submit project proposals using integrated tools. • Teachers can plan and assign projects to individual teams. • Teachers can provide individual student feedback. • Free 14-day trial available. 	x	x	x Designed for education.	Teacher manages student logins
Teamness	www.teamness.com	<ul style="list-style-type: none"> • An interactive web application intended to help teams organize project data and share it with other students. • Provides easy online collaboration for teams. • Provides milestones as incentives, tasks for requirements, whiteboards for sharing and tracking ideas, and many other tools. • Free version available. • No installation required. 	x	x		Must be at least 13 years old.

Teamwork Project Manager*	www.teamworkpm.net	<ul style="list-style-type: none"> • Maximum of two projects at one time. • 5 MB of free storage. • Includes task management, notebooks, messages, e-mail alerts, and time tracking. • Unlimited number of users. • Creates custom project URLs. • Designed for business, so some directions are business focused. 	x	x		No specific minimum age.
Zoho Projects*	http://projects.zoho.com/home.na	<ul style="list-style-type: none"> • Can organize, manage, and assign tasks. • Offers color codes to help prioritize tasks. • Can set goals and milestones. • Provides a way to break down complex projects into many related or dependent tasks. • Offers capability to create a project wiki. • Can assign any number of members to a task and track progress. 	x	x		Must be at least 13 years old.

TO-DO LISTS & TASK MANAGEMENT

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Comindwork	www.comindwork.com	<ul style="list-style-type: none"> • Unlimited number of users. • 20 MB of file storage. • To-do lists, milestones, discussions, time tracking, RSS, and reminders. • Wiki, blog, file storage, and tagging. • Charts, reports, and video tools. • Integrates with Project*, Basecamp*, Facebook*, Gmail*, Google Drive*, Yahoo!*, and Twitter*. • Multiple time zones and 29 languages. • Custom project URL. • Free account for one project. • Designed for business; some features many not be applicable to education. 	x	x		Must be at least 13 years old.
Remember the Milk*	www.rememberthemilk.com	<ul style="list-style-type: none"> • Can create and share tasks. • Tasks accessible from mobile phone devices. • Can manage tasks offline. • Can use with Google Calendar* and add tasks from iGoogle*. • Offers e-mail or IM reminders. • Can color-code priorities and categorize tasks. 	x	x		Must be at least 13 years old.

Data Collection

FORMS, POLLS & SURVEYS

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
FindTheData	www.findthedata.org	<ul style="list-style-type: none"> • Centralized database with information from business and economics to education and government. • Information from public databases, primary sources, and expert sources. • Compiles the information into accessible databases that can be refined using search parameters. • Optional registration. 		x No registration required		Must be at least 18 years old and “able to form a legally binding contract.”

Google Drive Forms*	http://www.google.com/drive/apps.html	<ul style="list-style-type: none"> • Can choose from over 60 themes and 7 question types. • Can see entries in spreadsheet form. • Can add survey responses to a spreadsheet automatically. • Can generate charts and graphs automatically. • Must have a Google* account. 	x	x		Any age if you are using a Google Apps for Education account managed by a school.
Google Public Data Explorer	www.google.com/publicdata/home	<ul style="list-style-type: none"> • Data sets from dozens of public organizations available for users to select, sort, and turn into charts and graphs. • Tools allow users to change chart colors and selections. • By using the time feature, users can show how data displayed in charts changes over time. 	x	x		No age restriction.

Polldaddy*	http://polldaddy.com	<ul style="list-style-type: none"> • Free version allows up to 100 survey responses per month. • Polls can be placed on blogs, Web sites, or social networks. • View results live as people respond. • Allows multiple choice, free text, design/color choice. • Free version allows up to 10 questions. • Poll contains a link to Polldaddy. 	x	x		Must be at least 13 years old.
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Poll Everywhere*	www.polleverywhere.com	<ul style="list-style-type: none"> • Free version allows up to 30 responses. • Can create multiple choice (voting) and free response (txt2screen) polls. • Results and voting widgets can be placed on a Web site or PowerPoint* slide that updates automatically. • Full results can be downloaded in Microsoft Excel*. • Participants can use Twitter*, text messaging, web-enabled phones, or Web to respond. • Works on Windows, Mac, and Linux. • Supports multiple languages and worldwide regions. • Cannot identify answers by participant in the free version. • Poll is deleted after 30 days if it is not modified or does not receive any responses. • Individual cell phone carriers may charge standard participants text message charges. 	x	x		Must be at least 13 years old.
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SurveyMonkey*	www.surveymonkey.com	<ul style="list-style-type: none"> • Easy online survey creation. • Can export results in Microsoft Excel* and PDF formats. • All languages are supported. • Offers 15 types of questions. • Offers 15 templates and visual themes. • Can have both required and optional survey responses. • Free version allows up to 10 questions. 	x	x		Appropriate for elementary aged students.
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SOCIAL GEOGRAPHICAL MAPPING

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Google Earth*	http://earth.google.com	<ul style="list-style-type: none"> • Can view satellite imagery, maps, terrain, 3-D buildings, ocean floor and surface data, and historical imagery. • View from the perspective of galaxies in outer space to the canyons of the ocean. • Can save toured places, and share with others. • Can use simplified touring with audio and voice recording. • Must download and install free software. • Must have a Google* account. 	x	x		Any age if you using a Google Apps for Education account managed by school.

