

## **Exploring Free Digital Tools in Education**

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### **ABSTRACT**

Technology can assist instructional designers and teachers in meeting the needs of learners in traditional classrooms and virtual course environments. During the COVID-19 pandemic, many teachers and instructional designers began looking for resources they could use for hybrid and online course delivery. Many found that the cost of some technology tools was well outside of their financial means to assist them in meeting student learning outcomes. However, some digital tools provide free access for educators and are beneficial to students. In this article, the authors shared five tools they have used in developing and teaching online and traditional technology courses at the college level. They share how they used a learning management system tool, a collaboration tool, a search engine tool, a content creation tool, and a content sharing tool to engage students in their courses. As teachers look for alternatives to use as they move content from classroom teaching to online instruction, this article can help them consider the recommended tools for instruction. Teachers, instructors, and instructional designers may explore the free digital tools in this article and do further research on other digital tools to support student learning in their disciplines.

**Keywords:** *Digital Tools, Google Classroom, Google Docs, Google Scholar, Screencast-O-Matic, QuickTime Player, YouTube*

### **INTRODUCTION**

Educational institutions are using technology in teaching, learning, and research (Johnson & Samora, 2016; Mucundanyi, 2019; Wiburg, Parra, Mucundanyi, Torres, & Latorre, 2017). Technology is transforming how schools, colleges, and universities operate. Some universities are recommending online over paper admission applications. Accessing content and submitting assignments, theses, and dissertations online are becoming mandatory rather than a choice. However, technology is not a good equalizer in education (Mihelj, Leguina, & Downey, 2018; Reynolds & Chiu, 2016). Educational institutions with enough resources and budgets can afford to buy and use any technology. In contrast, educational institutions with limited budgets and resources face challenges affording expensive technologies with advanced learning features.

The digital divide between educational institutions also affects students. On the one hand, students at educational institutions with limited resources struggle to access advanced technologies. On the other hand, teaching courses with advanced technologies while there are free digital tools to support learning raises the cost of education. There might be free digital tools with the basic features of expensive technologies that can deepen learning and allow students to meet course expectations. Besides, some digital tool developers and software companies provide free access to educators who are willing to teach using their digital products. Therefore, educators need to analyze and use free technology tools, if possible, to improve student learning experiences and minimize the cost of education. The analysis of digital tools should be an ongoing activity to discover new features that can support different topics in courses (Woods & Rosenberg, 2016). Technological Pedagogical and Content Knowledge (TPACK) could guide educators in analyzing and selecting a technology that supports pedagogy to engage students in learning.

## TECHNOLOGICAL PEDAGOGICAL AND CONTENT KNOWLEDGE (TPACK)

The TPACK framework allows teachers to intertwine technological, pedagogical, and content knowledge (Mishra & Koehler, 2006; Parra, Raynor, Osanloo, & Guillaume, 2019). Stover and Veres (2013) summarized the knowledge of a TPACK educator. They emphasized that an educator who teaches with technology should be experts in the content area, know how to teach, and be able to use it as a supporting pedagogical tool. As technology changes, it is also essential for teachers to be informed about the digital tools that support teaching and learning in their field of expertise and have “an effective pedagogy in the specific discipline” (Stover & Veres, 2013, p. 100). Furthermore, a teacher should be comfortable incorporating digital tools that support pedagogies in course design. Finally, teachers should use their expertise in technology, pedagogy, and content area to facilitate learning and meet the course objectives.

Teachers develop course descriptions, goals, and objectives and determine pedagogy and technology to better assist students in acquiring the required knowledge and skills (Papanikolaou, Makri, & Roussos, 2017; StauS, Gillow-Wiles & NieSS, 2014). Teachers need to at least understand the general features of digital tools to make connections between technology tools and their use in courses. Lack of expertise in using digital tools should not prevent teachers from using the tools because they can explore and analyze the tools together with the students and discover new features connected to their courses. According to Bilici, Yamak, Kavak, and Guzey (2013),

beliefs of a teacher with regards to their technological pedagogical content knowledge (TPACK) are pivotal in terms of using technology in the classroom because belief about their capability to use technology is a powerful predictor of their potential technology use. (p. 37).

Teachers who doubt the learning impact of digital tools have a low probability of using technology as a teaching and learning tool. Teachers who do not feel comfortable to learn with and from students limit student exposure to technology.

