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The Disconnect Between Policy and Research: Examining the Research into Full-Time K-12 Online Learning

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Abstract – While there has been some improvement in what is known about supplemental K-12 online learning, there continues to be a lack of evidence to guide the practice of full-time K-12 online learning. This paper concludes that despite considerable enthusiasm for full-time virtual education in some quarters, there is little high quality research to support the practice or call for expanding this form of virtual schools.

"A paucity of research exists when examining high school students enrolled in virtual schools, and the research base is smaller still when the population of students is further narrowed to the elementary grades." (Rice, 2006)

A number of scholars have documented the absence of rigorous reviews of virtual schools (Barbour & Reeves, 2009). Cavanaugh, Barbour, and Clark (2009) defended this state of affairs, writing that:

> in many ways, this [was] indicative of the foundational descriptive work that often precedes experimentation in any scientific field. In other words, it is important to know how students in virtual school engage in their learning in this environment prior to conducting any rigorous examination of virtual schooling.

We can ask, however, "How long must we wait?" K-12 online learning began around 1991 (Barbour, 2011). The first cyber charter school began around 1994 (Darrow, 2010). The first supplemental online learning programs also began in the mid-1990s (Clark, 2001; 2003), and proliferated considerably throughout the early 2000s (Clark, 2013).

Eight years after Rice's initial assessment, the state of research into K-12 online learning has not changed. While there has been some improvement in what is known about supplemental K-12 online learning, there continues to be a lack of reliable and valid evidence to guide the practice of full-time K-12 online learning (Barbour, 2013). Yet it is the full-time K-12 online learning that has seen the greatest growth in recent years (Watson, Murin, Vashaw, Gemin, & Rapp, 2011). It's past time to insist that K-12 online learning policy, particularly when it comes to full-time programs, be driven by what is actually known based on the available research.

Research into Full-Time K-12 Online Student Performance

In its 2009 report summarizing the research into the effectiveness of K-12 online learning, the International Association for K-12 Online Learning (iNACOL) concluded, "the preliminary research shows promise for online learning as an effective alternative for improving student performance across diverse groups of students" (Patrick & Powell, 2009). However, as Cuban (2013) outlined, this claim that online learning is as effective as face-to-face instruction is comprised of "weak studies that offer little compel-ling evidence of enhanced student achievement." Cuban's assessment is further strengthened when the nature of these studies is carefully examined.

To date, the vast majority of research comparing student performance in K-12 online learning with student performance in traditional schools has examined supplemental programs (Barbour & Mulcahy, 2006; 2008; 2009). This is problematic for a number of reasons. The biggest problem—beyond the methodological issues that Cuban (2013) raised—is the fact that when the majority of these studies were conducted, the population of students enrolled in supple-mental K-12 online learning opportunities was a highly selective group of students. One of the best descriptions of these online learners was written by Haughey and Muirhead (1999):

> Students who do well in online programs are motivated to learn. They are self-directed and self-disciplined. They are not disenchanted with school…. Successful online students are at their grade level. They read and write well…. Online students need to be independent learners. They should be curious and able to ask for help… [They have or should have an] interest in technology and good computer skills.

This description is certainly not representative of the average K-12 student, nor of many K-12 online learners. Yet it is representative of the nature of students included in the majority of research that has found K-12 online learning to be as effective as face-to-face instruction.

While there is little peer-reviewed research into the effectiveness of full-time K-12 online learning, there is a growing body of literature from state governments, policy think tanks, and investigative journalists. For example,

the Colorado Department of Education found in 2006 that full-time "online student scores in math, reading, and writing have been lower than scores for students statewide over the last three years" (Colorado Department of Education, 2006). Five years later, an iNews Network investigation found that full-time "online student scores on statewide achievement tests are consistently 14 to 26 percentage points below state averages for reading, writing and math over the past four years" (Hubbard & Mitchell, 2011). These are not isolated examples.

In Wisconsin, a state audit found mixed performance in comparisons of full-time online students and students in brick-and-mortar schools. Online charter school students had higher median scores in reading, but lower median scores in math (Joint Legislative Audit Committee, 2010). A similar audit in Minnesota found similar mixed results. Online charter school students performed at approximately the same level in reading as compared to brick-and-mortar students, but a much smaller percentage of full-time online students scored proficient in math (Office of the Legislative Auditor, 2011). Further, the audit found that 25% of online charter school seniors dropped out of school, compared to a statewide average of only 3%. Investigative journalists reported similar findings in Arizona, where the largest online charter schools—which together enroll 90% of all full-time online students in the state—all had lower levels of performance in mathematics and only two had performance levels in reading above the statewide average (Ryman & Kossan, 2011). Further, all of the state's online charter schools had lower graduation rates than the state average. Issues related to poor student performance even prompted a class action lawsuit by shareholders against one for-profit, online charter provider for inflating student results (Faruqi & Faruqi LLP, 2012).

