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Improving Student Engagement

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Abstract

The paper that follows reviews research literature in the area of student engagement. Our goal in this work is practical: we hope to discover in this literature curricular and pedagogical ideas educators might successfully use to better engage students in learning. Prior to outlining the specifics of our research, we offer a general overview of what we have found as we have studied the literature to provide a context that might help readers better understand this area of study. Specifically, our reading suggests that work in the area of student engagement seems to have grown in a number of ways – the greatest of which is the change from focusing upon disengaged

students (who are not learning) to engaged learners (who are learning). We theorize that older work about student engagement attempted to reshape 'renegade' students back into the fold of schooling, but current work is more willing to revision schools to fit the learning needs of students. This change seems crucial and promises to organize how the study of student engagement will be carried out in the future.

Keywords: student engagement, student learning, pedagogy, assessment for learning

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Improving Student Engagement

Pedagogy should at its best be about what teachers do that not only help students to learn but actively strengthens their *capacity to learn*." David Hargreaves, *Learning for Life,* 2004, p. 27.

Student engagement has primarily and historically focused upon increasing achievement, positive behaviors, and a sense of belonging in students so they might remain in school. Because the focus was high school completion, research on student engagement *targeted* students in middle school and high school, where disengagement typically becomes a concern (Willms, Friesen, & Milton, 2009), and student engagement was seen as a way to re-engage or reclaim a minority of predominantly socio-economically disadvantaged students at risk of dropping out of high school. Over time, student engagement strategies were further developed and more broadly implemented as a way to manage classroom behaviors. More recently, student engagement has been built around the hopeful goal of enhancing all students' abilities to *learn how to learn* or to become lifelong learners in a knowledge-based society (Gilbert, 2007, p. 1). Student engagement has become both a strategic process for learning and an accountability outcome unto itself.

Defining and measuring student engagement

Clearly, educators hope students will become successful learners. Teachers' experiences also clearly tell them that students disengage and do so for a variety of reasons – perhaps each of which could be studied and mediated on its own. For very good reasons, a large number of researchers have studied student engagement. However, the literature we reviewed did not agree upon a definition of what *student engagement* might be. Several types of engagement were noted – academic, cognitive, intellectual, institutional, emotional, behavioral, social, and psychological to name a few. These differences beg a number of questions. Must a learner function in all arenas

of engagement for successful learning to take place? For example, some researchers studied students' need to "belong" to achieve high grades and graduate. But, must students *belong* to be academically successful; or, must they simply *behave*? Are high-achieving students who work but do not participate in extracurricular school events disengaged learners? (Willms, Friesen, & Milton, 2009; Willms, 2003; Harris, 2008). Such questions stir both our interest and the age-old question: What might our education system do to help students engage successfully?

Perhaps one way to define student engagement is to see how it is measured. Historically, a number of common measures have been used to identify if students are actively engaged in learning. These measures have predominantly focused on quantitative data such as attendance, standardized test scores, and truancy or graduation rates. The majority of these measures track levels of achievement (outcomes such as high scores, full attendance for the year) but not levels of student engagement in learning (interest, time on task, enjoyment in learning). More recently however, researchers are beginning to ask students and teachers how *they* would measure engagement. This question is producing both interesting qualitative criteria and further definitions of engaged learning, which, consequently, have impacted how we 'assess' learning. Answers to this refocused question have revealed a gap between what teachers consider engagement in learning and what students consider engagement in learning.

The Promise of Student Engagement

Clearly, student engagement is a rich research area. Educators must continue to seek to understand and apply specific, well-considered, if not agreed upon, strategies that support *student engagement in learning* both in and beyond the classroom. The consequences of not engaging students in learning are reportedly dire (Prensky, 2001; Tapscott, 1998; Gilbert, 2007; Willms, 2003, p. 56; Claxton, 2007). "Some educationists consider engaging disengaged pupils

to be one of the biggest challenges facing educators, as between 25% (Willms, 2003) and over 66% (Cothran & Ennis, 2000) of students are considered to be disengaged" (as cited in Harris, 2008, p. 57).

It is obvious that students live in world that engages them differently than the world their parents experienced. That students respond to this world and have changed over the last twenty years in response to their engagement within a technology rich society and changes in upbringing almost goes without saying. How schools respond is key to student success. A great issue might be that students leave school incapable of or unprepared for a productive and healthy life in the "Knowledge Society" in which they will live and lead (Gilbert, 2007). If we fail to change our pedagogy, curriculum, and assessment strategies, we fail our students and jeopardize our own futures (Willms, 2003; Robinson, 2009; Tapscott, 1998; Prensky, 2005; Gilbert, 2007).