TPACK shifts teachers' roles from being the only center of knowledge to a facilitator of learning (Piotrowski & Witte, 2016; Parra, Woodley & Lucero, 2018). Encouraging students to use various tools expands learning and creates an opportunity for hands-on activities and real-world scenarios (Dukuzumuremyi & Siklander, 2018; Morales, Trujillo, Mucundanyi, & Castillo, 2019; Wiburg, Parra, Mucundanyi, Latorre, & Torres, 2017). Thus, teachers who embrace technology accept challenges and value collaboration, communication, discovery, innovation, and excellence in teaching and learning.

## FREE TECHNOLOGICAL TOOLS IN EDUCATION

Sharing free digital tools from a teacher's experiences allows other teachers to analyze and explore digital tools. The authors of this article have developed, designed, and taught online and traditional education technology courses for more than five years. One of the challenges for the students to adapt the technology was the cost of technological tools. Most of the students were pre-service and in-service teachers looking for technological tools to use in their teaching careers. With the increase in the number of open source and free digital tools, the authors decided to focus first on free digital tools before moving to the tools with subscription fees. Adapting free digital tools has increased student engagement in classrooms and helped students connect learning and professional careers. Although there are many free digital tools, this article focuses on five types of tools in particular. Specifically, this article provides information about a learning management system tool and the tools that can be used for searching, creating, and sharing the content as well as improving collaboration between students.

A Learning Management System (LMS) establishes an environment that connects students to learning. A LMS with a paid license accommodates many students and has the flexibility to use embedded applications and connect to other applications outside of the system. Two of the dominant LMSs in the United States of America and Canada are Blackboard and Canvas (Karplus, 2017; LeMire, 2016). These two LMSs have embedded applications that assist educators in designing courses. At the same time, Canvas and Blackboard provide advanced learning features to teachers and students, including an opportunity to schedule live conferences or virtual sessions (Carroll, Tchangalova, & Harrington, 2016; Baldwin, Ching, & Hsu, 2018). However, some educational institutions could not afford the licenses of Canvas and Blackboard and consider using other affordable LMSs, including free LMSs. Modular Object-Oriented Dynamic Learning Environment (MOODLE) is a well-known free LMS (Mwalumbwe & Mtebe, 2017), but institutions may pay for services. Google classroom is also a free LMS that could facilitate teaching and learning (Al-Marouf & Al-Emran, 2018; Iftakhar, 2016). Woodley (2018) notes that in meeting the course and student learning objectives

"Whether your institution uses Canvas, Blackboard, or any other learning management system, most systems include different tools you can use to engage students" (p.40).

Besides LMSs, teachers and students need other digital tools to collaborate, search, create, and share content. Collaborative tools help students to work in groups. Khalil and Ebner (2017) highlighted asynchronous collaboration tools such as discussion forums, and Google Docs, as tools that teachers can use to engage student-to-student interactions. In addition to these asynchronous collaboration tools, search engines are connected to different databases, which provides access to open-source journals and ebooks that may be free and open to the public (Blake & Morse, 2016). Moreover, screen video recording tools allow instructors and students to create their learning materials (Tobin, 2014; Thompson & Lee, 2012) and share learning with other students and the world through digital sharing tools.

Free digital tools can support learning activities and improve student learning experiences in schools, colleges, and universities. This article discusses and guides how to use Google Classroom, Google Docs, Google Scholar, Screencast-O-Matic, QuickTime Player, and YouTube.

### **Google Classroom - A Learning Management System Tool**

Google Classroom is a valuable tool to create courses, invite students to join courses, add content, communicate with students, and create assignments and quizzes (Brown & Green, 2016; Shaharane, Jamil, & Rodzi, 2016). Google Classroom also shows grades and due dates of assignments. It is possible to reuse existing materials, adjust the calendar, and customize the front page. Google Classroom is becoming more popular and comes in two versions, Google Classroom for teachers and G Suite for Education with advanced features recommended to schools. G Suite for Education includes Google Classroom with other features such as Gmail, Calendar, Google Docs, Sheets, Forms, Slides, and Hangouts. More than 90 million teachers and students are using G Suite, while the number of teachers and students for Google Classroom is above 40 million ("G Suite for Education", n.d.).

