



Online Postsecondary Learning for Workforce Development

Net Smart States and Students

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Michigan State University Higher, Adult
and Lifelong Education

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MSU EDA University Center for Regional Economic Innovation (REI)

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INTRODUCTION: Questions of Online Learning for States and Students

This report addresses two questions in the relations of postsecondary education and workforce development in Michigan:

How well do Michigan institutions—colleges, universities, and allied organizations—reflect the rapid growth of online teaching and learning, particularly in offering online certificate and two and four year degree programs, and resources for prospective students to learn about postsecondary educational opportunities?

How can Michigan residents prepare for online teaching and learning, and thus for the lifetime advantages—in work and personal development—associated with completing a postsecondary certificate or a two or four year degree?

- The report addresses the interests of these potential students, of all ages, for online postsecondary learning in courses, programs, and degrees.
- High school graduates in the workforce who face barriers in time, cost, and distance to campus courses and programs.
- High school graduates in the workforce with some college credit who have postponed (for reasons above) certificate or degree completion.
- High school graduates, currently unemployed but contemplating the uses of a postsecondary credential in planning for work and career.
- Certificate holders or graduates of two year degree programs seeking to improve their workplace credentials.
- Graduates of two or four year institutions seeking professional and/or personal development.

According to current census-based data compiled by the Lumina Foundation (2013), a national leader in higher education studies, Michigan's rate of postsecondary degree attainment, though it has been growing and is now 36.8% of 5.2 million working adults between 25 and 64 years old, is still below the national average (38.7%). Among young adults (between 25 and 34) in Michigan, degree completion is at 37.8%. But that is also below the national average (40.1%). Also, in Michigan, more than 1.3 million adults (or 25% of the state's population) have some college credit but lack either a two or four year degree.

New employment forecasts by the Georgetown University Center on Education and the Workforce say that by 2020 65% of all jobs will require postsecondary credentials (Carnevale, Smith, and Strohl, 2013). Plainly workforce and economic development in Michigan will depend on capitalizing on opportunities in postsecondary education, including, as this report proposes, online programs.

The report addresses the two questions above by synthesizing recent and current work from university scholars, research organizations, foundations, media, government agencies, and other sources. The goal is to provide platforms for activities designed to promote: 1) Enrollment in and completion of postsecondary online programs, aided by state-wide services, for workforce development; and 2) Mastery of foundational online academic abilities necessary for online

postsecondary learning. The plan relies on the simple but demanding idea of becoming “net smart,” or capable of capitalizing on the educational uses of the new information and communications technologies. States and individuals can both be net smart.

Part One begins with an account of what is often called the “college reward,” or the advantages for work and career in having a two or four year degree, or a “sub-baccalaureate” credential. The place of online learning in postsecondary education is considered next since the digital transformation of our society means change for all colleges and universities. More and more students are taking courses and pursuing complete programs online. In some states, postsecondary education is being re-designed and presented to prospective students to reflect such changes. But that is not the case in Michigan. According to a 2012 study by the U.S. Chamber of Commerce of “leaders” and “laggers” in postsecondary education, Michigan merited only a grade of “D” in the category of innovation in online learning. The third section of Part One addresses the problem in the context of what other states are doing to become net smart in expanding online educational opportunity to promote workforce and economic development.

Part Two turns from the circumstances of online education nationally and in Michigan to the prospects of individuals for succeeding at online learning in postsecondary courses and programs, or becoming net smart themselves. It begins with a section on “readiness,” or what many institutions do to guide prospective students toward understanding of what it takes to succeed at online study. This section features a cautionary note about assuming too much about the online abilities of the “Net Generation.” There is then a proposal for a version of “digital literacy” for prospective distance learners featuring “online academic abilities.” These are represented in an account of becoming net smart according to a recent review of “How to Thrive Online.” The goal of this part of the report is to specify a limited approach to “digital literacy” and “net smartness” focused on foundational abilities necessary for launching an effort in online postsecondary education.

Part Three is a brief conclusion naming categories of action that can follow from what is presented about the institutional and individual dimensions of online postsecondary learning and workforce development. A *portal* can offer Michigan students what they need to know about postsecondary opportunities. A *primer* can direct them toward the online academic abilities necessary for getting started in their online courses and programs. Finally, the co-learning plan identifies a *place*—Michigan’s public libraries—where such abilities can be practiced with guidance from literacy and technology professionals.

PART ONE: Postsecondary Education, Online Learning, and the “New Michigan”

The three sections of Part One are aimed at placing the conditions for postsecondary online learning in Michigan in the context first of current data and opinion about the value of degrees and other credentials for workforce and economic development. The situation in Michigan is then viewed against what other states are doing in promoting online postsecondary degree attainment. While a December 2011 report from the McKinsey consulting group—*Growing the New Michigan: Higher Education Marketplace*—focuses on the state’s research universities, there is wide agreement that a prosperous state will benefit from postsecondary opportunities and success across the spectrum of colleges and universities offering two and four year degrees, and other credentials. Ann Arbor-based *Michigan Future* has in recent years made the case for re-investing in postsecondary education as the key to the state’s prospects in the “Knowledge Economy” (Glazer and Grimes, 2012). And the phrase, “New Michigan,” when applied more broadly to higher education, can also include its “newest” format, online learning, as it is featured in this report.

1. Is College Worth It?

With the May 2013 sale of the blogging site Tumblr to Yahoo for \$1.1 billion the *New York Times* found the latest occasion to display the fruitful results of dropping out of formal education. In this case, Tumblr founder David Karp left the famed Bronx High School of Science at age 14 in favor of his obsession with technology, made the centerpiece of his home schooling. He didn’t bother with college. The *Times* headline for the front page article celebrating Karp’s programming and entrepreneurial success says: “Before Tumblr, Founder Made Mom Proud. He Quit School” (Wortham and Bilton, 2013).

Bill Gates, Steve Jobs, and Mark Zuckerberg made it through high school but all three left college within a year or so of enrolling. And their cases—featuring their careers as innovators and then executives—are often cited as examples of the triumph of talent, aspiration, and entrepreneurship over formal learning. As the *Times* put it in 2012, such heroes of the 21st century economy offer models for a “vanguard committed to changing the perception of dropping out from a personal failure to a sensible option, at least for a certain breed of risk-embracing maverick” (Williams, 2012).

E-Bay founder and venture capitalist Peter Thiel, though himself a graduate of Stanford University, has recognized the value—in his view—of forgoing college with his “20 Under 20” project (thielfellowship.com) which, with substantial financial support, encourages such “mavericks” to abandon higher education and turn their energies toward market-oriented invention (Kelly, 2012). The title of a recent popular book couldn’t be more direct: *The Education of Millionaires: Everything You Won’t Learn in College About How to Be Successful* (Ellsberg, 2011). Michael Ellsberg is quick to say that dropping out will not guarantee millions. “You don’t have to be [a Silicon Valley leader]. I know people with dog-walking businesses who make six figures.”

There is new attention to “Do it Yourself” as an alternative to traditional postsecondary education, in part this is a reflection of the “unschooling” movement of the 1970s, but this time it is based on the seemingly endless resources of the Internet, the ubiquity of digital devices, and the habits of the so-called “Net Generation” (Kamenetz, 2010; Stephens, 2013). Defenders of formal education have reasserted the value of teachers and of learning that goes beyond preparation for careers (Wieseltier, 2012). Questions of access to postsecondary education now vie with doubts about the best way to prepare for adult life and work.

Postsecondary Degrees and Careers: What Do Americans Believe?

True enough, for some young adults college can be a constraining force, delaying what might come from complete attention to a particular gift or ability. And there are people who can organize for themselves the resources they need for learning—and can marshal the necessary motivation for a “Do-it-Yourself” education. But for most Americans there is still a clear connection between college, degrees, and careers. Americans have been undeterred from belief in the uses of postsecondary education, even by the economic crisis of 2008 and after.

Though in 2011 the job market was still a source of considerable uneasiness, and dismay over college costs was a familiar feature of public discourse, most Americans still agreed that formal education is essential to career success. That was a primary finding of a national study by the *Pew Research Center*. Thus, while the cost of college was judged to be too high, 86% of survey respondents said that “college has been a good investment for them personally” (Taylor, et al, 2011). Similarly, a Gallup poll conducted in 2011 showed that 69% of those surveyed agreed or strongly agreed that “having a college degree is essential for getting a good job in this country.” Figures for unemployment and underemployment show why. For adults, the rates of unemployment were lower for those with two and four year degrees than for those with only a high school diploma. According to the Gallup poll most Americans (57%) believe that “People who have a college degree have a good chance of finding a quality job” (Smith, 2011).

The Gallup poll was funded by the Lumina Foundation, whose *Goal 2025* project represents the most visible national effort to increase degree attainment (or “completion” as the Foundation prefers) in the U.S. The goal is to have 60% of adult Americans with a postsecondary degree or other credential by 2025¹. National surveys have focused on two and four year degrees but Lumina and other groups also make the case for “sub-baccalaureate credentials,” an awkward if accurate phrase signifying, in the case of certificates, flexible and timely “just-in-time” learning, typically for particular occupations (Pulley, 2012). Such credentials can also serve as “gateways” to two and four year degrees (Carnevale, Rose, and Hanson, 2012).

¹ In its latest account of the project Lumina (available at luminafoundation.org) reports some progress but also the need for a dramatic increase in coming years if the 2025 goal is to be met.

Return on Investment

The Pew study, using figures from the U.S. Census, confirms the estimates of survey respondents that having a four year degree has meant about a \$20,000 per year difference in earnings compared to those with a high school diploma. For a two year degree holder the difference is about \$10,000. Other studies have presented data identifying such differences in lifetime earnings, the “return on investment” (RoI) as signified by the costs of earning a postsecondary certificate or degree (e.g., Carnevale, Rose, and Cheah, 2011).

In effect, the Pew study and the Gallup poll confirm a series of recent reports from the *Georgetown University Center on Education and the Workforce* (cew.georgetown.edu) and by the Hamilton Project at the Brookings Institution (hamiltonproject.org). Led by Anthony Carnevale, the *Center* has made influential claims for the “College Payoff,” or the earning power of degree holders. Carnevale believes that it is best to think in the long term about education. In the *Center’s* 2010 study titled *The Undereducated American* he and his co-author Stephen Rose acknowledge, “with many college graduates unsuccessful in finding work in the current economic climate, the temptation to reject postsecondary education as a viable economic option grows stronger, especially among working families for whom college costs are always a stretch.”