Students have changed over the last twenty years; perhaps as a result of a technology rich upbringing, they appear to have "different" needs, goals, and learning preferences than students in the past. We must better understand these youth to determine how to best engage them in learning; yet, there is a notable lack of "student voice" or student perspectives in the literature on student engagement. That said, some critics (Carlson, 2005; Young, 2006; Carnivale, 2006; Bennett, Maton, & Kervin, 2008) do not believe today's students require special educational concessions. In fact, they believe we are dumbing down an entire generation through coddling. As "Professor Baron" is quoted in Carlson (2005):

> It is very common to hear people say, 'Here's the Millennial or the digital generation, and we have to figure out how they learn. Poppycock. We get to mold how they learn.' Administrators push professors to use technology in the classroom because they believe that is what today's students want, says Ms. Baron. And faculty members feel pressured

> to shorten lectures, increase group-discussion time, and ignore the "multitasking" student who is e-mailing his friends in the back of the room -- all to attract and satisfy a generation that doesn't have the discipline of its predecessors. 'We think that the students will come if we teach in a way that meets the expectations we have of what the students want. At some point, what we are doing is killing higher education' (Carlson, 2005, p. 2).

However, this view is a minority; the majority of the literature we read embraces the idea of changing education. In fact, most educators practically implore transforming education and pedagogy from Kindergarten through post-secondary and strongly believe we fail to meet the needs of students who have grown up in a digital world and are heading into different cultural and economic futures rich in ever-advancing technology and information (Project Tomorrow, 2010). Today's world absolutely requires collaborative critical thinkers, creative and courageous innovators, and true lifelong learners (Prensky, 2005; Tapscott, 1998; Robinson, 2009).

Common elements

When we sift the literature for common strategies to improve student engagement in learning, a rather clear pattern of practices has emerged and certain "best practices" were recommended and repeated. For example, Windham (2005) recommends that, to engage learners in learning, new educational curriculum and activity must include – "Interaction, Exploration, Relevancy, Multimedia and Instruction" (pp 5.7-5.9). Her themes echo throughout the literature. Various elements of Windham's (2005) list are shared by Willms (2003, 2007, 2009), Claxton (2007), Hay (2000), Barnes, Marateo, & Ferris (2007), Dunleavy & Milton (2009), and OECD (2003) to name a few. We have synthesized the following categories from our reading and will use these to elaborate further: (1) Interaction, (2) Exploration, (3) Relevancy, (4) Multimedia, (5) Instruction, and (6) Authentic assessment.

Interaction. Respectful relationships and interaction – both virtual and personal – are shown to improve student engagement. Students today are intensely social and interactive learners. Those surveyed by Willms, Friesen, and Milton (2009) stated that they want to interact with people both within and beyond the classroom and school environment. The results from *Imagine a School*, *Design For Learning*, and *What did you do in school today?* repeatedly show that:

> • Students want stronger relationships with teachers, with each other, and with their communities – locally, provincially, nationally and globally. They want their teachers to know them as people.
>
> • Students want their teachers to know how they learn. They want their teachers to take into account what they understand and what they misunderstand, and to use this knowledge as a starting place to guide their continued learning.
>
> • Students want their teachers to establish learning environments that build interdependent relationships and that promote and create a strong culture of learning (p. 36).

Today's learners want to connect and communicate constantly and want an environment to support these connections. Educators from "older" generations might see forms of communication such as computer chatting or texting "as the opposite and the antithesis of contact," but for the Net Gen it "allows interaction with a variety of people and material" (Windham, 2005, p. 5.7) Dunleavy & Milton (2009) asked students what their ideal school would look like and what learning environment increases engagement. Students listed three criteria that correlate to the concept of interaction: (1) Learn from and with each other and people

in their community, (2) Connect with experts and expertise, and (3) Have more opportunities for dialogue and conversation (p. 10).

These dialogues and conversations extend beyond the classroom. If learners engage Physics, they want to talk to engineers in the field. Windham (2005) suggests, "students should be given the opportunity to interact with faculty and researchers outside the confines of the curriculum and to develop meaningful relationships with them (p. 5.8). Facilitating such expanded relationships requires a shift from vertical to horizontal classrooms – no longer the sage on the stage, teachers are learning along side students, helping them actively construct their learning experiences and knowledge. As Friesen notes in Dunleavy & Milton (2009),

> Authentic intellectual engagement requires a deeper reciprocity in the teaching-learning relationship where students' engagement *begins* as they actively construct their learning in partnership with teachers, work toward deep conceptual understanding, and contribute their own ideas to building new knowledge or devising new practices in activities that are "worthy of their time and attention (Friesen, 2008, p. 8, as cited in Dunleavy & Milton, 2009, p. 14).

Such teaching contains more interaction, negotiation, and exploration among learners and teachers, who explore and discuss content together, often with teachers modeling learning as opposed to telling students what the answers, process, or outcomes should be (Claxton, 2007). Open, caring, respectful relationships between learners and teachers are essential to develop and support social and psychological engagement in learning, but also are part of the new curriculum itself, as described by Dunleavy & Milton (2009).