OpenStreetMap: The Free Wiki World Map*	www.openstreetmap.org	<ul style="list-style-type: none"> • Editable map of the world that is “created” and edited by users. • Allows users to view roads, paths, landmarks, locations from GPS surveys, satellite images, and old maps. • Can drag and drop icons for points of interest. • OpenStreetMap is open data, licensed under the Creative Commons Attribution-ShareAlike 2.0 license (CC-BY-SA). • Can edit the map “live” and change the master map. • Some edits take from a few hours to a week to show up on the map. • Easy access to user “diaries” that give details to locations, which may or may not be appropriate for students. • Cannot save “private” maps. 	x	x		No specific age minimum.
UMapper*	www.umapper.com	<ul style="list-style-type: none"> • Can create an unlimited number of public or private maps. • Can view map usage statistics. • Can use maps from various sources. • Free version is “branded” with UMapper name. • In the free version, ads are embedded in the map. 		x		Must be at least 13 years old to register, but can create maps without registering.

ZeeMaps*	www.zeemaps.com	<ul style="list-style-type: none"> • Can create customized, interactive maps. • Can publish a map on a blog or Web site. • Can customize marker fields for geo search. • Can add map legends. • Can highlight regions, such as states or countries. • Can create PDF files or JPEG images. • Can create wiki-maps for group collaboration. • Can make maps private. • Can view all markers in a geographic location that have been created by all ZeeMaps users. 		x		Appropriate for elementary aged students.
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Teacher Productivity

ASSESSMENT RESOURCES

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Intel® Education Assessing Projects	http://educate.intel.com/en/AssessingProjects	<ul style="list-style-type: none"> Teachers create assessments that address 21st century skills and content knowledge. Database of rubrics, scoring guides, and checklists that can be modified for specific use. Cannot enter scores online. Not designed for assessing students in the Assessing Projects Web site. 	x	x No student use or accounts.	x Designed for education.	n/a
QuizStar*	http://quizstar.4teachers.org	<ul style="list-style-type: none"> Can create quizzes that are scored online. Can manage multiple classes and quizzes. Can attach multimedia files to questions. Multiple languages. Does not require student email 		x Requests students under 13 to use first name and last initial in registration.	x Designed for education.	Requests students under 13 to use first name and last initial in registration.

CALENDAR

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Google Calendar*	http://calendar.google.com	<ul style="list-style-type: none"> • Schedule one-time or recurrent events with reminders. • Can create multiple calendars. • Add events, tasks, and appointments. • Add file attachments. • Can invite others to view or edit calendar. • Can embed in Google Web sites. 	x	x		Any age if you are using a Google Apps for Education account managed by a school.
HiTask*	http://hitask.com	<ul style="list-style-type: none"> • Free version provides only an individual calendar. • Can assign tasks and receive notification when done. • Premium and Business Services are offered at a cost and offer the most collaborative options. • Premium and Business Services are offered at a cost and offer the most collaborative options. 	x	x		Must be at least 13 years old.

Yahoo! Calendar*	http://calendar.yahoo.com	<ul style="list-style-type: none"> • Integrated calendar, notepad, e-mail, and contacts. • Standard features include reminders sent to e-mail, Yahoo! Messenger, and mobile device. • Creates an email account at the time of Yahoo! registration. • Cannot attach documents to calendar events. 		x		Must be of "legal age to form a binding contract"; under 13 allowed under a "family account."
Zoho Calendar*	http://calendar.zoho.com/mycalendar	<ul style="list-style-type: none"> • Schedule one-time or recurrent events with reminders. • Can create multiple calendars. • Add events, tasks, and appointments. • Can invite others to events. • Can associate appointments with tasks. • Cannot attach documents to calendar events. 	x	x		Must be at least 13 years old.

LESSON PLAN BUILDERS

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
Intel® Education Designing Effective Projects	http://educate.intel.com/en/ProjectDesign/UnitPlanIndex/GradeIndex	<ul style="list-style-type: none"> • Gather lesson ideas and modifiable resources from a collection of exemplary unit plans. • Learn strategies for project design and implementation. • Does not require student email. 	x	x	x Designed for education.	n/a
Intel® Education Thinking Tools	www.intel.com/education/tools	<ul style="list-style-type: none"> • Project plans and associated documents for thinking tools—Visual Ranking, Seeing Reason, and Showing Evidence. • Project wizard allows teachers to duplicate a project from any existing project that uses one or more of the tools. • Can copy and modify existing project settings for another project, and create student teams. • Does not require student email. 	x	x	x Designed for education.	No minimum age. Teacher manages student accounts.

NOTETAKING & ASSIGNMENTS

NAME	URL	FEATURES	AD-FREE	STUDENT PRIVACY MAINTAINED	EDUCATOR VERSION AVAILABLE	AVAILABLE FOR ALL AGES
NoteStar*	http://notestar.4teachers.org	<ul style="list-style-type: none"> • Assist students in the preparation of research papers. • Teachers and students can set up research projects with topics and subtopics, collect and organize notes, and prepare a bibliography. <p>Teachers can:</p> <ul style="list-style-type: none"> • Create, assign, and manage projects • Check sources' authenticity • Track group progress • Send messages to students • Help students organize notes <ul style="list-style-type: none"> • No email required even when students register themselves. • Assignments groups, and classes must be generated by the teacher. • Students cannot use the tool on their own; they can register, but assignments must be assigned by the teacher. 		x Requests students under 13 to use first name and last initial in registration	x Designed for education.	x

Yahoo! Notepad*	http://notepad.yahoo.com	<ul style="list-style-type: none"> • Integrated notepad, e-mail, calendar, and contacts. • Very basic plain text notepad. • Can file notes into subfolders. • Creates an email account at time of Yahoo! registration. 		x		Must be of "legal age to form a binding contract"; under 13 allowed under a "family account."
Zoho Notebook*	http://notebook.zoho.com	<ul style="list-style-type: none"> • Ability to create notebooks and not just single notes. • Can integrate spreadsheet pages, Writer pages, and Web pages. • Supports RSS and integration of images, audio, and video. • Can sign in with Google or Yahoo!. 	x	x		Must be at least 13 years old.