Students and families with significant or mounting debts might say that “stretch” understates their problems. But Carnevale believes that the “wage premium,” yet another way to name the difference in lifetime earnings between college graduates and those holding associate and BA degrees will, in the long term, prove postsecondary education a worthwhile investment, a claim made also by the Hamilton Project even when applied to the recent “Great Recession” and taking into account the rising cost of degrees (Greenstone and Looney, 2012).

Thus, a four year degree is worth a difference of over a million dollars over a lifetime compared to ending formal education with high school. For a two year degree holder the lifetime “premium” can be worth as much as half a million dollars. Other variables, of course--like gender, race, age, and location--also contribute to earning power, career advancement, and job satisfaction. But degree attainment makes a clear difference. “No matter how you cut it,” the *Center* says, “more education pays” (Carnevale et al, 2011). A 2012 *Center* report explains the “advantage” to degree holders in the economic recovery reflecting an important historical phenomenon: “Employment growth since 1989 has been entirely driven by workers with education beyond high school” (Carnevale, et al, 2012). And in a June 2013 U.S. employment forecast the *Center* projects that by 2020 65% of all jobs will require a postsecondary credential (Carnevale, Smith, and Stohl, 2013).

“Should Everyone Go to College?”

Of course, there are dissenting views. For example, a May 2013 report from the *Center on Children and Families* at the Brookings Institution (brookings.edu/cff) was titled *Should Everyone Go to College?* The question represented a common misunderstanding of the Lumina Foundation’s Goal 2025 project and the degree attainment movement as represented too in

initiatives of the Obama administration. That is, there has never been in either the assumption that everyone should pursue a two or four year degree. There are satisfying careers for Americans with only a high school diploma, particularly those who earn a certificate or other work-related credential (and there is research support, as noted above, for the uses of certificates). Personal goals and precisely tailored qualifications matter.

Stephanie Owen and Isabel Sawhill, authors of the Brookings study, remind us first that advantages come only with completing a degree program—and many students don't. Would they have been smarter to enter the workforce directly? For some, particularly those who accumulate substantial debt, the answer may be yes. Owen and Sawhill note that all calculations of the “college reward” represent the “average” benefit. Teachers, for example, can expect to see a relatively low RoI on their degrees, particularly if they are graduates of private institutions. In fact, 14% of people with only a high school diploma earn more than those with college degrees (think again of teachers).

For Owen and Sawhill, anyone contemplating a postsecondary degree should be mindful of “key dimensions” that affect the RoI: the type of postsecondary institution, its selectivity in admissions, its cost and what it offers in financial aid, the major and the occupations it prepares graduates for, and the probability of completing the degree. The last is particularly important, with low graduation rates at less competitive and noncompetitive institutions (in admissions, and especially for-profits) leaving students with debts and only marginally better career prospects than high school graduates--plus the years lost to work experience and its uses in career development.

“On average,” Owen and Sawhill acknowledge, having a degree is best. But there is considerable variation in the experience of postsecondary students and what they can expect, particularly if they do not complete their degree programs. And, as a recent University of Washington study showed, for some sectors of postsecondary credentialing completion itself may not fulfill the workplace expectations of graduates. It matters, as Owen and Sawhill say, where credentials come from. Thus, while two year degrees offered by for-profit institutions do provide greater access for previously underserved students, the “payoff” they present can be meager. Adults who earn such degrees earn about the same as those who only finish high school (Berrett, 2013).

While there are reasons to be cautious about college going for everyone, in the same month the Brookings study appeared the *New York Times* reported that college graduates have “suffered through the recession and lackluster recovery with remarkable resilience” (Rampell, 2013). High school graduates should be guided toward realistic assessments of the advantages of a postsecondary degree, as well as of their abilities and aspirations, but going to college remains a worthwhile investment and, if employment forecasts are correct, more and more a necessary one.

Other “Returns”

Finally, it is important to recognize a different kind of dissent in the matter of the “value” of a college degree. That is, critics of the economic analysis of postsecondary education and its benefits insist that there is more to a college degree than what it contributes to a graduate's

prospects for lifetime earnings. The Pew Center study found a divided view of the purpose in earning a degree (two or four year), with 47% of respondents saying it was to gain work-related skills and knowledge and 39% saying it is “to grow personally and intellectually.” Other respondents said both purposes are equally important. It is well known that apart from prestigious private institutions, still with strong commitments to the traditional liberal education curriculum, American colleges and universities have moved toward preparation for work as their primary purpose (Baker, Baldwin, and Makker, 2012).

In a recent account in the *Chronicle of Higher Education* of the popularity today of the “return on investment” approach to postsecondary learning, Scott Carlson (2013) says: “The conversation about college and its returns gets down to a question that has dogged academe for decades, if not centuries: “What is higher education for: Personal growth? A golden ticket? Or some of both?” Carlson interviewed leaders on both sides of the question but what *New York Times* columnist David Brooks told him suggests how we can recognize virtues in each of the competing views: “[Career preparation and return-on-investment] are perfectly legitimate ways of seeing an education, unless they are the only ways. I wouldn't mind all of the talk of education as an economic input if there were as robust a talk about the values that education was supposed to be offering.”

Needless to say, scholars in the liberal arts have been stout advocates for the distinctive “value” in what they teach. University of Chicago philosopher Martha Nussbaum has perhaps contested the “return-on-investment” rationale most directly with her pointedly titled book, *Not for Profit: Why Democracy Needs the Humanities* (2010). And a flurry of well-intentioned Op-Ed columns (e.g., Klinkenborg, 2013) have greeted a report from the American Academy of Arts and Sciences whose title suggests a range of educational and social values to be associated with the humanities and allied fields of the social sciences: *The Heart of the Matter: The Humanities and Social Sciences for a Vibrant, Competitive, and Secure Nation* (2013). These include workforce development, particularly what the postsecondary curriculum beyond strictly job-related courses contributes to skills in reading, writing, and spoken communications, almost always claimed by employers as essential to workplace success.

Still, academic observers have chronicled the ways that business values have made themselves primary in the management and curriculum of most American colleges and universities, with only subordinate roles for the humanities (e.g., Kirp, 2003). To the degree that more and more online teaching and learning is understood to support only narrow preparation for work, what will be done to remind job-oriented online students of what else can be gained from postsecondary and lifelong learning?

2. The Digital “Disruption” of Postsecondary Education

Even as American belief in the role of education in work and careers stays strong, the postsecondary curriculum continues to change, reflecting the digital transformation of all features of our culture. It is increasingly difficult to think of one without the other. Indeed, forecasts of what is ahead in postsecondary education favor alarmist metaphors representing urgent and overwhelming change in conventional ways of doing things. According to Stanford University President John Hennessy, whose institution has been a leader in providing and

promoting Massive Open Online Courses (or MOOCs) as essential to the future of postsecondary education, there is a “tsunami” ahead, reflecting rising costs and digital innovation, that will result in online learning moving to the center of institutional practices and student preferences (Auletta, 2012). In a similar statement of alarm, also anticipating the digital transformation of postsecondary teaching and learning, a report by an influential British policy organization is titled *An Avalanche is Coming: Higher Education and the Revolution Ahead* (Barber, Donnelly, and Rizvi, 2013).

Innovation by “Disruption”

Such forecasts are in keeping with recent attention to the likelihood of the far reaching online “disruption” of higher education. Clayton Christensen, of the Harvard Business School, made the idea of innovation by “disruption” well known first in the corporate world and now among college and university leaders (Christensen, 1997; Christensen and Raynor, 2003; Christensen, Horn, Soares, and Caldera, 2011; Christensen and Eyring, 2011). For him, “seismic change” is inevitable, and in the case of postsecondary education, even desirable. *New York Times* columnist Thomas Friedman has joined the bandwagon of university leaders who believe that only the digital transformation of teaching and learning can make the U.S. postsecondary system efficient, and thus likely to produce graduates who can contribute to the globalized economy (see Friedman [2013] for the latest of several *Times* columns on the subject since the advent of the MOOCs).

In Christensen’s view American colleges and universities should abandon emulation of the traditional elite institutions (like Harvard) and embrace “disruption” in the form he found it to be a force for innovation in large businesses. “Disruptive innovation is the process by which a sector that previously served only a limited few, because its products and services were complicated, expensive, and inaccessible, is transformed into one whose products and services are simple, affordable and convenient, and serves many no matter their wealth or expertise. The new innovation does so by redefining quality in a simple and often disparaged application at first and then gradually improves such that it takes more and more market share over time as it becomes able to tackle more complicated problems” (Christensen, et al, 2011).

In effect, Christensen is telling the story of the introduction of online teaching and learning into American higher education, a development he endorses as the necessary “disruption” displacing the conventional model. More online courses and programs will produce increased access while lowering costs. And, via what can be understood about learning in the “big data” derived from online courses and programs, digital innovation can also lead to more customized and better teaching. The new online possibilities can also lead to a change in values in postsecondary education. According to Christensen we must encourage a new view of how we judge “high quality.” That means “moving away from a focus on research and knowledge creation and instead moving toward a focus on learning and knowledge proliferation.” But, advisor to corporations as he is, Christensen is never far from questions of finance. Since colleges and universities are “facing economic models that are breaking,” he urges “business-like efficiency” and primary institutional attention to whatever replacements for conventional practices that can lower costs and thus maintain or increase an institution’s share of the student market.

When he introduced his theory to higher education leaders in 2011 Christensen had in mind forms of online teaching that have grown steadily in recent years (as explained in the next section). He foresaw a time in the near future when they would constitute the major share of higher education. But with the introduction of Massive Open Online Courses, and their scaling up in dramatic terms in the past year, Christensen's theory gained new evidence for "disruption." The free MOOCs would speed the process of reducing costs and demonstrate that online learning could be just as effective if not more so (in some subjects at least) as the traditional classroom-based face-to-face kind. The potential role of MOOCs, amplified by their rapid expansion via Coursera, the major provider, quickly gained the support of the media, particularly because the "disruption" was to be led by several of the nation's most prestigious universities (repeating the pattern of curricular reform of the past century). It was for good reasons that the *New York Times* declared 2012 "The Year of the MOOC" (see Pappano, 2012 for an excellent summary of the first six months of MOOC development).