A RAND Corporation study of charter school performance in eight states included an analysis of virtual charter schools in Ohio (Zimmer, Gill, Booker, Lavertu, Sass, & Witte, 2009). The authors found that online charter school students showed significantly lower achievement gains than students in the state's brick-and-mortar charter schools. Ohio also represents an interesting example of the potential bias that may be present in "research" produced by policy think tanks. While the RAND Corporation study concluded that the performance of students attending traditional charter schools was similar to the performance of students in non-charter traditional public schools, the authors' findings relative to online charter schools were quite negative. In contrast, another report the same year by the Ohio Alliance for Public Charter Schools (2009)—an "organization dedicated to the enhancement and sustainability of quality charter schools"—found that online charter schools "rank higher when looking at their 'value-added' progress over one year rather than simply measuring their one-time testing performance" (Ohio Alliance for Public Charter Schools, 2009). Interestingly, two years later Innovation Ohio (2011)—a self-described progressive think tank—compared the performance of Ohio's online charter schools to their brick-and-mortar counterparts. The authors found that only three of the state's 23 online charters were rated effective or better on the state report card, compared to more than 75% of the brick-and-mortar schools. Further, the authors reported that "nearly 97 percent of Ohio's traditional school districts have a higher score than the average score of the seven statewide" online charter schools (p. 4) and that the traditional charter schools had better graduation rates as well.

While this is an example of the potential skewing of data that often occurs when policy think tanks report the results of their "research," it is also a good illustration of how proponents of online charter schooling often attempt to confound measures of student performance used to highlight their gains. The use of value-added performance data by the Ohio Alliance for Public Charter Schools (2009) is an example of this selective use of possible measures. Another example of issues in measurement comes from Miron and Urschel's (2012) study of achievement in K12, Inc. online charter schools, in which the authors found that "all of the diverse measures we reviewed indicated a consistent pattern of weak performance." The authors made this conclusion based largely on annual yearly progress data, which they described as the only consistent measure available to use in comparing performance of online and traditional schools. In response, Jeff Kwitowski (2011), K12, Inc. Vice President of Public Affairs, wrote:

> AYP is not a reliable measure of school performance…. There is an emerging consensus to scrap AYP and replace it with a better system that measures academic progress and growth. K12 has been measuring student academic growth on behalf of its partner schools, and the results are strong with academic gains above the national average."

The strong academic gains Kwitowski references are available in *K12® Virtual Academies Academic Performance Trends* and *2013 K12® Academic Report* (K12, Inc., 2012; 2013). However, data from Colorado—one of the minority of states that factor performance growth into its state reporting system—indicate that K12's Colorado Virtual Academy showed adequate academic growth in only one of four areas within the middle school and high school levels, and none of the four areas at the elementary school level (State of Colorado, 2013).

In Pennsylvania, the Hoover Institution-based Center for Research on Education Outcomes compared gains on the state's standardized math and reading test scores for students in the state's charter schools and for comparable students in "feeder schools" (the brick-and-mortar schools which the charter school students left) (Center for Research on Education Outcomes, 2011). The authors found that 100% of students in the full-time online schools

performed significantly worse in both reading and math than students in the feeder schools. In response to the poor performance reported for their Pennsylvania school, a K12, Inc. representative stated, "the type of child now coming to an online school, 75 percent of those kids coming in are behind more than one grade level" (Saul, 2011). Interestingly, a study of special education students enrolled in cyber charter schools in Pennsylvania found that it mirrored the special education population in brick-and-mortar schools in that state (Carnahan & Fulton, 2013). Further, Miron and Urschel (2012) found that K12, Inc. online schools enrolled more white, more affluent, fewer English-language learner, and few special education students (i.e., all characteristics that often indicate more academically able students) than their brick-and-mortar counterparts. Although this national trend may not be reflective of Pennsylvania or for other cyber charter providers.

