HOW INVESTMENT IN TECHNOLOGY CAN ACCELERATE COLLECTIVE IMPACT IN ADULT LEARNING

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INTRODUCTION

Technology is now part of almost everyone's daily life. Many of us live on our devices, rely on them for information, directions, banking, restaurant reservations, etc. When our mobile phone is more than five feet from us, some of us may even get anxious and start looking for where we left it. It is often the first thing we look at in the morning and the last thing we put down at night. Technology drives our work, our play, and our engagement with others. It is required to be a fully-participating member of the 21st century.

Technology allows us to do more with less. With a few taps or clicks we can learn about topics that cross our minds and delve deeper into topics of academic study. We can access information from around the world, from libraries formerly off limits to the general public to databases that open a world of wonder for the curious. Technology allows us to reach further, extend learning, differentiate instruction, and break the silos that have existed for decades.

Attempting to provide insight about the potential collective impact that investment in technology could produce on Adult Basic Education (ABE) learning outcomes, focus groups were held in Minneapolis, MN, at the 2017 IDEAL Consortium Institute.[1] With the support of Aztec Software, ABE leaders who support development and implementation of distance and blended learning in adult education tackled a series of questions. The focus group participants included state-level professional development staff, educational technology specialists, program managers, and lead teachers from the 11 IDEAL Consortium states whose blended and distance learning programs reach tens of thousands of adult learners.[2]

World Education EdTech Center staff and a representative from Aztec Software facilitated group discussions on the following themes: 1) Using technology to **reach** new learners, 2) Using technology to **extend** learning for current students, 3) Using technology to personalize, or **differentiate** learning, and 4) Using technology to collaborate and **break the silos** that separate practitioners from different agencies that receive federal Workforce Innovation and Opportunity Act (WIOA) funds. These themes help to better understand how technology is currently being deployed as a disruptive tool and to determine how to position the return on investment in technology infrastructure for policy makers and funding agents.

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Each group addressed the same questions within these themes: What they are currently doing in their states? What would they like to be doing? What are the barriers that prevent it? How could the barriers be mitigated? The paper that follows describes both the barriers the participants identified and examples of effective programming that draw on creative use of technology and policy. It shares known examples of lessons learned by leaders in the field from across the United States. By describing this work, we aim to motivate innovation in policy and funding of ABE programs in order to maximize the potential positive impact of investment in technology.

[1] www.edtech.worlded.org/professional-development/ideal-consortium

[2] This paper is the result of a joint effort by Aztec Software (www.AztecSoftware.com) and The EdTech Center @ World Education (www.edtech.worlded.org). Aztec Software has been a leading provider of computer-delivered, adult education curriculum since 1980. Since 2002, Project IDEAL, now renamed as the IDEAL Consortium and a project of the EdTech Center at World Education, has provided technical assistance, web-based tools, and publications to ABE leaders from member states to help them design distance education programs based on their distinct needs, train their staff, and assess the progress of their efforts.

SECTION 1

TECHNOLOGY TO REACH NEW LEARNERS: SERVING THE UNDERSERVED

The ability to reach more students has long been an important goal for adult learning programs. Increased enrollment can have a positive impact on local economies and communities as learners' resulting skills and knowledge enhance employability and, in time, contribute to wage increases, more employment opportunities, and economic growth. Challenges mitigating the potential for these benefits are similarly felt across the country. Transcending urban, suburban, and rural areas, the barriers that slow progress range from lack of affordable childcare to scheduling conflicts to lack of transportation. Reaching more learners, however, remains crucial.

Compounding these barriers is the reality that people with learning and skill development needs, be they basic education or industry-specific training, are often unable to find the programming they need at a time when they can make use of it. Workers struggling in low-wage jobs can find it difficult to attend in-person programs because their work hours may constantly change, they may work night or swing shifts, or they may need to juggle more than one job.

Of 36 million lower literate adults in the United States, only 4.1 million (or 11%) receive services from our traditional workforce and adult education systems, according to an international Survey of Adult Skills by the Organisation for Economic Co-Operation and Development (OECD).[3] As a nine-fold increase in adult learning funding is highly unlikely, creative new technology solutions will be needed to reach and serve the 89% of potential students that are currently not served. This paper presents several promising examples of initiatives from around the country, including policy shifts and alternative program models, that ease the burden of access to internet and computers and bring instruction to underserved demographics.

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Policy Initiatives to Create More Opportunities for Learning

New Mexico, which has a 29% high school drop-out rate,[4] is struggling to meet a goal set by the governor of boosting the percentage of residents with a postsecondary credential (e.g., associate degree, bachelor's degree or industry-recognized credential) from the current 42% to 66% by the year 2030.[5] To achieve this goal, the state's Higher Education Department, Adult Education Division, is exploring options for distance learning, which can be defined as, "Formal learning activity where students and instructors are separated by geography, time, or both for the majority of the instructional period.[6]" New Mexico is also exploring alternative pathways to achieve high school completion, such as the fully online National External Diploma Program[7] from CASAS.

Other states have also expanded their reach through policy initiatives. Minnesota established proxy contact hour (PCH) reimbursement rates to incentivize and fund programs to

[3] www.oecd-ilibrary.org/education/time-for-the-u-s-to-reskill_9789264204904-en
[4] www.santafenewmexican.com/news/local_news/n-m-high-school-graduation-rate-up-to/article_46b2ca28-dc36-11e6-8f6a-8398e2285b57.html
[5] www.hed.state.nm.us/uploads/files/Policy%20and%20Programs/Articulation%20and%20Transfer%20Reform/4%20-%20Summit%20Presentation%20v4.pdf
[6] www.nrsweb.org/docs/NRS_Implementation_Guidelines_February2016.pdf
[7] www.nedp.org

provide adequate support and wrap-around services for their adult students enrolled in distance learning programs. Proxy hours differ from direct contact hours in that the identity of the learner and/or the exact amount of time spent on a learning activity cannot always be verified directly. While a learner may spend one hour in an online course, the time and effort offered by instructional staff to orient and support the student can exceed the one hour of learning.[8] To address this disparity, Minnesota assigns a reimbursement rate of 1.25 proxy hours for each hour of distance learning. This policy directly addresses and funds the time it takes to provide orientation services, ongoing tutorial support, and distance counseling to students. These essential services provide students the encouragement and support structures needed to build perseverance and success.