A Decade of Growth in Online Education

Technology influences teaching and learning in many ways, in and out of the classroom. Just how extensive a role online coursework will play in postsecondary education in the next decade is at issue, with these converging forces: pressure to limit costs, evidence that online courses yield as much learning as conventional ones, new developments in the scaling up of online teaching (as in the MOOCs), and the preferences of students who presumably bring high levels of digital ability to college work (though, as explained below in Part Two, there are reasons for skepticism about this force for change).

There is no question of the growth of online education in the past decade. According to the most recent study from the Babson Survey Research Group, which has been tracking online education for ten years, nearly 70% of all higher education institutions now see it as a "critical component of their long-term strategy." And while the online growth rate (9.3% in 2012) is slowing as a proportion of overall enrollment after a decade of double digit increases, the number of students taking at least one online course rose last year by well over half a million to 6.7 million out of total U.S. postsecondary enrollment of nearly 21 million. The proportion of students taking at least one online course reached 32% in 2012--an all-time high (Allen and Seaman, 2013).

Online enrollment figures for community colleges, key institutions in workforce development, represent even more enthusiasm for distance learning. According to a 2011 survey conducted by Harris Interactive on behalf of the Pearson Foundation (Pearson is a major publisher of educational materials used in online formats) online learning "has become a standard technique" for community college students. Nearly 60% of community college students have taken courses online. About half of the students surveyed had taken at least one course online in the fall 2011 semester and three quarters of the students who have taken online courses at community colleges report being satisfied with them. Finally, 40% of the community college students said they would prefer taking all of their courses online (13% are already doing so; Pearson Foundation, 2011).

Editorial writers at the *New York Times* (taking a different position from columnist Tom Friedman) expressed anxiety in February 2013 about the other 60%. Many students, according to studies by the Community College Research Center at Columbia University, never complete their online courses (Xu and Jagers, 2013). But the *Times* believes that the reasons for such failures are “well known.” That is, online courses do not provide enough contact with instructors, particularly as that is for students new to postsecondary education that are likely to be poorly prepared for its demands in time management and essential knowledge (e.g., in English and math)². Critics of the *Times*’ strongly worded editorial acknowledged that not all students can succeed in online courses but that many more would if properly oriented to their format and to the habits of digital literacy useful for academic work.³

Meanwhile, in addition to managing a growing demand for online courses, community colleges are investigating ways to capitalize on the new MOOCs and perhaps other kinds of Open Educational Resources. That means accepting successful completion of them for credit, via emerging authorizing processes (e.g., the program at the American Council on Education). But, in its latest report on eLearning at community colleges, the Instructional Technology Council noted that “many are skeptical that a large enrollment solution is appropriate for campuses that believe in smaller, more personalized instruction.” And to add to the volatility of public policy making in the area of online learning and postsecondary education, state legislators in California have been seeking to impose a MOOC-based strategy on both two and four year colleges as a way to cut costs and increase access (Fain, 2013; Meyer, 2013).

Steady growth in the past decade of online courses and programs has positioned online learning as a widely accepted part of postsecondary education. Soon it will be the rare college student who has not had an online course. But the advent of MOOCs, with widespread acceptance of Clayton Christensen’s claims for inevitable “disruption,” has altered views of online learning among all those interested in postsecondary education.

New Dilemmas of Recognition: Courses or Competencies?

Studies of online learning focus on credit courses in undergraduate degree programs. Of course, millions of Americans (and others around the world) learn in formal and non-formal settings without the expectation of college credit or a degree. But the latest developments in online

² The distinction between “new” and experienced online students is an important one. In fact, a comprehensive comparison of traditional and online courses found the two formats to be equally effective for student learning (Means, et al, 2010).

³ Considering that almost half of all US postsecondary students are enrolled in community colleges, the future of online learning in workforce and economic development will reflect, to a considerable degree, public commitments to these institutions. A report from the Century Foundation (2013) finds a major divide between the two and four year sectors of American higher education and sees increasing support for community colleges as essential to maintaining prospects for the “American Dream.” Part Three below includes attention to the uses of a portal devoted to online programs and degrees that would help bridge the divide.

learning are presenting questions about the credit and credentialing system. There is the “Do-It-Yourself” movement, which encourages the uses of Open Educational Resources (OER) of many kinds (e.g., Kamenetz, 2010). The popularity of MOOCs, a category of OER, has prompted widespread interest in roles they might have as elements of degree programs, contingent on suitable credit arrangements. New formats represent the rapid expansion of MOOCs, including recent arrangements by Coursera (the leading provider) with state university systems with hundreds of thousands of students (Lewin, 2013).

But alternative images of postsecondary credentialing include new forms of recognition, like the novel “open badges” project launched in 2012 by the Mozilla Foundation (at: openbadges.org; see Knight and Casilli, 2012). Postsecondary reformers urge the abandonment of “seat time” as a measure of learning, preferring instead direct assessments of learning or “competencies.” The innovative Western Governors University represents the best known institutional version of competency-based learning and online degrees (Mendenhall, 2012). Other digitally inspired reformers see students in the future aggregating the equivalent of a conventional degree from online experiences of many kinds.

Whatever “credit” comes to mean in the emerging digital world of teaching and learning, the degree is likely to remain the standard for learners and employers alike. It represents historical authority (precisely the problem according to reformers) but also a format for signifying the cumulative meanings of a group of courses and related experiences (e.g., service learning projects) organized around the agreed upon assignment of credit by students, faculty, and institutions. “Competencies,” verified by testing, portfolios, or some other form of assessment, may well complement what is demonstrated in courses. Online learning will have a place in any new configuration that emerges, strengthening its role in postsecondary learning at all levels.

3. Online Learning in Michigan: Doing Better than “D”

By all measures growth in online learning has been substantial and rapid. But a recent account of its impact on public higher education demonstrates gaps in the ways that states are capitalizing on the new format for degree attainment and economic development. While there has been a steady increase in online courses, online programs and services do not generally reflect the opportunities made possible by digital formats, whose benefits can be realized across two and four year institutions in new ways. An important recent study from the New America Foundation and Education Sector (*State U Online*) says: “In a nation with a large and growing number of nontraditional college students who need flexible educational options, the inconsistency and non-availability of publically supported online higher education are major barriers to helping more students earn the degrees they need’ (Fishman, 2013, p.8).⁴

⁴ The New American Foundation (newamerica.net) is also the source of another recent report on higher education. It urges recognition of “Next Generation Universities” as prototypes for increasing access and degree completion (Selingo et al, 2013). Online learning has a role at such universities (Fishman, 2013a). But their primary value as models is reflected in structural reforms in organization and curriculum. In its current configuration Michigan lacks the kind of

Leaders and Laggards

While some savvy (or knowledgeable or shrewd) states have moved quickly to capitalize on the possibilities in online programs and degrees with innovative arrangements, Michigan has done little to match the standing of its research universities in the emerging domain. *Leaders and Laggards* is the title of the 2012 “State-by-State Report Card on Public Postsecondary Education” from the U.S. Chamber of Commerce. There is no question of Michigan’s classification in the category of innovation. The question was: “Has the state made efforts to embrace innovative ways of delivering college instruction?” **Michigan gets a “D.”** The state merited a “B” for its “Openness to Providers,” presumably including the “for-profit” institutions. But Michigan gets an “F” for the “Policy Environment” necessary for improving all features of postsecondary learning. The low grade in this category suggests that progress will be slow in raising the grade for online innovation. But given the widespread agreement about the role of postsecondary education and economic development, Michigan must do better than “D” in online learning.

Many Michigan colleges and universities can claim innovative and appealing online opportunities in their degree and credentialing programs. But the Chamber of Commerce probed what the state is doing in a deliberate and coordinated fashion, with policy choices and initiatives, to make the most of new opportunities and to promote postsecondary online enrollment. In effect, in an increasingly networked world, innovation to promote access and degree attainment—in the broadest possible collaborations--will count as much as what Michigan colleges and universities do individually or in sector-based projects.

Since the publication of the Chamber report there has been one potentially significant step, a sign of being a “leader.” The *Virtual Learning Collaborative* at the Michigan Community College Association has revised its website (vcampus.mccvcl.org) to make it easier for prospective and current students to see what is available in online courses and programs. Nothing of the kind is available for Michigan’s four year institutions.

Seen against examples of innovation reported in *State U Online* (and elsewhere), efforts in Michigan across types of institutions have taken a different direction, best represented in the activities and reports of *Business Leaders for Michigan*. It’s “Performance Tracker for Public Universities,” introduced in early 2013, measures how the 15 public universities perform in productivity, efficiency, affordability, and access.⁵ There is no specific attention to online learning as a resource, or for collaborative arrangements aimed at new programs, or even consolidated information about current online programs in the manner of the *Virtual Learning Collaborative*. In effect, the “Performance Tracker” serves to reinforce the gap between the

institution the report describes (e.g., Georgia State University or the University of Central Florida).

⁵ According to a press release (February 11, 2013) on the launching of the Performance Tracker the new tool “shines a light on how our state’s public universities are performing. . . [and] places Michigan at the forefront of higher education transparency and accountability.” The Tracker can be found at: <http://www.blmperformancetracker.com>.

state's community colleges and four year universities. Plainly they have different missions. But both offer undergraduate online learning. There is a history of "articulation agreements" between the community colleges and universities enabling students to extend their educational goals and workforce preparation. It remains now to capitalize on what is possible in online learning beyond the limits of the traditional campus.

Postsecondary Learning, Online and Public

Where can we look for better "performance" in organizing for online learning and workforce development? The for-profit sector claims for itself considerable advantages in this regard. And in California, where there has been particularly intense pressure on the budgets of all sectors of public higher education, legislators and other public officials have welcomed for-profit providers as resources for workforce development. Still, questions of quality and cost prompt uneasiness about seeing the for-profit institutions with more than a small role in postsecondary learning. And in the past year they have seen the largest percentage of enrollment decline (8.7%) among colleges and universities, where the overall decline (2.3%), is generally understood to reflect the economic recovery (Lederman, 2013a).

The long time commitment of public colleges and universities to access can be the primary platform for relations between online learning and workforce development. Beginning with the land-grant movement of the mid-nineteenth century, and reaching into 20th century, developments like the G.I Bill and the substantial commitments made by states to postsecondary learning in the post-World War Two decades, higher education has reflected the view in the U.S. that it is a "public good," with what that means for obligations to respond in innovative ways to the newest conditions of education and work.

