Emma Eccles Jones College of Education & Human Services
Center for the School of the Future
UtahStateUniversity

Personalized Competency-Based Learning: A Policy and Research Brief

November, 2022

The purpose of the Center for the School of the Future is to promote empirically validated practices in public education systems and to encourage cooperative and research relationships between K-12 and higher education institutions.

The Context

A recent trend among states and educational think tanks has been to promote a system of instruction called Personalized Competency-Based Learning (PCBL). This recommendation is featured in the 2022 State Policy Priorities and Recommendations of the Aurora Institute (2022) [See https://aurora-institute.org/resource/aurora-institute-2022-state-policy-priorities/]. Currently the Utah State Board of Education (USBE) has publicized a commitment to the implementation of PCBL (https://www.schools.utah.gov/curr/pcbl), though there is little research to demonstrate its effectiveness in improving student learning.

The purpose of this policy brief is to help readers increase their understanding of PCBL generally, its potential impacts, and returns on investments. Although there are many definitions and variations of PCBL in schools and districts throughout the country, most combine the elements of personalized learning and competency-based learning. Traditionally, personalized learning (PL) has been characterized as the development of an individualized curriculum and instructional path for each student based on their unique skills, abilities, interests, background, and experiences (Herold, 2019). In the newest version of PL, computers allow instruction to be individualized or "personalized" for each student. Competency-based learning (CBL) is an approach to education that focuses on students' progression through curriculum to attain pre-determined competencies at their own pace, depth, etc., typically using computer digital technology.

Computer digital technology is central to the implementation of PCBL. In fact, the initial investment and support for PCBL came from the technology sector, including The Bill and Melinda Gates Foundation as well as the Chan Zuckerberg Initiative. These philanthropic organizations were interested in transforming schools and student experiences through innovative, adaptive technologies (Aslop & Mead, 2015). They developed a working definition of personalized and competency-based learning that involved four elements: 1) computerized learning profiles consisting of up-to-date digital records of learning strengths, needs, motivations, and goals, 2) personalized learning paths for each student based on adaptive software, 3) digital, competency-based progression through clearly defined personalized goals for each student, and 4) flexible learning environments responsive and adaptive to support students' goals (Bill and Melinda Gates Foundation, 2014).

Reports and stories about the success and challenges of PCBL are ubiquitous on the Internet. In 2018, the Education Week Research Center found that 97% of principals reported using digital technology to personalize learning in some way, and more than half of principals reported that personalized learning was a "promising idea" (Herold, 2019). Some important learning principles form the backbone of PCBL—the importance of choice, differentiated instruction, immediate feedback, individualized pacing, and so forth. The same report also found that most principals nationwide worried about, 1) too much screen time, 2) students working alone too often, and 3) the technology industry gaining too much influence.

Research Findings*

Because PCBL is an instructional learning system often mediated and managed by computer technology, it is informative to examine data from the COVID-19 pandemic-mandated conversion to remote technology or hybrid instruction. Prior to the COVID-19 pandemic, student achievement in the US and in Utah had remained stagnant. Post COVID-19, national long-term trends in reading and math are no longer stagnant; scores have dipped to historic lows with greater score decreases for lower-performing students (National Assessment of Educational Progress, 2022).

Research has demonstrated three reasons for these historic lows. First, the promise that technology would mediate instruction in ways that exceeded or even rivaled traditional classroom-based instruction failed (Azevedo, De, Rogers, et al., 2022; Goldhaber, Kane, McEachin, et al., 2022). Second, the learning losses for most students during this period of remote, technological instruction for children and adolescents, especially low-income students, have been substantial (Goldhaber, et al., 2021; National Assessment of Educational Progress, 2022). Third, high school students who worked remotely during COVID-19 reported statistically lower levels of social, emotional, and academic well-being than students who continued in-person instruction (Duckworth, Kautz, Defnet, et al., 2021).

Though there are many reports, surveys, and papers found on the Internet, high quality research on the effectiveness of PCBL published in top tier, blind-reviewed journals, especially as it relates to K-12 student learning, has been minimal, and results of studies on student learning outcomes have been mixed. Based on a RAND analysis of a large-scale study of PCBL, treatment effects were estimated to be approximately 0.09 ES in mathematics and 0.07 ES in reading. These effect sizes translated to minimal gains of about 3 percentile points in mathematics and no significant gains in reading (Pane, Steiner, Baird, et al., 2017). Hattie (2009) reported that effect sizes of .20 were considered small; he recommends a medium effect size of .40 before an instructional approach can be considered worth the effort. For PCBL, the “effort” includes massive financial, human resource, technological, administrative, and infrastructure changes required for full implementation.

Like the RAND study, results from a 2019 meta-analysis of competency-based learning (CBL) on student outcomes were also mixed (Evans, Landl, & Thompson, 2020). In fact, researchers were not able to calculate effect sizes because there was so much variability in how schools implemented and assessed CBL in different studies. A few studies even reported a negative impact of CBL. When positive results did occur, they did not generalize across grades and content areas (Evans et al., 2020). In other words, CBL benefited some grades and content areas but not others.

Finally, Leech, Gullet, Cummings, and Haug (2022) found that teaching remotely mediated by technology during COVID-19

led to complaints about workload stress among K-12 teachers. A quote from the findings of this study reported, “Another challenge that was discussed was the increased workload of teaching remotely. This was brought up by 28 teachers. These teachers felt like they were working longer hours and had more to do because of remote teaching. For example, one teacher stated, ‘The up keep is never ending. There are always lessons to make/post and papers to score/give feedback on.’” (pg. 259). Little is known about teacher workloads associated with providing personalized learning pathways for individual students engaged in PCBL.