It is evident that this body of research is rife with issues. Results vary with such methodological choices as how to measure student achievement; much of the literature applies to supplemental rather than full time offerings; findings are often over-generalized from specific to general contexts, and vice versa. Based on this decidedly mixed research, one would expect that policymakers would approach online learning cautiously. Even the authors of the U.S. Department of Education's 2009 Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies (one of the most often cited studies to support the growth of both supplemental and full-time K-12 online learning), advised that "caution is required in generalizing to the K–12 population be-cause the results are derived for the most part from studies in other set-tings" (Means, Toyama, Murphy, Bakia, & Jones, 2009). However, a cautious approach has not been the case in many jurisdictions.

For example, in 2009 the Michigan legislature passed *Public Act 205*. This legislation allowed for two online charter schools to be created in the state, limiting each to 400 students in the first year of operation and to an additional 1000 students in the second year of operation. However, in the second year to access these additional 1000 students the cyber charter schools were required to enroll one student from the state's dropped out roll for each regular student (e.g., in order to enroll a student that had attended a brick-and-mortar school during the previous school year, the cyber charter school had to re-capture a student that had officially dropped out). At the end of two years, each of the two online charter schools was required to submit a report to the State Superintendent providing data in a number of areas, including student participation and performance. The reports, or the Michigan Educational Assessment Program (MEAP), were to serve as a base to determine future growth rates (Watson, Murin, Vashaw, Gemin, & Rapp, 2010). Results for the Michigan Virtual Academy indicated that in 2010, the percentage of students meeting or exceeding proficiency fell below the state average in 9 of 17 categories reported; in 2011, that percentage fell below the state average in 13 of 15 categories. Similarly, results for the Michigan Connections Academy indicated that in 2010, the percentage of students meeting or exceeding proficiency fell below the statewide average in 9 of the 18 categories; in 2011, that percentage fell below the state average in 9 of 15 categories. However, before these reports had even been submitted, the legislature passed Public Act 219, which incrementally increased the number of online charter schools to 15 by the end of 2014 and removed any meaningful limits to the number of students to be enrolled (Watson et al., 2011). This potential massive expansion of full-time K-12 online learning in Michigan was not justified either by the performance of the state's existing online charter schools or by the existing research into full-time online learning.

Research to the Practice of Full-Time K-12 Online Learning

Unfortunately, there is little in existing research to guide policy relevant to K-12 instructional practice in full-time, online programs. This is not to say that research doesn't exist, only that it is context specific or methodologically limited in other ways—and generally both (Barbour, 2013). Much of the existing research is based on studies of supplemental rather than full-time instruction, for example.

Similarly, Barbour (2005; 2007) reported ten, and then seven, principles of effective online content for K-12 learners. This study examined the perceptions of six online course developers with the Centre for Distance Learning and Innovation (CDLI) in Newfoundland and Labrador, Canada. As was true for the study described above, the author did not examine course content in context to determine whether the developers actually used the principles they perceived to be effective, nor did he attempt to determine whether online courses reflecting these principles were more engaging or led to better student achievement. Finally, in a separate study, Barbour and Hill (2011) found that because CDLI relied on a heavily synchronous model of instruction, its online teachers made little use of asynchronous online course content. The findings on the ten/seven principles and on asynchronous course con-tent are limited, useful primarily in a limited context, or as starting points for future research. Such studies are typical.

Unfortunately, there are few large scale, longitudinal research studies presently available. In fact, there are so few, the following discussion includes nearly every one. One effort toward larger scale analysis has been made by