State U Online (2013) features the University of Wisconsin System eCampus. Launched in 2011, it consolidates information about and access to online courses and programs among all of the state's 26 two and four year colleges and universities.⁶ It is a portal, or gateway, to the state system of the best kind. And it makes plain that Wisconsin has an articulated statewide goal for online education where the focus is on service and coordination. The UW eCampus does not offer its own courses but promotes student enrollment in online programs with access to courses across the system.

In fall 2013 Wisconsin will take another step in online innovation with the launching of its "Flexible Degree" program, a system-wide effort focused on students--including many already having college-level credit--earning "competency-based" credit in addition to courses. The UW System has subordinated any potential cost savings to goals for learning and economic development. Thus, says a spokesman, "The university and the state are doing this to strengthen the state work force" (Porter, 2013). And Wisconsin is joining a growing number of states in

⁶ *State U Online* recognizes a flaw in the Wisconsin approach. The UW System eCampus does not include the state's "technical colleges" with their vocationally oriented courses, programs, and degrees. Still, the model for collaboration between two and four year institutions remains most timely.

making a policy of welcoming undergraduate credit earned via Prior Learning Assessment (PLA) opportunities offered by the American Council of Education and others who are certifying the quality and credit worthiness of the new MOOCs.

A similar effort in Montana, a state with a very different higher education landscape than Wisconsin, recognizes the significant number of adults who already have some college credit (there is a high percentage of such adults in Michigan). Thus, in Montana there is particular attention, again in a state-wide effort, to help such adults earn a credential. The Montana University System Online offers all general education courses (taken early in college careers) online and any course can be applied to a degree at any institution. Unlike Wisconsin, and other states welcoming Prior Learning Assessment, and thus credit for MOOCs and other Open Educational Resources, Montana has been cautious about this form of innovation.

What *State U Online* makes plain is that there are different ways to be innovative and expand access to online learning and credentials. But a system-wide approach is the best path whatever configuration of degrees, programs, courses, and Prior Learning Assessment arrangements state policy makers, institutional leaders, and college and university faculty might favor.

Net Smart States: Can Michigan Act Like It Has a Postsecondary System?

Can there be a “New Michigan” (in the voice of the McKinsey study of the state’s postsecondary education) with sub-standard performance in capitalizing in a coordinated fashion on the rapidly growing world of online learning? How can Michigan do better than “D” in innovation in online postsecondary learning and in degree attainment? Where a legislatively authorized centralized program of services is not possible, a modest step aimed at centralizing information about what is available can still help: a more extensive portal than the one now maintained by the *Virtual Learning Collaborative* at the MCCA. Without the legislative authority of a state-wide system of postsecondary education, a step in the right direction would be a version of the portals built and maintained by “leading” states intent on increasing degree attainment and workforce and economic development, with other benefits deriving from learning in adulthood.

Carrie Floyd (2012), at the Corporation for a Skilled Workforce in Ann Arbor, makes the case for “integrated online resources” offering “reliable real-time information” on education for “career navigation.” She acknowledges the availability of “online learning portals” (among other resources she hopes might be integrated to promote workforce development [e.g., “Job Matching Portals”]) but notes that these are “isolated” to the extent that they reflect opportunities at individual postsecondary institutions or categories of them. That is certainly the case for Michigan’s public universities and community colleges for someone wishing to know about online postsecondary courses, programs, and degrees in the state.

In contrast, there are Wisconsin, Montana, and others, including the largest of the state services aimed at online learning and workforce development in two and four year institutions, the *State University of New York (SUNY) Learning Network* with its 4,000 online courses, 107 online programs and degrees, and over 100,000 enrollments (sln.suny.edu). In March 2013 SUNY announced plans for *Open SUNY* which will be an even more comprehensive state-wide effort in

online learning. It was described this way in a press release: “By bringing every online program we offer together under one umbrella, SUNY students will have unprecedented access. . . significantly increasing their opportunities for timely degree completion and success both in school and after graduation” (see also Kolowich, 2013).

SUNY is guided by what chancellor Nancy Zimpher (2013) calls “systemness,” or the ability of state postsecondary systems “to channel institutional authority and resources in order to improve the economic status of the state . . . and enhance the quality of life its citizens possess” (p. 27). This report asks if features of “systemness” can be applied in states, like Michigan, without formal postsecondary systems (Lane and Johnstone [2013] offer an up-to-date account of such systems).

Later in this report Howard Rheingold’s recent book *Net Smart: How to Thrive Online* (2012) is introduced as a source of ideas for thinking about how individuals can prepare themselves for online learning. But, borrowing Rheingold’s title, something of the same thing might be said of states as they look at what they can do by marshaling resources for maximum networked benefits in the digital age. In effect, *State U Online* is an account of net smart states, or those leading (not lagging) in providing innovative degrees, programs, and services for adult students.

William Bowen, long an influential figure in policy studies of higher education, has now turned his attention to the digital transformation. His new book, *Higher Education in Digital Age* (2013) urges a form of patient innovation, or adoption of new technologies not for their own sake but only as we truly see and understand their effects. Still, he is certain of this: “System-wide thinking is required” (Bowen, 2013a, p. 11). Part Three of this co-learning plan returns to the idea of a postsecondary online portal meeting this requirement.

PART TWO: Online Students in Postsecondary Education: From Digital Literacy to Net Smart

The three sections of Part Two address the individual dimension of postsecondary online learning and workforce development. “Readiness” is the term generally used to name desirable prior conditions for taking online courses and enrolling in degree programs. Thus, what does “digital literacy” mean for new online students, or how can they prepare for postsecondary learning with online skills and habits that promote academic success?

Part Two features the idea of becoming “net smart” in a focused fashion, that is, by refining the broad general category of “digital literacy” for the purposes of potential online postsecondary students. The goal, of course, is not that they be less literate in the vast digital world but that they focus on those online abilities most likely to be foundations for the virtual classroom.

4. Questions of Readiness

The conditions of online learning, or the differences between a conventional classroom and virtual one, are still new enough to merit attention. However much online enrollments have grown, millions of prospective students will make the transition in the years ahead to fully digital learning. Expectations and abilities will matter, as will having the necessary technological resources for full participation in a course or program.

“Are You Ready?”

Visitors to the new website of the Michigan Community College Association’s *Virtual Learning Collaborative* (vcampus.mccvlc.org) are greeted with a banner asking “Are You Ready?” It is an invitation to anyone contemplating earning a degree or other credential to estimate the likelihood of success in mastering the demands of online education. A click yields an opportunity for a “Self-Assessment,” and also a place to see whether a prospective student has the necessary technology. And there are sections titled “Orientation to Online Learning” and “Tips for Success” in the MCCA’s laudatory effort to guide prospective students toward courses and programs in a suitably self-conscious manner.

Such resources are likely welcomed by prospective students, particularly those uncertain about the impact of limited experience in using information and communications technologies for educational purposes. Still, recent research on two popular web-based surveys used by many institutions—“Is Online Learning Right for Me?” and “What Technical Skills Do I Need?”—showed that there is often little correlation between the self-assessments of readiness and student performance in online courses and programs (Hall, 2011).

And getting beyond the self-assessments and reviews of necessary technology for coursework, there are plain limits to what the *Virtual Learning Collaborative* offers in guiding prospective

students toward “readiness.” For example, the site recognizes the differences between reading online and reading from printed texts. But it can only give this advice to prospective students: “There are many websites on the Internet that provide tips and techniques to improve your reading skills. By doing a search for ‘reading skills’ or ‘reading skills for distance learning,’ you will find literally hundreds of websites that will provide you with help.” A prospective student following such advice would encounter a dizzying array of resources, in effect putting pressure on his or her “digital literacy” at an inopportune moment. Thus, to the degree that “readiness” can be addressed at websites like the Virtual Learning Collaborative it must be done with more understanding of the rudiments of “digital literacy” for particular purposes, in this case named below as “online academic abilities.”

There is no perfect way to communicate “readiness” with a combination of self-assessments and resources. “Readiness” resources at college and university websites can help. But preparing to be a successful online student requires, in particular, the attitudes (or dispositions) and skills now associated with the broad category “digital literacy,” as considered below.

The “Net Generation”: Myth and Reality

The efforts made by community colleges and other institutions in matters of “readiness” reflect perhaps what is now—at least in academic research—a well-known feature of undergraduate teaching and learning. That is, there is uncertainty about the actual abilities of prospective students. Popular recent books about the impact of technology have presented an account of the so-called “Net Generation” (or those born since the early 1990s) as exceptionally adept at making the most of the latest technologies, hardware and software. Prominent examples are the popular books by business consultant Don Tapscott: *Growing Up Digital* (1999) and then *Grown Up Digital* (2008). Each reflects the view that the Net Generation (sometimes called “Millennials”) has digital gifts making it easily adaptive to educational technology.

The phrase “digital native” has also come into our educational vocabulary to signify all that the “Net Generation” knows and can do simply with its demographic advantages and habits of being online since childhood. Marc Prensky (2001), an independent educational consultant, has made this phrase, and its companion “digital immigrant,” popular among writers and school administrators. Of course, the differences between the two are generational. But for Prensky, as for Tapscott and many others, the most important thing to know about those born after 1990 is not merely that they have grown up as constant users of technology but that they have presumably mastered all that is necessary for new kinds of digitally-based learning.

Still, problems of readiness for online courses and degrees, or for the technological demands now common in conventional face-to-face teaching and learning, can be seen in a host of recent studies questioning assumptions made about the actual digital abilities of “Net Generation” students in relation to the so-called “digital immigrants,” or the adults they encounter at home and in educational settings (Bennett, Mason, and Kervin, 2008; Koutropoulos, 2011; Jacobs, 2012). Such studies, contrary to the beliefs of unquestioning enthusiasts for technology like Tapscott and Prensky, have found that we overestimate the abilities of those who have grown up

with technology, mistaking an “always-on” lifestyle with knowledge of how to use the newest tools for learning.