As part of WIOA implementation, California policy requires that all Title II funded agencies complete a Technology and Distance Learning Plan. As part of implementing that process, at least 10% of learners are required to complete a technology use survey. During the 2016-17 program year, up to 50,000 adult students provided data on their individual use of technology.[9] Of those, more than 86% reported having a smart phone. Through this initiative, programs have a better understanding of their learners' digital literacy skills and their access to digital technologies. This data informs efforts to create more opportunities for learning.

Easing Issues of Internet Access: Mobile Learning and Creative Access Solutions

Organizations in several states across the U.S. are working to leverage the power of technology to reach more learners by making use of mobile devices and by finding creative means by which to provide internet connections.

By using smart devices, innovative organizations are tapping into the technology already in adults' hands; indeed, 95% of U.S. citizens have cell phones, of which 77% are smart phones.[10] One successful initiative leveraging this access is the Mobile Up project of the California Labor Federation, which is reaching lower-wage workers previously underserved by adult education and workforce training.[11] Funded by a state Workforce Innovation Accelerator grant, Mobile Up targets the 20% of California's workforce that is foreign-born and limited English proficient. By providing access to English language instruction and career education through mobile devices, Mobile Up is helping immigrant English language learner (ELL) janitors, long-term care assistants, and other low-wage workers in high-growth industries gain skills and advance in their careers.

Mobile Up was designed to serve those who cannot attend regular classes due to their busy and irregular work schedules, but who can study and receive career coaching by phone. They can study even on a basic phone through interactive text and audio voice learning lines offered by Cell-Ed.[12] Workers learn of the English program through recruitment efforts that include worksite and union hall visits, targeted texts, and social media posts. Bilingual mobile coaches follow learners' progress and support learners by texting and speaking with them, as well as giving them referrals to further training, next step job opportunities, or additional resources in their community.

The Mobile Up model is a critical anytime, anywhere learning option for adults who cannot participate in traditional education programs. Though only a small percentage of workers are able to study primarily on their own, this effort is worthwhile. The SEIU 2015 long-term care union in California alone represents over 325,000 primarily immigrant workers. If 10% could be successful learning at a distance, that would be 32,500 adults! Program retention and learner success is significantly higher, however, when students are supported with some in-person peer support and instruction.

The majority of Mobile Up students have studied on basic phone lines rather than Cell-Ed web apps, underscoring lack of internet access and low digital literacy as barriers to adults learning on devices. In an attempt to broaden internet access, ABE programs in Massachusetts have explored using resources through the EveryoneOn website,[13] but concerns regarding a limit on the

[8] www.mnabe-distancelearning.org/approved-dl-platforms
[9] https://adulted.otan.us/Info/index.cfm?fuseaction=studentResults&yr=201617
[10] www.pewinternet.org/fact-sheet/mobile
[11] www.mobileuproject.weebly.com
[12] www.cell-ed.com
[13] www.everyoneon.org

number of people who can access the site at any given moment have inhibited implementation.

To the north, Maine is a very rural state but has ensured that every public library has internet access, and provides it free for all patrons. Maine's Libraries Without Borders[14] program runs a video on loop in laundromats to share community resources and encourage people to seek out programs. Libraries are also being used as a location for pre- and post-testing when more formal locations are unavailable.

Providence Public Library in Rhode Island has helped learners access the internet by purchasing MiFi mobile hotspot devices for the public library system. The "Borrow the Internet" program allows patrons of the library, with a library card, to check out MiFi devices and therefore have solid access to online learning tools.[15] Going one step further, patrons are also able to check out Microsoft Surface tablet. By providing the broadband access as well as the hardware needed for log-on, Providence Public Library is removing a barrier for adult learners that is often noted as a primary hurdle when seeking online learning opportunities. The Rhode Island Office of Innovation secured private sector funding to allow Providence Public Library to partner with Providence Housing Authority to offer Wi-Fi devices and access as well as computers. Public Housing residents who complete a digital literacy class, aligned with the Northstar Digital Literacy Assessment[16] standards, qualify for participation in the program.

Alternative Models to Create Learning Opportunities and Support Retention

Library systems in Rhode Island and Illinois have implemented learning circles as a means of providing a community of support to learners studying online, increasing retention, and encouraging a deeper exploration of content for their adult students. A learning circle is a highly interactive, participatory structure for organizing group work, in which learners "build, share, and express knowledge through a process of open dialogue and deep reflection around issues or problems with a focus on a shared outcome.[17]" Learning circles generally bring together learners who are studying on the same online program once a week for 2-3 hours. Meet-ups are often facilitated by volunteers or the learners themselves, and they are held at libraries, coffee shops, or other neighborhood venues.

Peer to Peer University[18] (P2PU) and World Education have piloted successful learning circles with lower-level English Language Learners on waiting lists for regular classes. In Massachusetts, Maine, and Rhode Island, 110 immigrant adults across five programs study via online ESL and citizenship programs, including USA Learns, Burlington English, Newsela, and Voice of America. Across 12 learning circles, post-tests showed learning gains, and learners expressed appreciation for the participatory approach of the circles, and how the peer community aided their learning and prepared them to succeed in more intensive instructional programs. By the second round of pilots, most learning circles reached 70%-100% attendance and completion rates. World Education is now looking to expand the number of learning circles and possibly diversify the topics as various libraries have done based on participant interest and need.