researchers at the University of Florida, who established the Virtual School Clearing-house. This project was funded by the AT&T Foundation from 2006-2009. The project was designed to provide K-12 online learning pro-grams, particularly statewide supplemental programs throughout the United States, with data analysis tools, metrics and human resources for school improvement (Black, Ferdig, & DiPietro, 2008). The school improvement lessons generated for 13 of those K-12 online programs were outlined in a publication entitled *Lessons Learned for Virtual Schools: Experiences and Recommendations from the Field* (Ferdig & Cavanaugh, 2008). Similarly, the National Research Center for Rural Education Support (NRCRES) created a Facilitator Preparation Program de-signed to prepare school-based facilitators to support K-12 students en-rolled in online courses (Irvin, Hannum, Farmer, de la Varre, & Keane, 2009). Supported by an Institute of Education Sciences grant, NRCRES researchers conducted a two year, randomized controlled trial with more than 600 students in 93 rural high schools to examine the effectiveness of their Facilitator Preparation Program—eventually finding that facilitators who participated in the training had an increased level of student retention and student performance (de la Varre, Keane, Irvin, & Hannum, 2011). Finally, Barbour (2013) outlined a design-based research approach that was employed by SRI International (i.e., the external evaluators), in partnership with the Virtual High School Global Consortium (VHS) (Espinoza, Dove, Zucker, & Kozma, 1999; Kozma, Zucker, & Espinoza, 1998; Kozma, Zucker, Espinoza, McGhee, Yarnall, Zalles, et al., 2000; Zucker & Kozma, 2003). Essentially, SRI International and VHS identified seven goals and focused all of their research and evaluation, as well as all of the instructional activities and professional development, on achieving these seven goals. SRI International would report, through annual evaluations how VHS was doing in meeting the seven goals. Goals that the VHS did not met in one evaluation would become a specific focus of activities throughout the subsequent year (and the next annual evaluation would have a specific focus on that goal(s). In two instances, SRI International conducted goal-specific evaluations to provide an event greater focus on areas where progress was not being made (Elbaum, McIntyre, & Smith, 2002; Yamashiro & Zucker, 1999). Several of the studies just described are limited in that much of the data informing them comes from supplemental rather than full-time programs. For example, the NRCRES studies, the SRI International research on the VHS global consortium, and the majority of programs included in the Virtual School Clearinghouse focused on supplemental K-12 online learning programs. Whether or to what extent insights might apply to full-time pro-grams is unknown.

While research on practice in full-time K-12 online learning environments is scarce, some exists. For example, Liu and Cavanaugh (2011) examined factors affecting student academic success in a Midwestern K-12 online learning program that offered supplemental and full-time K-12 online learning opportunities. The authors found that full-time online learning was particularly effective for students who spent a lot of time in the learning management system and who were not participating in a free or reduced lunch program. The authors acknowledged that this did not mean that students not described in the study should not enroll in full-time online learning, only that they would need additional levels of support in order to succeed. As the NRCRES research suggested, the presence of a local facilitator can have a significant impact with online student success.

In the full-time K-12 online learning environment, such local support often comes from the parent or a learning coach, a role that was found to be critical when full-time online programs faced legal challenges in Wisconsin (Johnson v. Burmaster, 2007). The importance of the learning coach is also evident in the fact that programs such as Connections Academy and Insight Schools have created substantial guides aimed at assisting parents/guardians on performing the learning coach role to support their children (Connections Academy, 2004; Kanna, Gillis, & Culver, 2009). In fact, the reliance of these online charter schools on the parent as a primary provider of instruction and instructional support have led some to question whether these programs are publicly-funded instances of homeschooling (Ohanian, 2004).

Some isolated studies have probed the role of the learning coach. For example, Carol Klein's dissertation study examined the relationship between the California Virtual Academy (CAVA) program and its "home schooling constituents." Klein's study found that CAVA parents/guardians were generally satisfied with their child's online learning experience. Klein also found that CAVA parents/guardians were "well educated and… wanted a solid educational foundation for their own children" (Klein, 2006). Such parents are well-equipped to support the full-time K-12 online learner in the home in multiple ways. More detail on services learning coaches provide comes from a dissertation study by Lisa Hasler Waters. Examining the performance of parents of full-time online students, Hasler Waters (2012) found that they: encouraged their children, modeled potential responses, reinforced content covered earlier, provided direct instruction, adapted instructional strategies and learning content, and leveraged resources.

Interestingly, Hasler Waters also reported that these parental "learning coaches believed they and not their children's teachers were ultimately responsible for instructing their children." Again, however, a limited context makes it unclear to what extent these parents may be similar to other parents of online students. For example, Borup, Graham, and Davies (2013) indicated that 40% of parents whose children were enrolled in the Open High School of

Utah had no instructional interaction with their children. Further, the authors found an inverse relationship between the level of parental interaction and student achievement. This led them to speculate that the correlation "reflected parents' tendency to increase interaction levels following academic problems." Liu, Black, Algina, Cavanaugh, and Dawson (2010) actually developed an instrument to measure parental involvement in K-12 online learning environments that was found to be valid and reliable in their initial study. However, to date this one study with a single statewide, supplemental K-12 online learning program in the Southeast has been the only research to examine the use of this instrument.

