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Technology and the Shift From Teacher-Delivered to Student-Centered Learning: A Review of the Literature

April Bo Wang
Glen County Community College

Full title, writer's name, and school name are centered halfway down the page.

An author's note lists specific information about the course or department and can provide acknowledgments and contact information.

Author Note

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Abstract appears on a separate page. Heading is centered and not boldface.

Abstract

In recent decades, instructors and administrators have viewed student-centered learning as a promising pedagogical practice that offers both the hope of increasing academic performance and a solution for teacher shortages. Differing from the traditional model of instruction in which a teacher delivers content from the front of a classroom, student-centered learning puts the students at the center of teaching and learning. Students set their own learning goals, select appropriate resources, and progress at their own pace. Student-centered learning has produced both positive results and increases in students' self-esteem. Given the recent proliferation of technology in classrooms, school districts are poised for success in making the shift to student-centered learning. The question for district leaders, however, is how to effectively balance existing teacher talent with educational technology.

Keywords (optional) help readers search for a paper on the Web or in a database.

Keywords: digital learning, student-centered learning, personalized learning, education technology, transmissive, blended

Technology and the Shift From Teacher-Delivered to Student-Centered Learning: A Review of the Literature

In the United States, most public school systems are struggling with teacher shortages, which are projected to worsen as the number of applicants to education schools decreases (Donitsa-Schmidt & Zuzovsky, 2014, p. 420). Citing federal data, *The New York Times* reported a 30% drop in "people entering teacher preparation programs" between 2010 and 2014 (Rich, 2015). Especially in science and math fields, the teacher shortage is projected to escalate in the next 10 years (Hutchison, 2012). In recent decades, instructors and administrators have viewed the practice of student-centered learning as one promising solution. Unlike traditional teacher-delivered (also called "transmissive") instruction, student-centered learning allows students to help direct their own education by setting their own goals and selecting appropriate resources for achieving those goals. Though student-centered learning might once have been viewed as an experimental solution in understaffed schools, it is gaining credibility as an effective pedagogical practice. What is also gaining momentum is the idea that technology might play a significant role in fostering student-centered learning. This literature review will examine three key questions:

1. In what ways is student-centered learning effective?
2. Can educational technology help students drive their own learning?
3. How can public schools effectively combine teacher talent and educational technology?

In the face of mounting teacher shortages, public schools should embrace educational technology that promotes student-centered learning in order to help all students become engaged and successful learners.

In What Ways Is Student-Centered Learning Effective?

According to the International Society for Technology in Education (2016), "Student-centered learning moves students from passive receivers of information to active participants in their own discovery process. What students learn, how they learn it, and how their learning is assessed are all driven by each individual student's needs and abilities." The results

Source provides background information and context.

Wang sets up her organization by posing three questions.

Wang states her thesis.

Headings, centered and boldface, help readers follow the organization.

Wang uses a source to define the key term *student-centered learning*.

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of student-centered learning have been positive, not only for academic achievement but also for student self-esteem. In this model of instruction, the teacher acts as a facilitator, and the students actively participate in the process of learning and teaching. With guidance, students decide on the learning goals most pertinent to themselves, they devise a learning plan that will most likely help them achieve those goals, they direct themselves in carrying out that learning plan, and they assess how much they learned (Çubukçu, 2012). The major differences between student-centered learning and instructor-centered learning are summarized in Table 1.

Because the author (Çubukçu) is not named in the signal phrase, the name and the date appear in parentheses.

Bell (2010) has argued that the chief benefit of student-centered learning is that it can connect students with "real-world tasks," thus making learning more engaging as well as more comprehensive. For example, Bell observed a group of middle-school students who wanted to build a social justice monument for their school. They researched social justice issues, selected several to focus on, and then designed a three-dimensional playground to represent those issues. In doing so, they achieved learning goals in the areas of social studies, physics, and mathematics and practiced research and teamwork. Bell reported that students engaged in this kind of learning performed better on both project-based assessments and standardized tests (pp. 39-40).

When the author's name and year of publication are given in a signal phrase, only the page number or numbers, if available, are needed in parentheses at the end of the source material.