Instituto del Progreso Latino,[19] based in Chicago, Illinois has achieved even higher retention (up to 97% by round two) in its Cyber-ESL program by having students study online through USA Learns[20] coupled with significant wrap-around support. The program features include:

1) Classes offered bi-weekly at non-traditional times (Friday nights, Saturday mornings)
2) Individual 30-minute calls weekly with teachers for personalized instruction and coaching
3) Check-in calls with student advisors once a month for additional coaching
4) Skype sessions once a week with a small group of students for language conversation
5) Childcare for the 76% of female participants (22% were single mothers)
6) Computer literacy instruction and a loaner computer, Wi-Fi hotspot and IT support.

[14] www.librarieswithoutborders.org
[15] www.provcomlib.org/borrow-internet
[16] www.digitalliteracyassessment.org
[17] www.sites.google.com/site/onlinelearningcircles/Home/learning-circles-defined
[18] www.p2pu.org/en
[19] www.institutochicago.org
[20] www.usalearns.org

For Instituto, a recipe for distance learning of 85% virtual and 15% in-person instruction proved effective with an otherwise hard-to-serve demographic– primarily older, working adults, and parents (the majority of whom are women) with an annual income of less than $20,000. Fifty-eight percent of the program participants advanced at least one or more grade levels in a 16-week period. By comparison, 30% of students on average make a leap of one level in Illinois community college ESL programs while 31% of Cyber-ESL students advanced two levels.[20]

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Coupled with online support systems, online coaching allows service providers the chance to deliver personalized support services and catch participants before they leave the program or otherwise fall through the cracks. Adult education leaders in Massachusetts are looking to expand employer partnerships to increase their reach into communities that are traditionally underserved. For example, Big Y,[21] a grocery store chain, offers a call-in tutoring program for K-12 students that could be leveraged for adult learners.

It is important to note that models such as Mobile Up, English Now!, Cyber-ESL and online coaching are not necessarily more affordable models. They require staff and program resources much like traditional programming. The role of staff, rather, is shifted to teaching, coaching, or counseling learners by phone or computer in addition to, when possible, facilitating classes and meet-ups to encourage in-person peer support, instruction, and practice of skills. Such models are essential for reaching learners who otherwise cannot attend traditional face-to-face classes.

The Rundown

Initiatives to extend the reach of ABE programs need not require more money. Adjusting proxy contact hour policy in ways that align with federal guidelines (e.g., the example from Minnesota described above), forming online learning circles or peer communities, or conducting access surveys are relatively low-cost endeavors that could make a significant difference in how programs reach and teach more adult learners. Distance learning models, which can indeed require extra funding and resources to set up, once established, can be implemented at a cost similar to, or sometimes even less than, traditional instruction. Further, if teachers or facilitators use programs that are cell/smart phone compatible, they open the door to learning for students with limited computer and internet access.

[20] www.edtech.worlded.org/cyber-esl-student-supports-recipe-success
[21] www.mathandreadinghelp.org/homework_help_line.html

SECTION 2

TECHNOLOGY TO EXTEND LEARNING FOR CURRENT LEARNERS: DISTANCE & BLENDED MODELS

Anytime, anywhere, any device learning opportunities have changed the dynamic of instruction. The ability to learn while on the bus, sitting in the waiting room, or while on a break at work has expanded learning outside the classroom walls. One way to extend learning via technology is through the implementation of blended learning models. The Clayton Christensen Institute defines blended learning as:

> *A formal education program in which a student learns: 1) at least in part through online learning, with some element of student control over time, place, path, and/or pace; 2) at least in part in a supervised brick-and-mortar location away from home; and 3) the modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience.*[22]

Murphy, et al. (2017) offer a more simplified definition of blended learning based on their study of hundreds of adult learners studying in 13 programs across the U.S., defining it as a unified learning program featuring tight integration of an online curriculum into a broader educational program that includes face-to-face, in-class instruction. A key observation about blended learning was that:

> *Instructors attempted to link the content in their lectures to the content that students were assigned in the product, or they closely monitored student progress in the product and modified instruction in the classroom accordingly and/or used students' performance in the product to identify those in need of individual attention (p. ES-5).*[23]

In the report, they contrast blended learning to hybrid learning, which draws on both online resources and teacher-led, in-class instruction, but where the online work is **not** closely connected to in-class lessons.

Indeed, there is not just one way to implement blended learning. Depending on learners' needs and resources available, programs can decide the best balance between direct, face-to-face instruction and more distance-focused, individualized activities. Blended learning, therefore, can help intensify instruction for currently enrolled learners, and can be a means of reaching many of the 89% who are not currently being served.[24]

Although today's technology allows for tracking of student engagement and learning online as well as accurate proctoring of online testing environments, ABE continues to struggle to move beyond the old-fashioned requirements for seat time, in which programs are paid for each hour a student attends in-person classes. State and local policies need to keep pace with the ever-changing ability to provide secure, relevant, and timely learning and assessment options via distance learning models.

Unique Implementation Models of Blended Learning

The National Immigration Forum (in partnership with Miami Dade College in Florida, and the Community College Consortium for Immigrant Education) has developed a successful, blended model for contextualized Vocational ESL instruction for

[22] www.christenseninstitute.org/blended-learning-definitions-and-models
[23] www.sri.com/sites/default/files/publications/evaluating-digital-learning_1.pdf
[24] www.oecd.org/edu/highlights.pdf

immigrant retail workers. The Skills & Opportunity for the New American Workforce program[25] provides 40% instruction in person to retail workers at their worksites, while the workers study the other 60% of time in an online program accessible by computer or mobile app. More than 1,000 participating workers in a two-year pilot offered in Florida, Texas, and New York have shown learning gains in English as well as improved employment and business outcomes in wages, promotions, and lower employee turnover. Of the participating managers, 88% reported increased store-level productivity.