And the influential web designer Jakob Nielsen has insisted for years that web page reading is often too impatient and partial to be taken unquestioned as a resource for serious learning, particularly in the case of college student readers (18 and older). He tells his clients that such readers are multitaskers “who move through websites rapidly, often missing the item they came to find.” From his research team’s formal observations student online readers “squander” as much time as they “spend” online. And they are impatient, typically staying at the surface of whatever they are viewing: “They pass over areas that appear too difficult or cumbersome to use. If they don’t perceive an immediate payoff for their efforts, they won’t click on a link, fix an error, or read detailed instructions” (Nielsen, 2010). Plainly the work of promoting “digital literacy” for online learning and workforce development cannot count on popular images of online abilities.

The Bandwidth Divide

It is for good reasons that postsecondary websites ask about student “readiness” in relation to hardware and software needed for full participation in online learning. But so too is a suitable Internet connection necessary for success in online courses and programs. And if there is a “myth” about the digital capabilities of the “Net Generation” there is a complementary one about broadband access in the U.S. That is, many people assume that the “digital divide” is behind us with the ubiquity of the Internet on mobile devices.

According to a 2012 study by the Pew Project on the Internet and American Life over 75% of Americans under age 50 have a broadband connection at home. But when income and education are considered the picture is different. Thus, for those with annual incomes less than \$49,000 the figure is closer to 60%. And it is 55% for Americans having only a high school diploma. Considering those most likely to benefit from online degree programs (as identified in the Introduction to this co-learning plan) the “bandwidth divide” merits attention in any efforts to increase postsecondary opportunities, particularly in rural areas (see also National Telecommunications and Information Administration, 2013 and Grossman, 2013). According to the Lumina Foundation’s latest state-by-state report (2013) Michigan’s mainly rural counties also show low rates of degree attainment, making broadband access essential if online study will help to increase it.

So too are broadband policies of the major Internet carriers in the U.S. a potential factor in education, as online courses employing video can easily exhaust the “capped data” plans companies increasingly favor. A recent article on this problem in *the Chronicle of Higher Education* said this: “As a nation, we should embrace the potential benefits of online education. But we must not ignore the disparities that may keep many from taking advantage of those innovations. In the 21st century, ensuring equal access to education may also depend upon equal access to broadband” (Lennett and Kehl, 2013). But the best path to such access is the subject of debate about the ideal relation of government regulation to free market forces (Crawford, 2013; McAdam, 2013). As policies are debated, *Connect Michigan*, dedicated to increasing broadband

access and use, contributes to the necessary conditions for online learning, including whatever might be done to improve coordination of state-wide courses, programs, degrees, and services.

5. Literacy, Old vs. New

If “Net Generation” skills with technology are not what we think they are, the need for recognition of readiness is even more urgent for those hoping to strengthen their workforce prospects with postsecondary online learning. What is needed to succeed in the increasingly digital college or university? It is often argued that “21st Century Skills” offer the best path to work and careers.⁷ Inevitably, literacy is among them, as it was in the 20th century. But what is new to our time is the role of the new information and communications technologies (ICT) in redefining what we mean by literacy.

Looking for the Right Name

Indeed, literacy has become an inclusive way to name a host of skills needed for education and work. The skills required by the new ICT have been named the “new literacies,” a phrase suggesting their roots in traditional reading and writing, which of course remain central to any concept of literacy. The question is how much more to include, or how to describe what skills with new media mean for older ones based on print and old media (like film, radio, and television). The new literacies can refer to communicative skills like searching and blogging, and also to the uses of social media like Facebook, Twitter, and Instagram.

There are many definitions of the new literacies, as there is also advocacy and resistance reflecting opportunities and dangers. And there are competing theories of how best to understand and study them, from their origins in high tech industries to the screen reading habits of young children. In higher education the new literacies are features of both the academic and social lives of students, the overlap of the two presenting now well-known problems of distraction, in and out of the classroom. Preoccupation with digital devices is but one sign of a major cultural transition, akin, as is often noted, to the introduction of the printing press.

It was the American Library Association which made the first ambitious proposals for a new kind of “literacy” necessary for postsecondary learning. The ALA (and its affiliate the Association of College and Research Libraries [ACRL]) named “information literacy” as necessary for success in college (ACRL, 1999). In the years since the ACRL standards appeared we have seen different versions of what contemporary digitally-based literacy means for education and learning: “silicon literacy” (Snyder, 2002), “digital literacy” (Eshet-Alkalai, 2004), “multi-literacies” (Selber, 2004), “ITC [Information and Communication Technology] Literacy,” later changed to “iSkills” (Katz, 2007), “digital competence” (Krumsvik, 2008), “new

⁷ The *Partnership for 21st Century Skills* has been an influential K-12 focused organization with a popular website: www.p21.org.

media literacy [or literacies]" (Ohler, 2009; Jenkins, 2009), and, in the now favored formulation, simply the "new literacies" (e.g., Coiro, et al, 2008).⁸

Innovation has been rapid but approaches to understanding the new literacies are gathering around central themes, from practices of global communications for purposes of formal education and social networking, to insistence on the redesign of the K-16 curriculum and the integration of informal digital learning and the conventional classroom. No one can match Duke University literary scholar and technology leader Cathy Davidson (2011) in claims for the reach of the "new literacies." She claims seventeen (!) of them, including "Global Consciousness," "Data Mining," and skill with interactive digital games.

In an important addition to conventional thinking about literacy as essentially cognitive, or based on the operations of the brain and mind, scholars have also proposed that it also depends on suitable dispositions, reflecting affective elements of our mental lives. According to Julie Coiro (2012), a leading scholar of online reading: "Learners with positive dispositions often seek out challenging reading tasks, and each successful experience reinforces their initiation and use of the comprehension skills and strategies applied. Similarly, as learners transition into online reading environments, their attitudes and self-efficacy relative to the Internet appear to be important factors that affect motivation and reading performance. Successful online readers are able to manage texts that often change from one day to the next with *patience*, *persistence*, and *flexibility*. In addition, they display *creativity* and *confidence* while using the Internet to comprehend diverse online texts" (p. 645; emphasis added).

Digital Literacy and Online Academic Abilities

The abilities and dispositions required by the new information and communications technologies have their roots in traditional reading and writing but, as Davidson's approach shows, many educators today prefer to focus on what is beyond conventional printed texts, or a variety of new media-based activities. They are said to represent an emerging configuration of communicative abilities, many learned and practiced away from classrooms (Ito, 2009).

Indeed, a report from the U.S. Department of Education (2010) titled *Transforming American Education: Learning Powered by Technology* consolidates these activities and spares nothing in its confidence in the digital future of education: "The challenge for our education system is to leverage the learning sciences and modern technology to create engaging, relevant, and

⁸ The focus here is on literacy for education. "Digital Literacy" can also be understood as a category of cognition for life and work with meanings beyond schooling and postsecondary education, as in recognition of how technology influences... *[footnote continues on next page]* people as family members, consumers, citizens, and more. From this perspective "digital literacy" is part of technological progress represented by the increase in mobile devices and the availability of broadband. Indeed, the case for increasing access to broadband, as noted above, is important to access to postsecondary online learning for workforce development, as well as for strengthening digital literacy in its largest meanings, or those beyond the uses students make of it.

personalized learning experiences for all learners that mirror students' daily lives and the reality of their future. . . . The opportunities [represented by students' out of school mastery of new media literacies] are limitless, borderless, and instantaneous." While recognizing the role of communications technology in virtually all features of our lives, we can specify features of digital literacy having roles in postsecondary learning, and particularly among adults who see themselves as part-time online students.

In effect, the version of digital literacy proposed here is limited to essentials of online academic work. Some students will bring to degree programs additional features of digital literacy, as identified, for example, by Davidson (2011). But online academic abilities represent what is foundational for courses, programs, and degrees.

Online academic abilities are listed below:

- A. Cultivating *habits of attention* made necessary by the near limitless abundance of online resources and opportunities for interaction via social media, and the pace of digital experience.
- B. *Searching for* and evaluating online information and *selecting* resources for educational purposes and tasks (e.g., course assignments and independent learning projects).
- C. *Interpreting* online resources, including multi-media ones, and *integrating* learning from online and traditional print resources.
- D. *Writing* with digital tools in traditional and new forms (e.g., blogs) and *communicating* in audio and visual formats (e.g., podcasts and video).
- E. *Collaborating* on academic assignments and projects (e.g., wikis) and *participating* in social networks in online course formats for the exchange of information and ideas.

Again, online academic abilities constitute a deliberately limited list, and the account below of becoming net smart features but the first two. An additional ability may be said to be keeping up with innovations in hardware like mobile devices and software, or rapidly multiplying "apps." Thus: "The new literacies of the Internet are not just new today, they will be newer tomorrow, even newer next week, and continuously renewed on a schedule that is limited only by the human capacity to keep up" (Coiro, et al., 2008, p. 4).

6. **"Google Stupid" or "Net Smart"?**

Everyone today recognizes the impact of technology on education, including what it means for how we go about using the limitless online resources now available. At the same time that online teaching and learning has been increasing in postsecondary education, scholars, teachers, historians of technology, neuroscientists, and others have been seeking to demonstrate the consequences of our culture's rapid digital transformation.

Nearly everyone recognizes that with gains come losses in any technological change. Anyone seeking to understand our situation would do well to acknowledge contributions on the side of (nearly) unqualified enthusiasm for the educational uses of technology (as in Jenkins, 2009), and those who are anxious about how technology influences student life (e.g., Turkle, 2011). There is as yet no perfect synthesis of our prospects and problems, and of practices that can be resources for digital learning. But a recent effort in that direction appeared in a 2012 book by technology writer Howard Rheingold: *Net Smart: How to Thrive Online*. This report adopts the main title to suggest how states and students can better themselves in online postsecondary learning.

Reading and Learning in an “Interruption System”

There is no question of the momentum in the transition to more and more online teaching in postsecondary education. Indeed, “transition” understates the current policy environment, when “transformation” is the favored position, the only way to manage (if that is possible) the “tsunami” or “avalanche” predicted for higher education (as above, pp. 10-11). A recent and likely to be influential account of “Education in the Digital Age” sees online learning as the only solution to the financial problems facing American colleges and universities, chiefly in the decline of public support, rising costs, and increasing student debt (Bowen, 2013).