A Stanford study came to a similar conclusion; researchers examined four schools that had moved from teacher-driven instruction to student-centered learning (Friedlaender, Burns, Lewis-Charp, Cook-Harvey, & Darling-Hammond, 2014). The study focused on students from a mix of racial, cultural, and socioeconomic backgrounds, with varying levels of English-language proficiency. The researchers predicted that this mix of students, representing differing levels of academic ability, would benefit from a student-centered approach. Through interviews, surveys, and classroom observations, the researchers identified key characteristics of the new student-centered learning environments at the four schools:

Wang summarizes an important article, providing parenthetical citations even for a summary.

- teachers who prioritized building relationships with students
- support structures for teachers to improve and collaborate on instruction
- a shift in classroom activity from lectures and tests to projects and performance-based assessments (pp. 5-7)

Table 1

Comparison of Two Approaches to Teaching and Learning

Teaching and learning period	Instructor-centered approach	Student-centered approach
Before class	• Instructor prepares a lecture/instruction on a new topic. • Students complete homework on the previous topic.	• Students read and view new material, practice new concepts, and prepare questions ahead of class. • Instructor views student questions and practice and identifies learning opportunities.
During class	• Instructor delivers new material in a lecture or prepared discussion. • Students—unprepared—listen, watch, take notes, and try to follow along with the new material.	• Students lead discussions of the new material or practice applying the concepts or skills in an active environment. • Instructor answers student questions and provides immediate feedback.
After class	• Instructor grades homework and gives feedback about the previous lesson. • Students work independently to practice or apply the new concepts.	• Students apply the concepts/skills to more complex tasks, some of their own choosing, individually and in groups. • Instructor posts additional resources to help students.

Note. Adapted from "The Flipped Class Demystified," n.d., retrieved from New York University website: https://www.nyu.edu/faculty/teaching-and-learning-resources/instructional-technology-support/instructional-design-assessment/flipped-classes/the-flipped-class-demystified.html.

Wang creates a table to compare and contrast two key concepts for her readers.

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After the schools designed their curriculum to be personalized to individual students rather than standardized across a diverse student body and to be inclusive of skills such as persistence as well as traditional academic skills, students outperformed peers on state tests and increased their rates of high school and college graduation (Friedlaender et al., 2014, p. 3).

When this article was first cited, all authors were named. In subsequent citations of a work with three to five authors, "et al." is used after the first author's name.

Can Educational Technology Help Students Drive Their Own Learning?

When students engage in self-directed learning, they rely less on teachers to deliver information and require less face-to-face time with teachers. For content delivery, many school districts have begun to use educational technology resources that, in recent years, have become more available, more affordable, and easier to use. For the purposes of this paper, the term "educational technology resources" encompasses the following: distance learning, by which students learn from a remote instructor online; other online education programming such as slide shows and video or audio lectures; interactive online activities, such as quizzing or games; and the use of computers, tablets, smartphones, SMART Boards, or other such devices for coursework.

Wang develops her thesis.

Much like student-centered learning, the use of educational technology began in many places as a temporary measure to keep classes running despite teacher shortages. A Horn and Staker study (2011) examined the major patterns over time for students who subscribed to distance learning, for example. A decade ago, students who enrolled in distance learning often fell into one of the following categories: They lived in a rural community that had no alternative for learning; they attended a school where there were not enough qualified teachers to teach certain subjects; or they were homeschooled or homebound. But faced with tighter budgets, teacher shortages, increasingly diverse student populations, and rigorous state standards, schools recognized the need and the potential for distance learning across the board.

In a signal phrase, the word "and" links the names of two authors; the date is given in parentheses.

As the teacher shortage has intensified, educational technology resources have become more tailored to student needs and more affordable. Pens that convert handwritten notes to digital text and

organize them, backpacks that charge electronic devices, and apps that create audiovisual flash cards are just a few of the more recent innovations. According to Svokos (2015), College and Education Fellow for *The Huffington Post*, some educational technology resources entertain students while supporting student-centered learning:

> GlassLab, a nonprofit that was launched with grants from the Bill & Melinda Gates and MacArthur Foundations, creates educational games that are now being used in more than 6,000 classrooms across the country. Some of the company's games are education versions of existing ones—for example, its first release was SimCity EDU—while others are originals. Teachers get real-time updates on students' progress as well as suggestions on what topics students need to spend more time on.