To truly provide an individualized academic pathway, Los Angeles Unified School District[26] has chosen to implement Aztec Software across all adult education programs: Independent Study, High School Equivalency, and Distance Learning. The programs allow for students to study remotely at their own grade level in math, reading and writing, while adhering to stringent guidelines that monitor their progress through ongoing NRS assessments. Both TABE and CASAS are administered on-site at various times to accommodate adult learners juggling busy schedules. The robust reporting functionality of the Aztec platform enhances the data and accountability reporting mandated by the state, and allows teachers to track, in real time, the performance of students. By doing so, the District has made a commitment to its diverse student population to provide curriculum access that is anytime, anywhere, and on any device.

Bring Your Own Device (BYOD) models are in place at many educational institutions, such as New York City Public Schools (District 79),[27] and are being deployed by American Job Centers such as those in Honolulu, HI.[28] Students can learn at their own pace, and have access to all the materials typically reserved for brick-and-mortar instruction. The "click" is quickly enhancing or extending learning beyond the "brick" in many places, supported by wrap-around services that ensure positive outcomes.

Leadership Commitment at the State Level

Several adult education state-level offices have established distance and blended learning program improvement as a prioritized initiative, establishing policy and providing guidance to foster equitable access to programming for learners across their states. The Arizona Department of Education Adult Education Office now requires blended learning models to be included in all state ABE grant applications, thereby extending learning opportunities. Coupled with this is professional development provided through the IDEAL Consortium, which has been offered across the state to ensure implementation of blended learning models. The combination has been successful, as illustrated by comparisons between learning gains of students in blended learning classes versus students in traditional classes. Blended learning students demonstrated 6% higher learning gains than students in traditional, in-person classes in 2014, 16% higher in 2015, and 13% higher in 2016. Of interest is that distance learning results were also higher than in traditional classes but not as high as blended learning, with 5% higher learning gains in 2014, 9% in 2015, and 9% in 2016.

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The Massachusetts Department of Elementary and Secondary Education has opted to include questions about use of technology in their ABE Request for Proposals and has added requirements for digital literacy, which are delineated in a newly released Digital Literacy and Computer Science Curriculum Framework.[29] Curriculum software that aligns to these new standards are currently being evaluated. These include Aztec Software,[30] Newsela,[31] Reading Horizons,[32] and Elevate Education.[33]

The Outreach and Technical Assistance Network (OTAN) state leadership project in California has been working to extend learning opportunities for adults by introducing the use of

[25] www.immigrationforum.org/blog/project-impact-skills-and-opportunity-for-the-new-american-workforce
[26] www.wearedace.org
[27] http://schools.nyc.gov/NR/rdonlyres/06585363-835B-40B9-9BDF-D75DC0FDFB1F/0/techplanFINAL_021816.pdf
[28] www.labor.hawaii.gov/wdd/onestop
[29] www.doe.mass.edu/frameworks/dlcs.pdf
[30] www.AztecSoftware.com
[31] www.newsela.com
[32] www.readinghorizons.com
[33] http://us.elevateeducation.com

mobile tools including online learning through Facebook groups, Moodle,[34] and Kahoot[35] as a means of embedding more interactive tools into the learner experience. OTAN also offers a multitude of professional development opportunities for teachers, hosts various online courses for students,[36] and sponsors an annual Technology and Distance Learning Symposium.[37]

The Pennsylvania Department of Education has implemented policies that promote blended and distance learning as a means of extending learning opportunities for adults, particularly in areas where programs routinely have waitlists. It also offers distance learning opportunities to students who are at higher Educational Functioning Levels and are more able to study independently. Assignments are also posted to Schoology[38] so students who are not able to attend a particular class can access content and learning materials provided by instructors.

Overcoming Barriers to Extending Distance Learning/Blended Learning

Extending learning opportunities beyond the traditional brick and mortar setting is challenging. Finding qualified instructors, when there is no certification or licensing requirement, proves to be challenging in many places. Furthermore, between federal, state, and grant-specific mandates, some programs are simply too taxed to implement new and/or innovative solutions to existing barriers. Coupled with teacher shortages in adult education and the heavy reliance on part-time instructors, the human capital is often not available to try new things, extend the reach of education through technological innovation, or implement pilot projects that require dedicated staff time.

Moreover, administrators might demand that teachers integrate technology into their classrooms and lesson plans, while they themselves fail to utilize the tools and systems put in place by their agencies. For this reason, organizations such as International Society for Technology in Education (ISTE)[39] and the European Computer Driver's License Foundation[40] publish standards for technology integration that include mention of administrative level personnel. These standards can serve as state technology standards and can help frame a policy dialogue for technology implementation at not only the classroom level, but also for administration.

When thinking of ways to overcome barriers to implementing more distance learning or blended learning, it is important to not let the tool define the task.

When thinking of ways to overcome barriers to implementing more distance learning or blended learning, it is important to not let the tool define the task. Teachers and administrators may feel constrained by the tools they have at their disposal. They look at the hardware and software being implemented at their agencies, and try to solve problems using existing infrastructure. The tools should not define programming, rather, the programmatic goals should determine required tools. Agencies should focus on the goal first, then work backwards to determine a pathway to that goal. This nuanced approach is one reason starting new distance or blended learning programs might require additional funding. Administrators and teachers need professional development, along with supportive policies, on how to select and make effective use of a range of both instructional strategies and technologies in distance and blended programs.

Supporting Development through Professional Development

A lack of expertise is a significant barrier to successful programming. Teachers may not know **how** to use available technology tools (both software and hardware) or they simply do not know **what** technology is available. The ability to reach instructional staff with needed professional development (PD), particularly in rural areas, remains a hurdle that agencies are struggling to overcome. Coupled with the discomfort some

[34] www.moodle.com
[35] www.kahoot.com
[36] www.otan.us/browse/index.cfm?fuseaction=browse&catid=10851
[37] www.otan.us/tdlsymposium
[38] www.schoology.com
[39] www.iste.org
[40] www.ecdl.org

teachers feel using technology, the barriers become insurmountable for many adult education programs.