What do critics of the digital transformation say? For some, this is the time to defend “residential” education and the virtues of the face-to-face classroom, with what it has traditionally offered in the long lasting consequences of encounters between faculty and students (e.g., Edmundson, 2012; Delbanco, 2012). William Bowen wonders if we have overestimated such effects, and others say that with the evolution of e-learning platforms online education can yield its own powerful forms of teaching and learning. Still, skeptics warn that we are headed toward a highly stratified national environment for postsecondary education, with a group of elite institutions able to offer teaching and learning in small classes, and with all the advantages of the traditional “college” experience. Other institutions will welcome online courses and programs, mainly for their cost savings, though some will rely too on claims (from MOOC advocates) for advantages in learning associated with digital teaching. In any case, the dispute certainly matters little to non-traditional students—working adults contemplating a postsecondary credential—who stand to benefit from the expansion of online teaching, particularly at public institutions.

There is, however, a second line of criticism of the digital transformation of education, reflecting worry over the cognitive impact of technology, or how the Internet is prompting a reorganization of how we read and manage ideas generally. With what is required in schooling at all levels, such cautions about the direction “online thinking” merit recognition.

According to technology historian Nicholas Carr (2010), “the Internet is, by design, an interruption system, a machine geared for dividing attention” (p. 131). Carr began a project of inquiry into the new situation of digital readers with his provocatively titled and widely cited 2008 article “Is Google Making Us Stupid?,” a question he also probes in his book *The Shallows: What the Internet is Doing to Our Brains* (2010). He reviews recent scientific research and asserts that the “juggling” common in Internet searching and reading—prompted by the ease

of ubiquitous hyperlinking--can have serious cognitive "switching costs." They tax our mental resources, particularly attention and memory, and what is needed for understanding "long form" texts.

So, managing multiple digital resources for teaching and learning presents us with problems deriving from the nature of the new media, with the habits they promote of mindless scanning and skimming, both elements of being "Google Stupid," so to speak. The "Net Generation" may be socialized in this manner of Internet use but Carr sees it as a danger even to older and experienced readers like himself as we move away from print, with, in his view, its salutary effects on the pace of reading and precision in managing ideas.

In effect, Carr's work serves to caution us about the far reaching consequences of a rapid change in how we educate ourselves. For example, being an effective hypermedia reader, someone who works comfortably and purposefully with links, calls for awareness of what dilemmas the new format presents as well as what it offers in the expansion of educational resources. Working within such a limit does not preclude other forms of the "new media" literacies, but it specifies a place to begin, with screen reading as increasingly the primary location of academic work.

Paying Attention to Paying Attention

Partisans of the digital transformation often dismiss cautionary statements about it as mere nostalgia for books, or as shortsighted and insufficiently appreciative of how teachers and students must change in order to make the greatest possible use of the "affordances" of the newest information and communications technologies. But in *Net Smart* Howard Rheingold takes Nicholas Carr's position seriously. That prompts him to focus on what can be done to mitigate the adverse effects of digital technologies on reading, and the attention necessary for sustained and deep thinking. Thus, even if Rheingold sees Google as an indispensable resource for the "new literacies" he values, he appreciates the situation of those who find it increasingly difficult to maintain the older skills of literacy, including the ability to read "long-form" texts with what they can require in following complex arguments. Have we allowed technology to distract us as much as augment what we can learn and do? In a candid moment he admits that our lives have been "colonized" by mobile "gadgets."

For Rheingold, there is a choice to be made: "Today's digital literacies can make the difference between being empowered or manipulated, serene or frenetic. Most important, as people who are trying to get along day-to-day in a hyperscale, warp-speed civilization that seems to so often to be beyond anyone's control, digital literacy is something powerful we can learn as well as exercise for ourselves and each other" (Rheingold, 2012, p. 3). The always-on style of life today makes necessary self-conscious mental control of a new kind. That means a new formula for learning: "intention added to attention" makes up what Rheingold names as "infotention," which he defines as "The specific combination of learned attention skills and learned information technology know how," or "synching our attentional habits with our information tools" (pp. 17, 101). But the combination can vary from student to student. Thus, according to Rheingold, "There is no single recipe for a mindful life in the digital mediasphere" (p. 8). We must pay attention to how we pay attention to find our way as learners and students.

There is a reason why attention leads the list of “Net Smart” literacies Rheingold takes to be essential: “When it comes to interacting with the world of always-on info, the fundamental skill, *on which all other skills depend*, is the ability to deal with distraction without filtering out opportunity” (p. 41, emphasis added). The other four net smart literacies Rheingold favors are the ability to: search thoughtfully online, participate in the new social media, collaborate with others on behalf of joint interests, and join in networks that increase social intelligence.

This report features the first two—attention and Internet searching (also as part of the “online learning abilities” named above (p. 24)—because they are the ones most directly related to “readiness” for online learning in postsecondary education. The third, fourth, and fifth literacies for Rheingold—all forms of participation in new media and of cultural production—can certainly be part of formal learning but as of yet they are not as essential to online learning as are attention and search. Rheingold and likeminded thinkers (e.g., Jenkins, 2009 and Davidson, 2011) hope that will change and that postsecondary teaching will soon come to reflect digital literacy also as a social phenomenon.

Internet Searching: More than Clicking

In preparing for and succeeding in online learning everything begins with attention. Rheingold’s comment on our digital situation reminds us why: “Clearly the raw volume and velocity of information as well as opportunity for distraction is now unprecedented.” Students know that regular access to the Internet does not necessarily mean making the best use of what is available for learning. The task is finding one’s way through what any search reveals to the resources that best address a particular need. Search is all about asking the right questions, several times. For Rheingold, we are giving new form to an old practice: “Just as the ancient arts of rhetoric taught citizens how to construct and weigh arguments, a mindful rhetoric of digital search would concentrate attention on the process of inquiry—the kinds of questions people turn into initial search queries, and the kinds of further questions that can deepen their search” (p. 53).

Students bring experience in searching to formal education but, like many others, Rheingold believes that there is much to know about how to do it well. He relies on a recent Microsoft project aimed at teachers, in which he participated, to specify essential features of searching online. The guide, *Developing Critical Thinking Through Web Research Skills*, features adept searching as a form of “critical thinking,” always near the top of the list of 21st century literacies.⁹ The phrase has become a slogan, with few uses precise enough to guide teachers and students toward fruitful practices. But in the case of online search, aimed at research for academic purposes, the goal is critical interaction with digital resources. That means, according to Rheingold and the Microsoft guide, that any serious searcher is really a researcher, or someone interested in the discovery, interpretation, and uses of information.

⁹ Microsoft’s guide, also an effort to promote Bing, its own search engine, is available at: Microsoft.com/education/en-us/teachers/guides.

Thus, online learners “should not be dependent solely on a search engine’s view of ‘relevant’ sources but should also be able to navigate on their own to the sources they determine are relevant for their topic.” There follows, in the Microsoft guide and in more extensive form in *Net Smart*, a series of search procedures that feature determining the reliability of sites and fact checking, or what Rheingold calls “crap detection.” But the main point is a variant of his case for attention as the primary “new literacy” in our media saturated world. That is, search has the best results and academic uses when the student is purposeful, persistent, patient, and discriminating. That amounts to paying attention while searching.

As explained below, public libraries have welcomed a role in promoting intelligent search and are valuable resources for “digital literacy” and “online academic abilities.” In an admirable expression of local initiative, librarians at a small school district in Washington State devised an “Information Skills Rating Scale” that earned recognition in the Microsoft guide. The skills for rating are: Questioning, Planning, Gathering, Sorting, Synthesizing, Evaluating, and Reporting (see fno.org/libskill for the complete self-assessment). These are consistent with Rheingold’s principles of search but they also suggest how individuals can find a vocabulary of their own to describe the process, enabling perhaps easier self-assessment of progress.

Google itself—no surprise!—also offers guidance in searching. *Inside Search at Google* tells the story of search and explains what Google’s famed search engine does. And there are “Tips and Tricks” and appealing “Search Stories.” There is another Google site (*Search Education*) that resembles Microsoft’s in its guidance for teachers, if not in the vocabulary of “critical thinking.” But anyone can use *Search Education’s* self-paced video courses and numerous exercises to improve at online search.¹⁰

Participation: How Much Connectivity is Enough?

Rheingold is a seasoned technology professional. While he is the age of a “digital immigrant” he has transformed himself into the most assimilated of “digital natives”(in the terms explained above, p. 20). In fact, he welcomes designation as an “Internet entrepreneur.” It is in the spirit of such technological entrepreneurship that Rheingold presents the other features of his scheme for digital literacy. The focus is on participation, collaboration, and networking. And of course the new social media play a prominent role in what he advises about being net smart according to the opportunities presented by wikis, aggregating sites, etc., some well-known, others not (at least to those who don’t live as deeply as Rheingold does in the world of the Internet).

There is abundant attention (if you will) in Rheingold’s approach to the social dimensions of being net smart. He says in *Net Smart*: “Solitary skills are not enough today. Literacy now means skill plus social competency in using that skill collaboratively” (p. 4). That may be true but, as Rheingold himself demonstrates, whatever the social dimensions of digital literacy, making the most of learning online rests on what students do *on their own* in marshaling attention and searching for information in a suitably critical manner. For that reason it is

¹⁰ As in the case of the Microsoft’s guide, Google’s resources named here also promote its search engine: <http://www.google.com/insidesearch/searcheducation>.

important to recognize recent claims made for valuing solitude as a resource for learning. Indeed, *Wikipedia* co-founder Larry Sanger, someone hardly indifferent to “knowledge creation” (as it is called) as a social activity, has called for fresh recognition of the virtues of solitude in learning, and others have reminded us of the “joy of quiet,” the “tyranny of the social” as an obstacle to people doing things on their own, and the benefits of “introversion” (Sanger, 2010; Iyer, 2011; Morozov, 2012; and Cain, 2012).

In a similar vein, a recent book that can be seen as complementary to Rheingold’s *Net Smart*, William Powers’ *Hamlet’s BlackBerry*, explores with surprising historical examples a series of dispositions helpful, as the subtitle of his book says, in “Building a Good Life in the Digital Age.” We can say that compared to Rheingold, Powers is only moderately engaged on the Internet. With all the enthusiasm that schools, colleges and universities show for the uses of technology, there is the need for guiding students to variable images of online life and work. Powers offers one that is friendly to many uses of the Internet but suitably cautious about the consequences of being unselective about how we use it—or inattentive on Rheingold’s terms. So, paradoxical as it might sound, “digital literacy,” or the cultivation of “online academic abilities,” can include recognition of the limits of the “new literacies,” or managing our uses of them as part of a complete view of how we take in the world and make sense of our experience.