#### ***Steps to use Google Classroom***

Go to <https://classroom.google.com/> and sign in with a Gmail account. Click on the + icon in the upper right corner close to the Google Account name. There are two options, "Join class" or "Create class," then click on "Create class" and a message will be displayed with a link to "G suite for Education". To stay in Google Classroom, read the message and accept conditions. To join G Suite for Education, click on the link "G Suite for Education" in the message and set up an account for the school. Then, it is self-explanatory to create courses, invite students, add content, and create

assignments, and quizzes. There are tutorials on YouTube to guide instructors and teachers on creating a class in Google Classroom and G Suite for Education.

### **Google Docs – A Collaborative Tool**

Collaboration between students is essential in a student-centered approach learning environment. Equally important, instructors should collaborate with students and provide feedback on student work and learning growth. Google Docs makes collaboration more efficient synchronously and asynchronously (Lin, Chang, Hou, & Wu, 2016; Liu & Lan, 2016). Google Docs creates an opportunity for students to work in groups, and students can show individual contributions in a document using different colors. In addition to the edit feature, Google Docs also provides students with a "suggesting" feature that can be used to make recommended changes while still allowing document owners to choose to accept or reject suggested changes. Finally, Google Docs saves versions of a document so, if the students choose too, they can revert to an earlier version of the document.

#### ***Steps to use Google Docs***

Go to Docs <https://www.google.com/docs/about/> and the page appears with two options, "Personal" and "Business". Click on "Go to Google Docs" under the option "Personal" and login in with a Gmail account then click on the + icon above "Blank" to start a new document with a default name "Untitled document" which could be changed. The document is by default private. Invite people to the Google Docs by clicking on "Share". There are two ways to invite students and instructors to collaborate in Google Docs. The first option is to add instructors' and students' emails, and an automatic message is sent to the emails with a request to accept a collaboration. The second option is to click on "Get shareable link" and send a link in an email to students and instructors who want to join a collaborating group. Students and instructors with a shareable link can access the Google Docs. Users can also create a Google Doc by logging into a Gmail Account and clicking on "Docs" in the "Google Apps" icon in the upper right corner close to the Google Account name.

### **Google Scholar – A Search Engine Tool**

The use of Open Educational Resources (OER) can help educators meet course objectives while reducing costs. Valuing open source educational resources first could allow students to have access to the content and save their money to buy textbooks, book chapters, and journal articles. Google Scholar is one of the best search engines (Marks & Le, 2017; Martin-Martin, Orduna-Malea, Harzing, & López-Cózar, 2017) and is a free search engine connected to databases of different libraries, journals, and publishers.

#### ***Steps to use Google Scholar***

Type <https://scholar.google.com/> in the address bar of a browser and inside "Google Scholar search textbox", type keywords or the name of the article, book chapter, and book if known. It is possible to link a digital library of the university to Google Scholar using Google Scholar Settings then "Library links". A user of Google Scholar can also create a user profile through "My profile", and customize the search based on years of publication", such as from 2012 to 2019, using "Custom range" option.

### **Screencast-O-Matic, QuickTime Player – Content Creation Tools**

There are many tools available to create content, but this section focuses on recording a computer screen with narratives, which is one of the best strategies to provide clear explanations. Teachers and students could use video recordings for individualized and group learning to provide in-depth

explanations and guide the audience, including a whole class, individual students, or group of students (Hartsell & Yuen, 2006; Mayhew, 2017). Also, video recording materials are beneficial to students with special needs (Dukuzumuremyi, 2014; Kellems & Edwards, 2016). Educators could use Screencast-O-Matic or QuickTime Player to record videos with voiceover.

### ***Steps to use Screencast-O-Matic***

To use this tool, type <https://screencast-o-matic.com/>, click on “Start recording for free” and select a language then click on “Launch Free Recorder”. Wait for an installation file or executable file to be downloaded and install Screencast-O-Matic. The software highlights the recording area on the desktop, and users can adjust the area for recording. With a free version, users can record videos with a computer screen, webcam, or both and save the recording via the computer or upload a recorded video on Screencast-O-Matic or the YouTube website. There are limitations with Screencast-O-Matic free version, users can only record a video for up to 15 minutes using only narration, and there is a watermark at the end. Users who want access to the advanced features and record videos beyond the 15-minute limit have the option of purchasing a subscription to use the tool.