In response, several states are focusing on professional development as the means to empower teachers to do more with the technology they already have in their classrooms. For example, Pennsylvania strives to bring all ABE teachers to the level of "master teacher." Often, it is the enthusiasm of a teacher that creates results and impacts change in student learning. A champion of a particular online curriculum or technology resource can raise the bar for all teachers on site.

Similarly, the impressive results in Arizona's blended learning initiative described previously are due to Arizona Department of Education's investment in a wide array of professional development offerings. With the goal of empowering teachers to do more with technology so that they can reach a greater number of students, the state is supporting extended learning opportunities for their current students, learners who may not have persisted in traditional instruction.

Texas, too, has initiated a unique PD opportunity to spur the use of technology in ABE instruction. Led by the Texas Center for the Advancement of Literacy and Learning (TCALL), TRAIN PD at Texas A&M uses a seven-level badge program for certifying Technology Integration Coaches. This robust train-the-trainer model is intended to build program-wide capacity for drawing on technology to support instruction both in and out of the classroom.[41]

More broadly, the IDEAL Consortium draws on the PD provided by the Ed Tech Center at World Education.[42] Over the years, the focus of the PD has shifted from initially building expertise for quality distance education programming to a focus on blended learning. Professional development offerings range from year-long program development support to three-hour online courses on topics such as blended learning, mobile learning, and use of Open Educational Resources (OER).

As is often the case when implementing a paradigm shift, practitioners struggle with how to make best use of available resources. Many states, including Arizona, have looked to the Technology Integration Matrix (TIM) from the University of South Florida as a guide. The TIM provides a framework for describing and targeting the use of technology to enhance learning.

The TIM incorporates five interdependent characteristics of meaningful learning environments: active, collaborative, constructive, authentic, and goal-directed. These characteristics are associated with five levels of technology integration: entry, adoption, adaptation, infusion, and transformation. Together, the five characteristics of meaningful learning environments and five levels of technology integration create a matrix of 25 cells.[43]

Finally, ABE leadership in Rhode Island is working toward digital badging and micro-credentialing that recognize the skills-based competencies of adult education faculty. These options make it possible for educators to drive their own professional development and to demonstrate proficiency and skills in "competency-based, personalized, and on-demand professional learning.[44]"

The Rundown

Blended and distance learning models are breaking barriers to access and extending learning across the country. The ability to learn anywhere, anytime and on any device is bringing curriculum and professional development to the people who need it, both on the student and teacher side of the equation. Support, however, needs to be ongoing for policies and funding models that spur innovation, provide adequate professional development, and make possible effective implementation and scaling for maximum impact.

[41] www.edtech.worlded.org/badging-in-action-becoming-a-tech-integration-coach-in-texas/
[42] www.edtech.worlded.org/professional-development/ideal-consortium/
[43] www.fcit.usf.edu/matrix/
[44] www.cce.org/thought-leadership/blog/post/cce-rhode-island-micro-credential-symposium

SECTION 3

TECHNOLOGY TO DIFFERENTIATE LEARNING: WAYS TO CUSTOMIZE LEARNING

Over the years, instructional methodology in ABE has transformed from one of pedagogical theory to andragogical theory (i.e., a theory devoted to understanding how adults learn[45]). However, given the advancements in technology, and the readily available devices on the market today, heutagogical theory is increasingly pertinent. Heutagogy is the study of self-directed learning. "Heutagogy looks to the future in which knowing how to learn will be a fundamental skill given the pace of innovation and the changing structure of communities and workplaces.[46]" Competencies and capabilities form the basis for self-determined learning, and become more and more relevant as people attempt to solve problems themselves that used to require professional knowledge. One way to help learners develop this skill is to provide differentiated instruction, or personalized instruction to allow learners to access resources at their level, according to their individual learning style, or grounded in the specific contexts in which they will utilize their skills.

Exemplar Uses of Technology to Differentiate

Texas Workforce Commission is currently utilizing programs that allow for leveled instruction[47] to meet the needs of adults with disabilities. The program is regularly profiled on the state-sponsored "Tech-and-Tell" webinars, which provide program overviews for instructors and how-to's for those needing a bit more support on the integration of technology into the classroom.[48] Similarly, Arizona's Department of Education is heavily promoting the use of online instructional platforms as a means of differentiating materials for multi-levels of students including those with learning disabilities. Programs such as Burlington English, Aztec Software, and Odysseyware assist in this development of individual academic pathways for online learners.

One easy way teachers can leverage technology to provide individualized support to learners is through spaced learning text messages or emails. In spaced learning, teachers or programs send out questions to learners about content they have studied at various intervals in the week so that the learner must try to recall the answer. Recall aids with retention of content, or helps students understand gaps in their knowledge so they know what to study more. For example, Cell-Ed mobile coaches track student progress in mobile courses and send automatized or customized spaced learning texts depending on the exact student and their needs and learning challenges. For example, if a student has been studying the 100 questions for the citizenship exam, she might receive one text a day with a question to make her recall an answer she needs to practice.

A coach in a mobile ESL course might send more personalized spaced texts to help students recall and practice language learned, but in the context of their lives. For example, a mobile coach supporting a student with an interest in applying for a promotion at work who had recently studied the past tense in English, might not send the student a generic question such as "What did you do this weekend?" Instead, the coach could send a targeted text to help prepare the student for a job interview such as, "What did you do in your last job that prepared you for your current job?" Cell-Ed and Mobile Up coaches have determined that spaced learning texts, especially customized ones, boost retention of content and learning, increase the time students spend learning online, and increase student confidence and motivation to proactively request additional resources or personalized help from their coaches.