A quotation longer than forty words is indented without quotation marks.

Many of the companies behind these products offer institutional discounts to schools where such devices are used widely by students and teachers.

Horn and Staker (2011) concluded that the chief benefit of technological learning was that it could adapt to the individual student in a way that whole-class delivery by a single teacher could not. Their study examined various schools where technology enabled student-centered learning. For example, Carpe Diem High School in Yuma, Arizona, hired only six certified subject teachers and then outfitted its classrooms with 280 computers connected to online learning programs. The programs included software that offered "continual feedback, assessment, and incremental victory in a way that a face-to-face teacher with a class of 30 students never could. After each win, students continue to move forward at their own pace" (p. 9). Students alternated between personalized 55-minute courses online and 55-minute courses with one of the six teachers. The academic outcomes were promising. Carpe Diem ranked first in its county for student math and reading scores. Similarly, Rocketship Education, a charter network that serves low-income, predominantly Latino students, created a digital learning lab, reducing the need to hire more teachers. Rocketship's academic scores ranked in the top 15 of all California low-income public schools.

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Wang uses her own analysis to shape the conversation among her sources in this synthesis paragraph.

It is clear that educational technology will continue to play a role in student and school performance. Horn and Staker (2011) acknowledged that they focused on programs in which integration of educational technology led to improved student performance. In other schools, technological learning is simply distance learning—watching a remote teacher—and not student-centered learning that allows students to partner with teachers to develop enriching learning experiences. That said, many educators seem convinced that educational technology has the potential to help them transition from traditional teacher-driven learning to student-centered learning. All four schools in the Stanford study heavily relied on technology (Friedlaender et al., 2014). And indeed, Demski (2012) argued that technology is not supplemental but instead is "central" to student-centered learning (p. 33). Rather than turning to a teacher as the source of information, students are sent to investigate solutions to problems by searching online, e-mailing experts, collaborating with one another in a wiki space, or completing online practice. Rather than turning to a teacher for the answer to a question, students are driven to perform—driven to use technology to find those answers themselves.

How Can Public Schools Effectively Combine Teacher Talent and Educational Technology?

Some researchers have expressed doubt that schools are ready for student-centered learning—or any type of instruction—that is driven by technology. In a recent survey conducted by the Nellie Mae Education Foundation, Moeller and Reitzes (2011) reported not only that many teachers lacked confidence in their ability to incorporate technology in the classroom but that 43% of polled high school students said that they lacked confidence in their technological proficiency going into college and careers. The study concluded that technology alone would not improve learning environments. Yet others argued that students adapt quickly to even unfamiliar technology and use it to further their own learning. For example, Mitra (2013) caught the attention of the education world with his study of how to educate students in the slums of India. He installed an Internet-accessible

Wang uses a source to introduce a counterposition.

computer in a wall in a New Delhi urban slum and left it there with no instructions. Over a few months, many of the children had learned how to use the computer, how to access information over the Internet, how to interpret information, and how to communicate this information to one another. Mitra's experiment was "not about making learning happen. [It was] about letting it happen." He concluded that in the absence of teachers, even in developing countries less inundated by technology, a tool that allowed access to an organized database of knowledge (such as a search engine) was sufficient to provide students with a rewarding learning experience.

Brackets indicate Wang's change in the quoted material.

According to the Stanford study, however, the presence of teachers is still crucial (Friedlaender et al., 2014). Their roles will simply change from distributors of knowledge to facilitators and supporters of self-directed student-centered learning. The researchers asserted that teacher education and professional development programs can no longer prepare their teachers in a single instructional mode, such as teacher-delivered learning; they must instead equip teachers with a wide repertoire of skills to support a wide variety of student learning experiences. The Stanford study argued that since teachers would be partnering with students to shape the learning experience, rather than designing and delivering a curriculum on their own, the main job of a teacher would become relationship building. The teacher would establish a relationship with each student so that the teacher could support whatever learning the student pursues.