### ***Steps to use QuickTime Player***

This tool is available in Apple Inc. products. For Mac computer users, click on “Go” then “Applications” and select “QuickTime Player”. Once the QuickTime Player is open, click on “File” and select “New Screen Recording”. The small window of Screen Recording with a button in the center and a directional arrow appears. Drag the mouse to identify a desktop area for recording and click inside the “Start Recording” area. Once the recording is done, click on the “Stop Icon” in the top menu bar and the recording will pop up on the computer screen for review then save the recorded video on the Mac computer. QuickTime Player also has a Trim option through the Edit menu that allows the user to cut an unwanted part of the video. Open the video with QuickTime Player and click on the “Edit” menu then select “Trim”. Use the left or right edges close to the Play button and click on “Trim” then save the new video.

Additionally, QuickTime Player could be used to combine videos. Just open one video and drag other videos over to the QuickTime Player window then click “Done” and save the new combined video. Finally, this tool can record movies or audios using the options of a “New Movie Recording” or “New Audio Recording”.

### **YouTube – Content Sharing Tool**

YouTube is one of the tools available to post and share educational resources (Kotluk & Kocakaya, 2016; Laaser & Toloza, 2017). YouTube provides students and instructors with an opportunity to learn from the videos by pausing, playing, and replaying. Using a variety of educational learning resources such as audio and video, motivates and engages students to learn (Woodley, Mucundanyi, & Lockard, 2017). Students and instructors may be afraid of using this tool, but there are many ways to share educational materials, including public, private, and unlisted options. The public videos are available to all YouTube users. The unlisted videos do not appear in search engine results or on the channel's list of videos. Finally, those YouTube videos that are marked as private can only be accessed by people who have been invited by the video's owner to view them.

### ***Steps to use YouTube***

Go to <https://www.youtube.com/> and sign in with a Gmail account. Click the big + icon in the upper right corner close to the Google Account to upload a video. There are two options, “Upload video”

or “Go live”; select “Upload video”, then click on “Select File” and upload the video. The default option is “Public,” but by scrolling down the other options, namely public, unlisted, private, and unscheduled, become visible. Upload the video and wait for YouTube to display a YouTube video link. Finally, share this YouTube link with students, instructors, and other educators.

## CONCLUSION AND RECOMMENDATION

Beliefs of teachers influence their decisions and ways of using technology in classrooms. Understanding the connection between content, pedagogy, and technology through the TPACK lens could guide the teachers to select free digital tools and integrate technology in education. As companies work hard to provide technological tools in the hands of consumers, educators need to explore and analyze free digital tools that can help students acquire twenty-first century skills and excel in learning. While there are many free digital tools, this article highlighted digital tools that educators may explore to start a marathon using free digital tools to support student learning and push students to excel through discovery and innovation.

Teachers should create, share, and expand a list of their favorite free digital tools and update them as technology advances. Prioritizing free digital tools allows students to continue learning beyond what happens in the virtual or face-to-face classroom. It is impossible to analyze all free digital tools that can be used by instructional designers, teachers, and students. The authors of this article choose to share from their personal experience using these tools in online and traditional courses while encouraging others to try out various digital tools for themselves. By so doing, they create opportunities for novice and experienced teachers to try different tools while learning from other educators' experiences.

## REFERENCES

- Al-Marouf, R.A.S., & Al-Emran, M. 2018. “Students acceptance of Google classroom: An exploratory study using PLS-SEM approach”. *International Journal of Emerging Technologies in Learning (IJET)*, vol. 10, no.1, pp. 112-123.
- Baldwin, S., Ching, Y.H., & Hsu, Y.C. 2018. “Online course design in higher education: A review of national and statewide evaluation instruments”. *TechTrends*, vol. 62, no.1, pp. 46-57.
- Bilici, S.C., Yamak, H., Kavak, N., & Guzey, S.S. 2013. “Technological Pedagogical Content Knowledge Self-Efficacy Scale (TPACK-SeS) for pre-service science teachers: Construction, validation, and reliability. *Eurasian Journal of Educational Research*, vol. 52, pp. 37-60.
- Blake, M.R. & Morse, C. 2016. “Keeping your options open”. *Reference Services Review*, vol. 44, no.3, pp. 375-389.
- Brown, A., & Green, T. 2016. “Virtual reality: Low-cost tools and resources for the classroom”. *TechTrends*, vol. 60, no.5, pp. 517-519.
- Carroll, A. J., Tchangalova, N., & Harrington, E. G. 2016. “Flipping one-shot library instruction: using Canvas and Pecha Kucha for peer teaching”. *Journal of the Medical Library Association: JMLA*, vol. 104, no.2.
- Dukuzumuremyi, S. 2014. *The use of technology to promote collaborative learning in inclusive education in primary school*. Available at: <http://jultika.oulu.fi/files/nbnfioulu-201410221949.pdf>
- Dukuzumuremyi, S., & Siklander, P. (2018). “Interactions between pupils and their teacher in collaborative and technology-enhanced learning settings in the inclusive classroom”. *Teaching and Teacher Education*, vol. 76, pp. 165-174.