In Pennsylvania, the Department of Education is working to develop a collection of real job applications so that programs

[45] https://www.nationalcollege.org.uk/cm-andragogy.pdf
[46] www.heutagogycop.wordpress.com/history-of-heutagogy
[47] www.readworks.org
[48] www-tcall.tamu.edu/techTell.html

can provide job seekers with authentic examples of applications in the sectors and job classifications they are targeting. Similarly, adult education leadership in Massachusetts is working to develop a curated list of products and tools that can be used by teachers with particular classes or learners depending on their needs and goals. The list would not only include online solutions, but also suggest the purposes and uses by ABE programs. By providing a curated list of curriculum content and instructional tools, the state's goal is to help strengthen Integrated Education and Training (IET) program models. Adults in need of specific skills to get a job or advance in their careers can be pointed to specific online learning programs or tools to meet their needs.

Differentiating learning opportunities takes many forms across the country. Students in Texas can access an online Distance Learning (DL) Call Center for Math,[49] where they can either ask quick questions or receive one-on-one tutorials with a Spanish-English bilingual tutor. The Texas Workforce Commission has made this service, which is still a pilot project, free to all users and programs who refer students are not charged. In California, OTAN makes available and trains teachers to use mobile optimized LMS systems such as Moodle to allow teachers to share specific content with learners.

Aztec Software now has a feature in their online platform that allows teachers to create custom "classes" to target specific groups of learners. For example, a teacher could create a "class" of students who are all at the CASAS 210 scale score in math, or at the TABE Level M in reading. However, an affordable, curriculum-agnostic Learning Management System, in which teachers can add content to truly differentiate instruction, is still on the "wish list" of many agencies.

Extending the Benefits of Differentiation into Real Life

Technology enables more customized instruction on how learners can use skills in the context of their own lives, and it opens doors for more real-life practice. This focus on applied practice is critical as research shows that students learn by practicing, and this is especially true for basic skills instruction. Practice Engagement Theory[50] argues that, as a result, instruction in class should not focus on trying to teach as much as possible during class time, but on helping students develop the competencies and confidence they need to successfully go out and practice skills in their real lives. Therefore, instruction must be much more personalized and focused on exact situations in which learners can practice skills, or even better, need to accomplish tasks in their real lives. Indeed, EdTech Center partner Steve Reder's nine-year "Longitudinal Study of Adult Learning[51]" found that the biggest long-term learning gains for adult learners in high school equivalency, literacy, and other classes are not correlated to most hours in the classroom, but instead, to hours spent practicing skills outside of class.[51]

The internet, mobile, and other new technologies offer endless, authentic opportunities for learners to practice skills through real digital tasks in their daily lives.

The internet, mobile and other new technologies offer a multitude of authentic opportunities for learners to practice skills through real digital tasks in their daily lives. Students in ESL or literacy classes can practice English and reading when finding information on their child's school website, navigate their healthcare or banking online, research or apply for jobs or prepare resumes. Math skills can be practiced while researching the going rate for apartments or comparing prices for online shopping.

When applying new basic skills as they try to accomplish tasks using technology, adult learners will inevitably run into challenges such as IT issues, a new online feature, or program to navigate, and they will need to figure out how to overcome them. In the process, they will develop the technology skills needed to be continuous, lifelong learners in their daily lives, not just in classrooms.

While these skills can be implicitly embedded into academic tasks, they might also be taught as a process. One model for

[49] www-tcall.tamu.edu/publication/17-Summer.pdf
[50] Reder, S. (1994). Practice engagement theory: A sociocultural approach to literacy across languages and cultures. In B. Ferdman, R.M. Weber, & A. Ramirez (Eds.), Literacy across languages and cultures (pp. 33-74). Albany, NY: State University of New York Press.
[51] www.centreforliteracy.qc.ca/sites/default/files/CFLRsrchBrief_Chllngng_Assmptns.pdf

this is PIAAC's Problem-Solving in Technology-Rich Environments (PS-TRE). PS-TRE is defined as, "using digital technology, communication tools, and networks to acquire and evaluate information, communicate with others, and perform practical tasks.[52]" Specifically:

> *PS-TRE assesses the cognitive processes of problem solving–goal setting, planning, selecting, evaluating, organizing, and communicating results. The environment in which PS-TRE assesses these processes is meant to reflect the reality that digital technology has revolutionized access to information and communication capabilities over the past decades.*[53]

PS-TRE is relevant in ABE because it provides a structure for decisions about choosing from a range of available information and communications technologies (ICTs) for accomplishing a task or solving a problem. Because we face an expanded range of ICTs with increasing complexity, tasks that were once routine are now not (e.g., many banking tasks that were once accomplished by interacting with a teller now require use of an online system). ABE learners need to be taught **how** to go about problem solving. Once comfortable with a process, they build the resilience and skills required when they encounter new technologies and tasks in the future.

Using Differentiation for Just-in-Time Learning

Motivation and retention in learning the skills to perform tasks is higher just before a student needs to do it. Unfortunately, many ABE programs teach skills in the abstract to prepare students for a time in the future. Technology can enable customization of just-in-time learning. Teachers can point students to online learning opportunities such as YouTube videos or courses on formal LMS systems. Additionally, artificial intelligence can recognize when a person is ready to learn the next thing or when, in life, someone might need to learn something and provide the information or instruction exactly when needed.

CEO Rob May of Talla,[54] a chat platform company, explained how bots are now being employed by human resources departments to mitigate the problem of overloading a new hire with too much information in their first few days. He said:

> *The right way to use the bot is to replace information overload with information precision. Many new hires get a ton of information during their first couple of days on the job, much of which won't get retained. A bot, can be used to drip information to the new employee over days or weeks or longer, meaning that person can get the right information at the right time, once other things have been learned that make the information more relevant, valuable, and memorable.*[55]

The Rundown

Differentiation allows for personalizing instruction to match learners' motivations, helping learners gain exactly the kinds of skills they need to accomplish their goals, whether English communication skills to speak to their child's teacher, digital literacy to access their health care online, or specific career technical education and interview preparation to land a job.