Howard Rheingold is a reliable guide to using the Internet for learning, whatever his seeming unlimited admiration for the social media--though he has doubts about Facebook, chiefly because of its poor record in protecting privacy. Early in *Net Smart* he cites a passage from neuroscientist Maryanne Wolf’s influential study *Proust and the Squid: The Story and Science of the Reading Brain* (2007) that is a timely guide to the practices and values of literacy in our time: “In the transmission of knowledge the children and teachers of the future should not be faced with a choice between books and screens, between newspapers and capsule accounts of the news on the Internet, or between print and other media. Our transition generation has an opportunity, if we seize it, to pause and use our most reflective capacities, to use everything at our disposal to prepare for the formation of what will come next. The analytical, inferential, perspective-taking reading brain with all its capacity for human consciousness and the nimble, multifunctional, multimodal, information-integrative capacities of a digital mind-set do not need to inhabit exclusive realms. Many of our children learn to code-switch between two or more oral languages, and we can teach them also to switch between different presentations of written language and different modes of analysis. Perhaps, like the memorable image captured in 600 BCE of a Sumerian scribe patiently transcribing cuneiform beside an Akkadian scribe, we will be able to preserve the capacities of two systems and appreciate why both are precious.”

PART THREE: Becoming Net Smart

This report has featured two closely related approaches to postsecondary learning and workforce development for what has been called by business leaders the “New Michigan.” There is first an *institutional* one, showing how states are moving toward consolidated or even networked arrangements in offering online programs and degrees. They are becoming net smart. Michigan’s constitutional arrangements for postsecondary education, giving all institutions autonomy, presents a challenge to systematic planning for new programs and services within and across the 43 public two and four year institutions.

There is an *individual* dimension to online learning and workforce development—becoming net smart learners. For Michigan citizens, apart from more information about current opportunities and, ideally new cooperative initiatives in online learning, there is the obligation to become “digitally literate,” or for purposes of postsecondary education, mastering what are named above as “online academic abilities.” In such an effort there are already useful resources, our public libraries being institutions prepared to fortify what individuals can do in learning how to learn online.

7. A Portal, a Primer, and a Place

Three proposals follow. There is first a *portal*, or a one stop gateway to Michigan’s resources for postsecondary online learning. A *primer* would represent what is essential for online academic abilities, becoming net smart with the digital tools and what can be found online. Public libraries are *places* where prospective students, or those resuming their undergraduate work, can sharpen their ability for online academic work.

A Portal: Start Here

As *State U Online* shows, for innovation in online learning the key is capitalizing on offerings across institutions, typically via what is possible within a statewide system of higher education, and making well known to students how they can proceed in planning for matriculation (or “navigation support”). Michigan can claim such advantages for online learning and workforce development in only a limited way. The lack of a centralized postsecondary authority makes collaborative action--like initiating online certificate and degree programs, or welcoming Prior Learning Assessment—difficult. A vivid example of the ability of statewide systems to act on behalf of online innovation was the announcement in May 2013 of arrangements between Coursera, the major MOOC provider, and postsecondary systems in nine states (Rivard, 2013).

Valuable steps have been taken independently by the Michigan Community College Association. But the MCCA is best at coordinating the activities of individual institutions. Its *Virtual Learning Collaborative* highlights online learning but it cannot itself guide students to opportunities and services across all postsecondary institutions in the state. The research

universities, organized as the Presidents' Council, offer no systematic information to students about their online courses, programs, and degrees.¹¹

The Century Foundation (2013) study of the roles of community colleges features as a strategy for reducing postsecondary stratification efforts to “connect what are now separate two- and four-year institutional silos” (p. 44). In fact, the Century Foundation study cites as a model of cooperation the “blended arrangement” offering students at Macomb Community College concurrent enrollment in a B.A. program via courses taught by Oakland University and Wayne State University faculty. The portal proposed here would reflect a similar intention, focused on online learning, to capitalize on resources for degree attainment across Michigan’s higher education sectors.

The American Association of State Colleges and Universities (AASCU) names “Collaboration and Cooperation among Education Sectors” as essential in *Creating a New Compact Between States and Public Higher Education* (the title of a report by its 2013 Task Force on Making Public Higher Education a State Priority). Of course, the AASCU project reflects the potential for “strategies” across sectors of higher education more likely in states where a system can advocate for a “new compact” and promote and coordinate activities representing innovations in such a direction. One result of Michigan’s de-centralized approach is its status as a “laggard” in policy making and initiatives for online learning. In the manner of states that have been named “leaders” in online learning, a portal can offer students the information they need in order to pursue formal online learning and credentials that will improve their career and economic prospects.

Such a portal, or streamlined point of entry, like the one provided by the University of Wisconsin System’s eCampus, is unlikely as a joint project of only the Michigan Community College Association and the Presidents’ Council, State Universities of Michigan, pursuing as they do quite different interests. But the Association and the Council, acting from a shared interest in promoting degree attainment and economic development, might collaborate with other organizations in launching such an effort. Thus, leaders of workforce and economic development organizations finding value in the portal idea—a timely centralized service to respond to the digital transformation of postsecondary learning—might also serve as conveners.¹² A first step could be a feasibility study of the technical requirements and costs of

¹¹ Virtually all of Michigan’s two and four year public institutions, with many private ones, participate in a website maintained by the Michigan Association of Collegiate Registrars and Admissions Officers (MACRAO; macrao.org). It focuses on transferring credit between institutions and includes links to admission applications and other resources. While there is a state-wide website for online educational services, its name is misleading. The Michigan Virtual University (mivu.org) actually focuses on K-12 education.

¹² Some candidates: Michigan Economic Development Corporation, Michigan Chamber of Commerce, Michigan Works!, Business Leaders for Michigan, Corporation for a Skilled Workforce, Michigan Workforce Development Coalition, Connect Michigan, the Michigan State University Center for Regional Economic Innovation, and the Prima Civitas Foundation (which works across economic, educational, and other sectors).

such a portal, including the possibility of “building out,” so to speak, from the *Virtual Learning Collaborative* (VLC) of the Michigan Community College Association.¹³ A more comprehensive portal might then appear—via a hyperlink--on the websites of all postsecondary institutions in the state, as well of organizations having roles in education and workforce development (e.g., the Michigan College Access Network).

Still, a portal is only that, a resource for information. It is a step in the direction of policy planning and collaboration in implementation for online postsecondary education, degree attainment, and workforce development. The design of a portal can also be the occasion for other steps in collaboration, a chance to act systematically on questions of online postsecondary programs and degrees. Thus, an allied system-like action would be a statewide agreement on Prior Learning Assessment, or what students might do to gain credit for successful completion of MOOCs and perhaps other Open Educational Resources, a key feature of the new state-wide Open SUNY and other system-based online projects as cited in Part One.

A Primer: Everything Depends on Attention and Search

For those contemplating enrolling in a certificate or degree program, determining how “ready” they are for online learning can be a useful first step. But digital literacy is the necessary counterpart of access to courses and programs. This report proposes a version of digital literacy in “online academic abilities” featuring strategies for becoming net smart for particular purposes. A primer introduces a subject, providing a reader’s first instruction in it. Its nature makes it incomplete, if well focused on essentials. A primer on “online academic abilities” would feature attention and search.

Becoming net smart in this way can be a project of individual learning, with online resources. But, as Howard Rheingold and others make plain, the abundance of the Internet can be an obstacle to inquiry. With a suitable portal to online learning in Michigan, as suggested above, a compact and well-focused primer presenting “academic abilities online” can display their essentials for new and returning students. Such students are unlikely to read a book on the subject, like Rheingold’s *Net Smart*, but they can benefit from compactly presented expert accounts of how to make the most of digital experience for learning.

A specialized primer, available online, would address adults directly, in the voice of Google’s “Inside Search.” Microsoft’s guide to critical thinking is written primarily for teachers and is aimed at influencing the curriculum. Still, what Microsoft offers, as in the case of Google’s teacher-directed resources, can be incorporated into a primer presenting search (in Microsoft’s terms) as the foundation of research for academic work, and understandable and accessible for adult students. And a primer would be organized as a resource for face-to-face guidance, ideally

¹³ In mid 2013 the VLC launched an ambitious effort to expand the services it provides, particularly to students at MCCA member institutions. These will include improvements in course registration across the colleges and guidance in “pathways” to postsecondary credentials. The site will be renamed *Michigan Colleges Online*.

at a public library welcoming an opportunity to extend its efforts in digital literacy (redefined for these specialized purposes as online academic abilities) and workforce development.

The Right Place at the Right Time

In a surprising paradox, American public libraries are thriving even as the traditional printed book declines as the primary resource for reading. As a 2013 study by the *Pew Internet and American Life Project* shows, libraries have responded to changes in reading habits and to new opportunities for literacy-based services, including guidance in “digital literacy” (Zickuhr, Rainie, and Purcell, 2013). According to a 2012 report addressing “Patron Technology and Internet Services,” 90% of public libraries offer some type of formal or informal technology training (American Library Association, 2013). Howard Rheingold himself recognizes what public libraries can offer as places for helping in becoming net smart. He says in *Net Smart*: “We already have a well-understood social role for a critical thinking tutor: librarians” (p. 89).

As noted above, it was the American Library Association that first prompted national attention to digital literacy (ACRL, 1999). And libraries continue to represent public commitment to the skills of literacy at all levels. Indeed, libraries are increasingly recognized as community resources with roles in people’s lives spanning all media (print, video, and audio) and offering broadband access to the Internet, the latter being essential for some adults limited by what they have at home in connectivity (if any). A recent president of the Michigan Library Association (MLA) referred to the role of members in helping people to “retool themselves” for work and careers (in part via the MLA’s Community of Practice on “Economic Development”).

Michigan public libraries can contribute to advancing “online academic abilities” by identifying part of their attention to “digital literacy” as having the goal of guiding adults toward “online academic abilities.” A primer on the subject, as described above, could be the necessary resource. Making such a responsibility part of public library services could be aided by a volunteer cadre of well qualified educational technologists (faculty and students) at Michigan colleges and universities. Such an alliance might be launched and sustained as part of traditions of service in postsecondary education, now in a form well suited to emerging digital formats for teaching and learning, and to Michigan’s needs in workforce development.