- G Suite for Education (n.d). "Collaborative tools for learning - Anywhere, anytime, any budget". Available at: [http://services.google.com/fh/files/misc/g\\_suite\\_for\\_education-collaborative\\_tools\\_for\\_learning.pdf](http://services.google.com/fh/files/misc/g_suite_for_education-collaborative_tools_for_learning.pdf)
- Hartsell, T., & Yuen, S. C. Y. 2006. "Video streaming in online learning". *AACE Journal*, vol. 14, no.1, pp. 31-43.
- Iftakhar, S. 2016. "Google classroom: What works and how?". *Journal of Education and Social Sciences*, vol. 3, no.1, pp. 12-18.
- Johnson, D., & Samora, D. 2016. "The potential transformation of higher education through computer-based adaptive learning systems". *Global Education Journal*, vol. 1, pp. 1-17.
- Karplus, S. S. 2017. "Integrating academic library resources and learning management systems: The library Blackboard site". *Education Libraries*, vol. 29, no.1, pp. 5-11.
- Kellems, R. O., & Edwards, S. 2016). "Using video modeling and video prompting to teach core academic content to students with learning disabilities". *Preventing School Failure: Alternative Education for Children and Youth*, vol. 60, no.3, pp. 207-214.
- Khalil, H., & Ebner, M. 2017. "Using electronic communication tools in online group activities to develop collaborative learning skills". *Universal Journal of Educational Research*, vol. 5, no.4, pp. 529-536.
- Kotluk, N., & Kocakaya, S. 2016. "Researching and evaluating digital storytelling as a distance education tool in physics instruction: An application with pre-service physics teachers". *Turkish Online Journal of Distance Education*, vol. 17, no.1, pp. 87-99.
- Laaser, W., & Toloza, E. 2017. "The changing role of the educational video in higher distance education". *The International Review of Research in Open and Distributed Learning*, vol. 18, no.2.
- LeMire, S. 2016. "Scaling instruction to needs: Updating an online information literacy course". *Reference & User Services Quarterly*, vol. 56, no.1, pp. 17-22.
- Lin, Y. T., Chang, C. H., Hou, H. T., & Wu, K. C. 2016. "Exploring the effects of employing Google Docs in collaborative concept mapping on achievement, concept representation, and attitudes". *Interactive Learning Environments*, vol. 24, no.7, pp. 1552-1573.
- Liu, S. H. J., & Lan, Y. J. 2016. "Social constructivist approach to web-based EFL learning: Collaboration, motivation, and perception on the use of Google Docs". *Journal of Educational Technology & Society*, vol. 19, no.1, pp. 171-186.
- Marks, T., & Le, A. 2017. "Increasing article findability online: The four Cs of search engine optimization". *Law Library Journal*, vol. 109, no.1, pp. 83-97.
- Martin-Martin, A., Orduna-Malea, E., Harzing, A. W., & López-Cózar, E. D. 2017. "Can we use Google Scholar to identify highly-cited documents?". *Journal of informetrics*, vol. 11, no.1, pp. 152-163.
- Mayhew, E. 2017. "Playback feedback: The impact of screen-captured video feedback on student satisfaction, learning and attainment". *European Political Science*, vol. 16, pp. 179-192.
- Mihelj, S., Leguina, A., & Downey, J. 2018. "Culture is digital: Cultural participation, diversity and the digital divide". *New Media & Society*, pp. 1-34.
- Mishra, P., & Koehler, M. J. 2006. "Technological pedagogical content knowledge: A framework for teacher knowledge". *Teachers College Record*, vol. 108, no.6, pp. 1017-1054.
- Morales, S., Trujillo, K., Mucundanyi, G., & Castillo, R. T. 2019. Math Snacks early algebra: Successes and challenges of a research design for computer-based games in mathematics classrooms. In *Society for Information Technology & Teacher Education International Conference* (pp. 1931-1937). Association for the Advancement of Computing in Education (AACE).
- Mucundanyi, G. 2019. *College Student Engagement in Online Learning* (Doctoral dissertation). Available at ProQuest Dissertations and Theses. (UMI No. 22588786): <http://search.proquest.com/openview/d27db84a2a7e439ad3fd48d79dea1845/1?pq-origsite=gscholar&cbl=18750&diss=y>