Agencies often get in their own way when working to overcome barriers. Firewalls installed with the best of intentions prevent access to sites needed by learners and instructors. Limited infrastructure and IT support creates barriers to utilizing the hardware that is on-site, but not working properly. Agency policies prevent Wi-Fi from being installed, accessed, or provides such limited broadband that only a few people can access at any given time. Limited broadband access often prevents instructors from implementing a "bring-your-own-device" policy in classrooms where adult learners have the technology in their hands, but are limited on personal data plans.

Despite these challenges, differentiation is worth investing in. It holds the potential to personalize learning via individual academic pathways, to build confidence and motivation, to utilize applied practice and authentic learning opportunities, and to develop a sense of life-long learning makes a critical impact on learning gains and economic mobility.

[52] www.nces.ed.gov/surveys/piaac/problem-solving.asp
[53] Ibid.
[54] www.talla.com
[55] www.fastcompany.com/3066620/this-is-how-ai-will-change-your-work-in-2017

SECTION 4

TECHNOLOGY TO SILO BREAK: WAYS TO COLLABORATE

The Workforce Innovation and Opportunity Act (WIOA) calls for a greater level of collaboration among federally-funded Title entities.[56] Adult education agencies funded through Title II are now mandated partners with their Workforce agency partners (Titles I and III), as well as Vocational Rehabilitation providers under Title IV. At the time of this writing, state and local agencies that receive WIOA funding are drafting and signing Memoranda of Understandings (MOUs) and Infrastructure Funding Agreements (IFAs) that define such collaboration. One concern with this process is that IFAs result in cost sharing, and therefore can pull administrative funds away from needed programming. Another concern here is the potential for a "turf protecting" way of thinking, which can lead to an unwillingness to truly collaborate on program offerings and service provision. However, to fully implement WIOA and provide the services needed, agencies need to begin asking tough questions, listening to tough answers, and focus on the human-centered design principles embedded in the legislation.

The depth of the legislated collaboration demands integration of effort in the areas of data collection and sharing, seamless transfer of students/clients/patients between service providers, use of common intake forms, and delivery of common assessments to determine employability skill levels and academic attainment levels. Technology should be at the core of these silo-breaking initiatives and requirements.

Examplar Uses of Technology to Silo Break

States across the country have varying goals when it comes to supporting collaboration. Clark County, Nevada, is taking a community impact approach to breaking down the silos that exist between agencies providing adult education and workforce training. The Clark County School District's adult education program (state funded), Clark County Library System (WIOA II funded), Clark County Workforce Development Board (WIOA I funded), the College of Southern Nevada (WIOA II funded), and the Correctional System (state funded) have all adopted Aztec Software for both ABE and HSE preparation. In doing so, the entire county has the ability to share student data, accommodate the needs of students/clients who change locations, and meet the needs of all adult learners on a single curriculum delivery platform.

The goal is to co-locate career centers with educational facilities to create true "one-stop" centers.

Adult education agencies in Michigan are currently collaborating with career centers to increase the cross-referrals between workforce development and adult education service providers. The goal is co-locate career centers with educational facilities to create true "one-stop" centers. To that end, programs in northwest Michigan are using Kuder Journey as a technology solution that affords users a common career exploration tool for both WIOA Titles I and II funded agencies. Each person can create a lifetime profile that includes a resume and a personal profile webpage that can be emailed to prospective employers. The profile pages will soon show digital badges earned, including those earned by passing Northstar Digital Literacy Assessment modules.

[56] www.doleta.gov/wioa

In Minnesota and Rhode Island, adult education providers are collaborating with library systems on service provision, and looking at braided funding models to improve collective impact and reduce replication of services. Additionally, state funded agencies are working on common electronic intake forms for all WIOA Titles. This is particularly true in states such as Texas, where the Texas Workforce Commission now manages Adult Education (WIOA Title II).

California is leading the charge on breaking down barriers between the silos. The Adult Education Block Grant (AEBG) initiative is a unique system bringing together a collaboration of K-12 Adult Education agencies and Community Colleges with local service delivery partners to form regional consortia.[57] In addition, the four titles of WIOA are aligned with the Workforce Development Boards (WDB) as partners to leverage tech-driven databases and websites to make available crucial Labor Market Information (LMI) that drives much of the decision-making. Just-in-time data can elucidate which industries are growing, need to hire, or have projected skills gaps. This data facilitates collaboration between employers and workforce programs so they can address pressing labor market gaps. Many consortia members are also sharing intake data, forms, and assessment scores with their partners through MOUs. By working as a regional consortium, agencies are developing common intake forms, exploring collaboration around common data systems, and developing common definitions for outcome measures.

Silo Breaking to Identify New Learners

Technology can facilitate collaboration and referrals between silos of government that usually do not work together. Whereas in the past, a health, social services, financial assistance, or other program could only refer a client to ABE or workforce training programs if they knew a client qualified for service and had the time and transportation to attend, case managers can now tell learners of opportunities to study online. For example, in a Los Angeles pilot, social service staff at Women, Infants, and Children agencies referred Limited English Proficient parents to study English on Cell-Ed through interactive voice and text learning lines.

Technology can facilitate collaboration and referrals between silos of government that usually do not work together.

Similarly, distance learning programs that offer live coaches who talk to learners and get to know their challenges and needs could make referrals of students to social service agencies. Other examples of potential cross-sector referrals are the Department of Motor Vehicles (DMV) or United States Citizenship and Immigration Services, if they played an active role in referring students who have failed tests to online learning programs for test preparation. Imagine the potential for enrollment if these agencies sent test takers automatic texts tailored by zip code with information on adult education programs offering test prep classes near them.