CONCLUSION: Becoming Net Smart, Just in Time

This report reflects today's consensus about the essential role of postsecondary education in workforce and economic development. Thus, it begins with two questions:

How well do Michigan institutions—colleges, universities, and allied organizations—reflect the rapid growth of online teaching and learning, particularly in offering online certificate and two and four year degree programs, and resources for prospective students to learn about postsecondary educational opportunities?

How can Michigan residents prepare for online teaching and learning, and thus for the lifetime advantages—in work and personal development--associated with completing a postsecondary certificate or a two or four year degree?

The answer to the first question is, alas, “Not well enough.” An answer to the second is: “With recognition of particular uses of digital literacy.”

As Part One showed, an obstacle in Michigan to organizing and presenting what prospective online students need to know in order to set them on the path toward degree attainment is the state's decentralized format for postsecondary education. Thus, the report proposes what might be done to allow Michigan postsecondary institutions to act as if there was a state-wide “system” for collaboration in advancing online learning as the best opportunity for advancing degree attainment for the state's workforce. Part Two focused on what individuals can do—with help from suitable resources and institutions like libraries—to gain the online academic abilities which can serve as a platform of postsecondary studies and, ultimately, degree attainment.

Of course, prospects for improving Michigan's performance in online education and workforce development (as in Part Three) must be part of a policy-oriented state-wide discussion about online learning and its role in public higher education.¹⁴ Will online learning “disrupt”(in the vocabulary of the popular theory) postsecondary education in ways that will change it fundamentally? How will states respond to any “disruption,” particularly in relation to what it means for costs, access, and the quality of education? Will more access improve degree attainment? What are the best formats for cooperation between the two and four year sectors? How will students adapt to new forms of postsecondary teaching and learning, and of academic credit and degrees?

Near the end of *Net Smart* Howard Rheingold says that “Educational institutions cannot change swiftly and broadly enough to match the pace of change in digital culture” (p. 252). Thus, state-wide adaptation to new conditions will be an ever present problem, with pressure from partisans of “disruption” for change in time to make the most of technological innovation. But the pace of

¹⁴ A June 2013 statement from the Committee on Institutional Cooperation (the CIC, of which the University of Michigan and Michigan State University are members, along with the other Big Ten universities and the University of Chicago) has asked about the wisdom of relying on private companies (e.g., Coursera) in “scaling” online learning and about other matters (see Committee on Institutional Cooperation, 2013).

change must also reflect the nature of Michigan's highly decentralized "system" of postsecondary education, and equally important, careful thinking about the consequences of the increasing digitalization of teaching and learning. In other words, becoming "net smart" will be as demanding as it is timely.

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GLOSSARY

Attention: Applying the mind to something, or the capacity to maintain concentration and put aside distractions. The question of attention in the digital age reflects the difficulties of managing it among ubiquitous mobile devices, electronic media, and Internet resources.

Badges: Traditionally, an emblem displayed as a sign of achievement. According to their advocates, virtual badges for successful demonstrations of competency, via an online educational experience, can complement or even replace traditional credits for postsecondary courses. A student in the future might aggregate such badges in pursuing an online credential (certificate or degree) where an institution recognizes them as a form of credit.

College Reward: The annual and lifetime advantages in earnings gained by those having two or four year postsecondary degrees.

Competency-Based Learning: A system of postsecondary education featuring assessments by testing of skills and knowledge, learned anywhere and via many kinds of experiences, though including, as suitable, traditional courses. Such a format for earning a certificate or degree, typified today by Western Governors University, contrasts with the traditional “seat-time” approach, which relies on the completion of a sequence of courses for credit.

Degree Attainment or Degree Completion: Completion of requirements for a two or four year postsecondary degree (sometimes applied to the completion of a postsecondary certificate). The phrase is featured in national efforts to increase educational achievement among American adults, as in the Lumina Foundation’s *Goal 2025* Project and initiatives of the U.S. government.

Digital Literacy: Generally speaking, the ability to use effectively the newest technologies in everyday day life and at work. When applied to education and learning the phrase can refer to using a range of abilities and activities, from online searching to using social media to playing electronic games. It is often meant to signify what must now be added to traditional reading and writing for emerging forms of digital learning, in and out of formal education (K-12 and after).

Digital Natives: One of two phrases--with “Digital Immigrants”--coined by technology writer Marc Prensky to refer to generational differences in the uses of technology. A “native” has abilities with technology characteristic of people born since the early 1990s and who have thus grown up as natural inhabitants of the “digital age.”

Digital Immigrants: A second phrase coined by technology writer Marc Prensky--with “Digital Natives”—to refer to generational differences in the uses of technology. An “immigrant” is an older adult who experiences technology as a newcomer, often needing special efforts--in the manner of immigrants to a new nation--to adjust to unfamiliar ways of living, working, and learning.

Disruptive Innovation: Formulated in the late 1990s by business scholar Clayton Christensen, the phrase refers to what happens in a company or sector of business when a new and cheaper version of a well-established product or service is introduced and gradually gains in quality and reputation, ultimately forcing adjustments in prevailing assumptions and practices in product

development, pricing, and marketing. The theory is used today to describe potential change in postsecondary education, with online learning being the “disruptive innovation” prompting attention to questions of college and university structures, instructional methods, and costs.

Goal 2025: A national project of the Lumina Foundation to promote an increase in postsecondary degree attainment in the United States to 60% of adults by the year 2025.

Infotention: A term coined by technology writer Howard Rheingold (in *Net Smart: How to Thrive Online* [2012]) to refer to “intention added to attention, mixed with knowledge of information-filtering tools, working together in a coordinated mind-machine process.”

Internet Search: The activity of seeking digital information and resources via the Internet. Rather than being a simple process of sequential online clicking, Internet searching presents questions of problem formulation, resource evaluation, and application, particularly for its uses by students in research and other academic tasks.

Interruption System: The phrase coined by technology writer Nicholas Carr (in *The Shallows: What the Internet is Doing to Our Brains* [2010]) to refer to the impact of hyperlinked online resources on traditional habits of reading and thinking based on printed texts.

Massive Open Online Course (MOOC): A new format for online education featuring free courses taught by faculty at leading institutions and made available via private companies like Coursera and Udacity (both with ties to Stanford) and postsecondary partnerships like edX (led by MIT and Harvard). Global enrollment in MOOCs can reach tens of thousands. While not now carrying college credit, MOOCs may do so in the future according to arrangements now being formulated by the American Council on Education and other groups.

Navigation Support: What can be provided by an “integrated set of tools,” including online portals, for people seeking knowledge of educational and career opportunities. According to Carrie Floyd of the Corporation for a Skilled Workforce (Ann Arbor), such support will require a new initiative representing stakeholders in education and economic development.

Net Smart: A phrase, as in the title of recent book by Howard Rheingold, referring to the abilities necessary for “thriving” in the rapidly growing digital world. It features mastery of new kinds of literacy, including what is required in attention, intelligent online searching, and the uses of social media. It is applied in this report as a goal for states as well as students.

New Literacies: Those elements of “digital literacy” featuring cognitive activities associated with digital media, including interactive uses of Web 2.0 technologies (e.g., blogging and video). Some advocates propose electronic gaming, globalization, environmental sustainability, and other categories of learning as part of the “new literacies.”

Next Generation Universities: A new category of postsecondary public institutions proposed in a 2013 report from the New America Foundation. Such universities, with sizeable enrollments, reflect what can be gained for efficiency and student success by restructuring operating costs and

focusing on broad access, including online learning, within traditions of academic research and service.

Online Academic Abilities: A limited approach to digital literacy focused on what it takes to succeed in online courses and degrees. The abilities feature habits of attention, Internet search, and more.

Online Course: A course offered fully online featuring Internet-based resources and interactions. An online course can be distinguished not only from a traditional face-to-face class but from a “hybrid” course, or one that may be based largely in the classroom but include substantial online features, including faculty-student and student-student interaction.

Online Degree Program: A credit based program offered by a two or four year institution based on online courses, though in some cases courses are featured in a “hybrid” format.

Portal: Traditionally a doorway or gateway but now often used to refer to a clickable option at a website providing access to information on a particular subject. A portal, like a primer (below) can guide a potential or new postsecondary student toward suitable educational opportunities.

Postsecondary Education: Formal study at a certificate or degree granting two or four year institution. Such study can take place on a traditional campus or online, or a combination of the two. The phrase “lifelong learning” is often used to refer to the many things that adults do over the life course for educational purposes, including enrollment in credit courses and degree programs.

Primer: A text, in print or digital form, introducing a subject, and typically having educational purposes. Like an online portal (above), a primer can guide a new postsecondary student to awareness of what is necessary for academic success.

Readiness: The degree to which a prospective postsecondary student is prepared for success in an online program. Community colleges in particular seek to guide such students toward recognition of their readiness for online learning with online self-assessments available at institutional websites.

Return on Investment (ROI): The economic value of a postsecondary certificate or two or four year degree. Thus, an investment is made in time and tuition in order to gain a credential leading to a job and career. The return on investment is the difference between such costs and annual and/or lifetime earnings.

State Systems of Postsecondary Education: The form of centralized oversight and coordination, typical of most states, of degree programs and related educational services among two and four year publically supported postsecondary institutions (e.g., the University of Wisconsin System). In some states such centralized oversight and supervision is organized in an independent agency with responsibility for all levels of postsecondary education (e.g., the Colorado Commission on Higher Education). Such systems and agencies carry legislative

authority as opposed to Michigan's voluntary associations: the Michigan Association of Community Colleges and the Presidents' Council, State Universities of Michigan.

Sub-Baccalaureate Credential: Evidence of a person's skill or ability reflected in completion of a program with a limited number of courses and credits, typically half or fewer than are required for a two year postsecondary degree.

Wage Premium: The pay commanded in a particular occupation by the holder of a postsecondary credential, typically represented in the differences between having a high school diploma and bachelor's degree (although the idea can be applied to an advantage held by someone having a certificate or two year degree).

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The MSU EDA University Center for Regional Economic Innovation (REI) seeks to identify and develop new economic development tools, models, policies and practices to support innovative economic development high-growth enterprises and job creation in distressed regions across the state. REI has established a new economic development ecosystem to cope with the ever-changing global and regional dynamic. Through this ecosystem, we engage innovative and creative minds which result in new economic development practices.

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