- Mwalumbwe, I., & Mtebe, J. S. 2017. "Using learning analytics to predict students' performance in Moodle learning management system: A case of Mbeya university of science and technology". *The Electronic Journal of Information Systems in Developing Countries*, vol. 79, no.1, pp. 1-13.
- Papanikolaou, K., Makri, K., & Roussos, P. 2017. "Learning design as a vehicle for developing TPACK in blended teacher training on technology enhanced learning". *International Journal of Educational Technology in Higher Education*, vol. 14, no.1.
- Parra, J., Raynor, C., Osanloo, A., & Guillaume, R. O. 2019. (Re) imagining an undergraduate integrating technology with teaching course. *TechTrends*, vol. 63, no.1, pp. 68-78.
- Parra, J., Woodley, X.M., & Lucero, L. 2018. "Practice-Based Teaching with Technology in Online, Blended, and Hybrid Courses". *The International Journal of Instructional Technology & Distance Learning*, vol. 15, no.3, pp 3-15.
- Piotrowski, A., & Witte, S. 2016. "Flipped learning and TPACK construction in English education". *International Journal of Technology in Teaching and Learning*, vol. 12, no.1, pp. 33-46.
- Reynolds, R., & Chiu, M. M. 2016. "Reducing digital divide effects through student engagement in coordinated game design, online resource use, and social computing activities in school". *Journal of the Association for Information Science and Technology*, vol. 67, no.8, pp. 1822-1835.
- Shaharane, I. N. M., Jamil, J. M., & Rodzi, S. S. M. 2016. "The application of Google classroom as a tool for teaching and learning". *Journal of Telecommunication, Electronic and Computer Engineering (JTEC)*, vol. 8, no.10, pp. 5-8.
- StauS, N., Gillow-Wiles, H., & NieSS, M. 2014. "TPACK development in a three-year online masters program: How do teacher perceptions align with classroom practice?". *Journal of Technology and Teacher Education*, vol. 22, no.3, pp. 333-360.
- Stover, S., & Veres, M. 2013. "TPACK in higher education: Using the TPACK framework for professional development". *Global Education Journal*, vol. 1, pp. 93-110.
- Thompson, R., & Lee, M. J. 2012. "Talking with students through screencasting: Experimentations with video feedback to improve student learning". *The Journal of Interactive Technology and Pedagogy*, vol. 1, no.1, pp. 1-16.
- Tobin, T. J. 2014. "Increase online student retention with universal design for learning". *Quarterly Review of Distance Education*, vol. 15, no.3, pp. 13-24.
- Wiburg, K., Parra, J., Mucundanyi, G., Latorre, J., & Torres, R. C. 2017. "Constructivist instructional design models applied to the design and development of digital mathematics game modules". *International Journal of Technology in Teaching and Learning*, vol. 13, no.1, pp. 1-15.
- Wiburg, K., Parra, J., Mucundanyi, G., Torres, R., & Latorre, J. 2017. Using emerging design models to develop mathematics games. In *Society for Information Technology & Teacher Education International Conference* (pp. 2043-2050). Association for the Advancement of Computing in Education (AACE).
- Woodley, X. M., Mucundanyi, G., & Lockard, M. 2017. Designing counter-narratives: Constructing culturally responsive curriculum online. *International Journal of Online Pedagogy and Course Design (IJOPCD)*, vol. 7, no.1, pp. 43-56.
- Woodley, X.M. 2018. "Authentic Dialogue in Online Classrooms". *Academic Exchange Quarterly*, vol. 22, no.4, pp. 38-43.
- Woods, M., & Rosenberg, M. E. 2016. Educational tools: Thinking outside the box. *Clinical Journal of the American Society of Nephrology*, vol. 11, no.3, pp. 518-526.