Additionally, tech innovation, especially in artificial intelligence, has allowed for online skills assessment and employment matching systems. These allow employers to target workers with specific functional competencies rather than looking for more general credentials. Whereas in the past, an employer might ask a WDB to refer job seekers who had a specific educational credential, they could now have a WDB refer any student who took and passed an online assessment screening for specific skills, whether that be coding or awareness of customer service practices. Business leaders gathered at the 2017 Close It Summit[58] to share innovative systems and technologies for identifying workers with the abilities to succeed on the job who may have been screened out in the past by traditional credentialing systems.

New initiatives have been launched to support and test

[57] http://aebg.cccco.edu
[58] www.Closeit.org

technology solutions for competency-based skills matching and hiring. The non-profit Innovate+Educate[59] is working to shift hiring and advancement practices that "filter out" socially disadvantaged citizens to competency-based practices that "filter in." The Employment Technology Fund[60] was formed by four leading foundations to invest in tech-based solutions, including tools for skills assessment and matching, that help lower-wage workers overcome traditional barriers to employment, skills development, and economic mobility.

The Rundown

To truly break silos and create positive collective impact, innovation needs to be blended with incentives. Seed funding should be linked with a sustainable plan for technology implementation and integration. Pilot programs, with successful outcomes, need to be shared across agencies and regions so that we don't end up with multiple wheels, all rolling in the same direction.

Common language needs to be found that allows for greater levels of communication. Currently, WIOA Title I serves clients/customers, while Title II serves learners/students. Title III serves clients, and Title IV serves patients. Use of different terms to describe the same participants is confusing and creates barriers to collaboration. Coupled with common language is a need for database interoperability to support common intake forms that can collect required demographic data, provide needed information to multiple service providers, and reduce the time learners spend in enrollment and registration processes. Interoperability addresses the ability of systems and services that create, exchange, and consume data to have clear, shared expectations for the contents, context, and meaning of that data. With such interoperability, program administration could be much more efficient.

Professional development needs to be delivered across agencies to practitioners and staff working in both education and workforce development. This is especially important for staff from agencies receiving WIOA Title I funds, who may administer the TABE or CASAS assessment but as of yet have not had the opportunity to develop an understanding of the purpose of the assessments or know how to interpret the data reflected by the test scores. For example, they may not know whether or not a 215 in CASAS reading qualifies a candidate for industry training in an electrical certification program or whether a candidate is yet ready to read the manuals and other training materials required by the course. Provision of ongoing cross-agency training can help service providers establish shared expectations for both assessment protocol and data analysis and translate to stronger performance outcomes for learners no matter where they are served.

[59] www.Innovate-Educate.org
[60] www.EmploymentTechnologyFund.com

CONCLUSION

CALL TO ACTION

At the IDEAL Consortium Institute, it quickly became apparent that, despite it being 2017, participating states have issues with hardware and software in the classroom and with technology support. For example, one focus group participant described K-12 administrators locking down computers at the end of the school day, preventing evening adult classes from accessing the equipment. Further complicating matters are policies which can inhibit innovation, such as funding formulas based solely on contact hours rather than competencies gained or requirements for in-person testing. To overcome such issues, national, state, and local leadership is needed. The field needs a vision, a plan, and an investment strategy for how we use technology to expand reach, extend learning, differentiate instruction, and silo break for increased impact.

Strong leadership will be especially needed for leveraging new, digital technologies that are exponential; each year their power and/or speed are doubling, and/or their cost is dropping in half and in ways we can hardly imagine.[61] As happens when exponential new technologies enter any industry, the biggest impacts on adult learning will occur relatively fast and will likely blindside our whole field. Shlomy Kattan, leader of the Barbara Bush Foundation Adult Literacy XPrize,[62] an app development competition for literacy instruction, commented on this reality:

> *Rather than being terrified and frozen by the speed and scale at which technology will change education, we can take action to harness these exponential technologies for the social good – to increase access to education and accelerate learning for the world's most vulnerable populations.*[63]

We can take action to harness these exponential technologies for the social good - to increase access to education and accelerate learning for the world's most vulnerable populations.

Disruptive innovation is a term often used in the business world. To remain competitive, corporations seek to create new markets and values that disrupt the existing norms. Doing so causes problems for the existing market leaders and products. As Clayton Christensen so eloquently noted, "Disruption is a process, not an event, and innovations can only be disruptive relative to something else.[64]"

Agencies providing services to adult learners, both in the education and workforce arenas, need to disrupt the norm in how services are provided to positively affect a change in outcomes. While holding tight to our values and missions, we must identify and leverage the opportunities that disruptive technologies present for forging new and innovative practices. This paper highlights state and program-level innovations that disrupt the norm and point the field to promising directions.

A "Collective Impact" framework is needed to tackle deeply

[61] https://commons.wikimedia.org/wiki/File:PPTExponentialGrowthof_Computing.jpg
[62] https://adultliteracy.xprize.org
[63] www.edtech.worlded.org/facing-the-tech-revolution-in-adult-education
[64] www.forbes.com/sites/stevedenning/2015/12/02/fresh-insights-from-clayton-christensen-on-disruptive-innovation

entrenched and complex social problems. It is an "innovative and structured approach to making collaboration work across government, business, philanthropy, non-profit organizations and citizens to achieve significant and lasting social change.[65]"

This is the approach required today. Together, we must envision, develop, and implement policies, funding streams, professional development opportunities, and other initiatives to support the infusion of digital strategies into adult education and workforce initiatives. By developing a shared strategy for leveraging the power of technology, we can create a truly accelerated collective impact in how we enable adults to reach their goals as workers, family members, and community members.

[65] *www.collaborationforimpact.com/collective-impact*

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