Utah PCBL Examples

There appear to be few Utah school district-based exemplars of full implementation of PCBL. One PCBL school district exemplar often highlighted by the USBE is Juab County School District in Nephi, UT. In 2021/2022 Juab posted a 38% RISE reading proficiency score, and 36% math proficiency, and 37% science proficiency scores. These scores compare to a 2017/2018 posting of 43% RISE reading proficiency, 52% math proficiency, and 51% science science proficiency. This represents a 5% drop in reading, a 16% drop in math proficiency, and a 14% drop in science proficiency over a five-year period (https:// datagateway. schools. utah.gov/Assessment /StudentProficiency/ 2022). Despite the decline of students’ test scores during COVID-19, if PCBL is as promising as is claimed, Juab students’ learning outcomes would be expected to improve, not drop, over this five- year period.

Juab posted some of the highest high school graduation rates in the state in 2020-2021, 98%, and some of the lowest high school drop-out rates - less than 2%. Also of note, the high school graduation rate in Juab has steadily increased from 78% in 2008 to 98% in 2021. ACT scores show Juab to be 16th from the bottom of all Utah school districts and charter schools with only 44.8% of their graduates scoring above an 18 on the ACT with a district average of 17.5 Composite ACT Score (State Average Composite ACT score in Utah is 19.6 in 2021). From these data, PCBL seems to endow secondary students in Juab School District with some motivational advantages to finish a high school diploma, but this does not appear to translate into higher levels of student academic outcomes in either the secondary or elementary school levels.

Computer technology plays a role in education, and approaches like PCBL may offer advantages to certain student outcomes over traditional classroom instruction. There is great variability in how states, districts, and schools define and implement PCBL. Empirical studies of PCBL are few, and currently, there is little research that demonstrates that PCBL improves academic achievement. Further, little is known about the cost-benefit ratio of system-wide implementations of PCBL.

References

Aslop, A., & Mead, S. (2015). A path to the future: Creating accountability for personalized learning. Bellwether Education Partners. https://files.eric.ed.gov/fulltext/ED557085.pdf.

Azevedo, J. P., De, W. Rogers, F. H., Ahlgren, S. E., Cloutier, M., Chakroun, B., Chang, G., Mizunoya, S., Reuge, N. J., Brossard, M., Bergmann, J. L. (2022). *The state of the global education crisis : A path to recovery*. World Bank Group.

Bill and Melinda Gates Foundation (2015). A working definition of personalized learning. http://s3.documentcloud.org/documents/1311874/personalized-learning-working-definition-fall2014.pdf.

Duckworth, A. L., Kautz, T., Defnet, A., Satlof-Bedrick, E., Talamas, S., Lira, B., & Steinberg, L. (2021). Students attending school remotely suffer socially, emotionally, and academically. *Educational Researcher, 50*(7), 479-482.

Evans, C. M., Landl, E., & Thompson, J. (2020). Making sense of K-12 competency-based education: A systematic literature review of implementation and outcomes research from 2000 to 2019. *The Journal of Competency-Based Education*, 5(4), 1-28.

Goldhaber, D., Kane, T. J., McEachin, A., Morton, E., Patterson, T., & Staiger, D. O. (2022). *The consequences of remote and hybrid instruction during the pandemic* (No. w30010). National Bureau of Economic Research.

Hattie, J.A.C. (2009). *Visible learning: A synthesis of over 800 meta-analyses related to achievement.* Routledge.

Herold, B. (November 5, 2019). What is personalized learning? *Education Week.* https://www.edweek.org/technology/what-is-personalized-learning/2019/11.

Leech, N. L., Gullett, S., Cummings, M. H., & Haug, C. A. (2022). The challenges of remote K-12 education during the COVID-19 pandemic: Differences by grade level. *Online Learning Journal, 26*(1), 245-267.

National Assessment of Educational Progress (2022). *Reading and math scores decline during COVID-19 pandemic.* https://www.nationsreportcard.gov/highlights/ltt/2022/.

Pane, J. F., Steiner, E. D., Baird, M. D., Hamilton, L. S., & Pane, J. D. (2017). *Informing progress: Insights on personalized learning implementation and effects.* Santa Monica, CA: RAND Corporation, RR-2042-BMGF, 2017 (available at www.rand.org/t/RR2042). To view this brief online, visit www.rand.org/t/RB9994.

* Research reports funded and disseminated by program developers or publishers were excluded from this policy brief due to conflicts of interest.

Acknowledgment

This policy brief was supported by funding from the Center for the School of the Future at Utah State University.

Parker Fawson
Director
Center for the School of the Future
Emma Eccles Jones Endowed
Chair in Early Education

David E. Forbush
Associate Director
Center for the School of the Future

D. Ray Reutzel
Senior Research Fellow
Center for the School of the Future

Janice A. Dole
Senior Research Fellow
Center for the School of the Future

The Center for the School of the Future| Utah State University | 2605 Old Main Hill, Logan, Utah 84322-2605
www.csf.usu.edu | (435) 797-0240
Twitter: @USU_CSF | Facebook: USU Center for the School of the Future

Emma Eccles Jones College of Education & Human Services
Center for the School of the Future
UtahStateUniversity