Many schools have already effectively paired a reduced faculty with educational technology to support successful student-centered learning. For example, Watson (2008) offered a case study of the Cincinnati Public Schools Virtual High School, which brought students together in a physical school building to work with an assortment of online learning programs. Although there were only 10 certified teachers in the building, students were able to engage in highly individualized instruction according to their own needs, strengths, and learning styles, using the 10 teachers as support (p. 7). Commonwealth Connections Academy (CCA), a public school in Pennsylvania, also brings students into a physical

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school building to engage in digital curriculum. However, rather than having students identify their own learning goals and design their own curriculum around those goals, CCA uses educational technology as an assessment tool to identify areas of student weakness. It then partners students with teachers to address those areas (pp. 8-9).

Conclusion

The conclusion is objective in tone and presents answers to Wang's three organizational questions.

Public education faces the opportunity for a shift from the model of teacher-delivered instruction that has characterized American public schools since their foundation to a student-centered learning model. Not only has student-centered learning proved effective in improving student academic and developmental outcomes, but it can also synchronize with technological learning for widespread adaptability across schools. Because it relies on student direction rather than an established curriculum, student-centered learning supported by educational technology can adapt to the different needs of individual students and a variety of learning environments—urban and rural, well funded and underfunded. Similarly, when student-centered learning relies on technology rather than a corps of uniformly trained teachers, it holds promise for schools that would otherwise suffer from a lack of human or financial resources.

References

Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House, 83*(2), 39-43.

Çubukçu, Z. (2012). Teachers' evaluation of student-centered learning environments. *Education, 133*(1), 49-66.

Demski, J. (2012, January). This time it's personal. *THE Journal (Technological Horizons in Education), 39*(1), 32-36.

Donitsa-Schmidt, S., & Zuzovsky, R. (2014). Teacher supply and demand: The school level perspective. *American Journal of Educational Research, 2*(6), 420-429.

Friedlaender, D., Burns, D., Lewis-Charp, H., Cook-Harvey, C. M., & Darling-Hammond, L. (2014). Student-centered schools: Closing the opportunity gap [Research brief]. Retrieved from Stanford Center for Opportunity Policy in Education website: https://edpolicy.stanford.edu/sites/default/files/scope-pub-student-centered-research-brief.pdf

Horn, M. B., & Staker, H. (2011). The rise of K-12 blended learning. Retrieved from Innosight Institute website: http://www.christenseninstitute.org/wp-content/uploads/2013/04/The-rise-of-K-12-blended-learning.pdf

Hutchison, L. F. (2012). Addressing the STEM teacher shortage in American schools: Ways to recruit and retain effective STEM teachers. *Action in Teacher Education, 34*(5/6), 541-550.

International Society for Technology in Education. (2016). *Student-centered learning*. Retrieved from http://www.iste.org/standards/essential-conditions/student-centered-learning

Mitra, S. (2013, February). *Build a school in the cloud* [Video file]. Retrieved from https://www.ted.com/talks/sugata_mitra_build_a_school_in_the_cloud?language=en

Moeller, B., & Reitzes, T. (2011, July). Integrating technology with student-centered learning. Retrieved from Nellie Mae Education Foundation website: http://www.nmefoundation.org/research/personalization/integrating-technology-with-student-centered-learn

Rich, M. (2015, August 9). Teacher shortages spur a nationwide hiring scramble (credentials optional). *The New York Times*. Retrieved from http://www.nytimes.com/

List of references begins on a new page. Heading is centered and not boldface.

List is alphabetized by authors' last names. All authors' names are inverted.

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Double-spacing is used throughout.

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Svokos, A. (2015, May 7). 5 innovations from the past decade that aim to change the American classroom [Blog post]. Retrieved from http://www.huffingtonpost.com/2015/05/07/technology-changes-classrooms_n_7190910.html

Watson, J. (2008, January). *Blended learning: The convergence of online and face-to-face education*. Retrieved from North American Council for Online Learning website: http://www.inacol.org/wp-content/uploads/2015/02/NACOL_PP-BlendedLearning-lr.pdf