It is important to remember, and so it bears repeating, that much of the re-search into full-time K-12 online learning has the same weaknesses as K-12 online learning literature in general. Most of the literature consists of unpublished dissertations (Barbour & Reeves, 2009), which by their nature tend to be limited in a variety of ways. As a body, research on practice frequently focuses on specific contexts and often has other methodological limits, making it difficult—and unwise—to generalize based on their findings (Barbour, 2013).

Research to Support K-12 Online Learning Policy—For Prof-it Corporations

A common theme in popular media, if not in academic literature, is the role of for-profit corporations and educational management organizations (EMOs) within the cyber charter school sector. For example, Andrew Knittle (2013) noted in *The Oklahoman* that online charter schools were receiving generous state funding—and that two of the three pending applications for new cyber charter schools were from for-profit corporations. Similarly, Kalyn Belsha (2014) wrote in the Illinois The *Courier-News* about a non-profit group attempting to block the ability of a for-profit corporation to create an online charter school in the state. More recently, the Pennsylvania Department of Education rejected all of the applications for new full-time cyber charter schools (Herold, 2014). In the written rationale for the decision, the department questioned the independence of the "independent boards" from the for-profit corporations that would be contracted to operate the online schools.

Of primary concerns in such reports is the tension between providing a quality online school experience and the need of corporations and EMOs to maximize profit. A notable example is the crucial issue of student to teacher ratio, which is a major factor in determining overall quality of online schooling. EMOs commonly have much higher student to teacher ratios in order to reduce labor costs, which is not surprising given that their business model depends on maximizing the difference between funding and delivery cost (Downey, 2014; Saul, 2011). This tension is likely reflected in EMOs' extensive public relations and lobbying efforts.

Utah is one jurisdiction where the performance for-profit and non-profit online charter schools can be compared. Mountain Heights Academy, formerly the Open High School of Utah, is a non-profit online charter school that was created based on a philosophy of "open access software and open educational resources for course delivery and content" (Tonks, Weston, Wiley, & Barbour, 2013). Conversely, two for-profit corporations—K12, Inc. and Connections Education, a division of Pearson Education—operate the Utah Virtual Academy and Utah Connections Academy, respectively. An examination of the Utah State Office of Education Public School Data Gateway indicated that for the 2012-13 school year the Mountain Heights Academy received a grade of C, while the Utah Virtual Academy received a grade of F (the Utah Connections Academy did not have enough students enrolled and/or tested to receive a grade) (Utah State Office of Education, 2014). While this example is itself limited to a single state and only three educational entities, and *Gateway* is an imperfect measurement tool, it nevertheless raises the larger question of whether there are pervasive and significant differences in the quality of education and the level of services being provided by non-profit and for-profit online charter schools. Researchers and policymakers need to look closely at this area to determine if public funding for schools run by for-profit corporations constitutes an investment in quality education.

Conclusions and Recommendations

In last year's report, Cuban (2013) wrote that "the current climate of K-12 school reform promotes uncritical acceptance of any and all virtual education innovations, despite lack of a sound research base supporting claims that technology in and of itself will improve teaching and learning." While Cuban did not make the distinction between supplemental and full-time online learning, his general sentiment is still applicable to the field as a whole. Given this reality it is recommended that state and federal policymakers create long-term programs to support independent research and evaluation of full-time K-12 online learning. More than twenty years after the first K-12 online learning programs began, there continues to be a deficit of empirical, longitudinal research to guide the practice of K-12 online learning, particularly full-time learning. Especially critical is research on factors linked to student success and on how the profit motive of commercial providers may affect the quality of programs. Further,

researchers focus on collaborating with individual K-12 online learning programs to identify specific challenges that can be answered using a design-based research methodology. This approach will provide data-driven solutions that address real problems experienced by those individual K-12 online learning programs. These solutions can also serve as a starting point when other programs experience similar challenges. Additionally, policymakers limit the growth and geographic reach of full-time, taxpayer-funded online learning programs. While there is little research to guide policymakers in how they regulate full-time online learning, those programs that have a managed growth and geographic focus have tended to outperform those with unlimited growth and no geographic restrictions. Finally, state and federal policymakers examine the role of the parent/guardian in the instructional model of full-time online learning to determine the level of teaching support that is necessary for students to be successful. If the instructional model used by full-time online learning resembles traditional homeschooling more than traditional brick-and-mortar instruction, consideration should be given to adjustments in the funding provided to full-time online learning to reflect their decreased teaching responsibilities.

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