Effective learning experiences are also shaped by student-teacher relationships that support the development of young peoples' social and emotional competencies. As students progress through middle and secondary schools, they face increasing complexity. Students themselves consistently say that what most helped them thrive in spite of these challenges was the quality of relationships they developed with adults in their schools. When students have opportunities to connect with adults who approach these relationships with a spirit of caring, empathy, generosity, respect, reciprocity and a genuine desire to know students personally, they can make a unique contribution to young peoples' emerging adaptive capacity, self-sufficiency, resiliency, confidence, and knowledge of themselves as learners (Dunleavy & Milton, 2009, p. 15).

One might conclude that this "interaction" criteria falls under *Social Engagement*. But, the literature connects social engagement and intellectual engagement. To be engaged in learning, today's students need social interaction. Dunleavy & Milton (2009) list strategies for social engagement, but these same strategies emerge for other types of engagement:

> In the early development of the concept, measures of social engagement were considered a constructive way of identifying students who were at risk of disengagement and, ultimately, of dropping out. Since then, this dimension of student engagement has also provided schools with *direction* for adopting proactive dropout prevention strategies focused on improving school climate factors that tend to have the most influence in supporting high levels of engagement in the life of school. These include, for example:
>
> - An ethic of caring and supporting relationships.
> - Respect.
> - Fairness, trust and a strong disciplinary climate.

- Teachers' sense of shared responsibility and efficacy related to learning.
- A school-wide culture of "academic press" (Lee, Bryk, & Smith, 1993), or high expectations for academic success (Dunleavy & Milton, 2009, p. 8).

It is worth noting that students expect and respect challenging, rigorous, disciplined, positive, and safe learning environments. Willms, Friesen, and Milton (2009), in *Transforming Classrooms through Social, Academic and Intellectual Engagement,* suggest one factor of relationship building that stands above others: "the importance of a positive classroom disciplinary climate. Students who describe their classroom disciplinary climate as positive are one and a half times more likely to report high levels of interest, motivation and enjoyment in learning" (p. 35).

Exploration. Classroom practices reported to engage learners are predominantly inquiry-based, problem-based, and exploratory (Willms, Friesen, & Milton, 2009; Brown, 2000; Hay, 2000; Oblinger & Oblinger, 2005; Barnes et al., 2007). Our own longitudinal Alberta-based research (Parsons, McRae, & Taylor, 2006) about the efficacy of problem-based learning supports these findings. Today's learners ask for the opportunity to explore and to find solutions and answers for themselves (Windham, 2005):

> Just as we want to learn about the Web by clicking our own path through cyberspace, we want to learn about our subjects through exploration. It's not enough to accept the professor's word. We want to be challenged to reach our own conclusions and find our own results. The need to explore is implicit in our desire to learn (p. 5.8).

How important is it to help students engage the digital world? Crucial, say linguist James Paul Gee and educator Elisabeth Hayes, whose recent *Language and Learning in the Digital Age* suggests that digital media are reshaping language - especially the role of oral language. Gee and

Hayes note that new forms of digital media draw children increasingly toward video games, social media, and alternative ways of learning. Their insightful work explores how alternative methods of learning might create a paradigm shift for schools. Hay (2000) reports that "Net Geners want more hands-on, inquiry based approaches to learning and are less willing to simply absorb what is put before them" (as cited in Barnes, Marateo, & Ferris, 2007, p. 23).

> They want to turn the thing on, get in there, muck around, and see what works. Today's kids get on the Web and link, lurk, and watch how other people are doing things, then try it themselves. This tendency toward "action" brings us back into the same loop in which navigation, discovery, and judgment all come into play *in situ* (Brown, 2000, p. 6).

As Brown (2000) says, "Learning becomes situated in action; it becomes as much social as cognitive, it is concrete rather than abstract, and it becomes intertwined with judgment and exploration" (p. 6). If the environment in which learners explore is sterile and lacks context, there is a chance transference of knowledge will not occur beyond the classroom. Such exploration is also tied to learners' requests to move past classrooms: students often ask to take their research and learning into the larger community and into the fields they are studying. Seeing how "a thing works in real life" is more engaging than reading about it in class.

Relevancy. One common prerequisite for engaging learners is "relevancy." Today's learners ask that their learning apply to real-life scenarios whenever possible as opposed to being theoretical and text-based. Working with authentic problems or community issues engages students and builds a sense of purpose to the learning experience (Claxton, 2007; Dunleavy & Milton 2009; Willms, Friesen, & Milton, 2009). "The work students undertake also needs to be relevant, meaningful, and authentic – in other words, it needs to be worthy of their time and attention" (Willms, et al., 2009, p. 34). Students, themselves, clearly want their work to be

intellectually engaging and relevant to their lives.

Effective teaching is characterized by thoughtfully designing learning tasks with these features:

- The task requires and instills deep thinking.
- The task immerses students in disciplinary inquiry.
- The task is connected to the world outside the classroom.
- The task has intellectual rigor.
- The task involves substantive conversation (Willms, Friesen, & Milton, 2009, p. 34)

Ramaley & Zia's (2005) chapter in Oblinger & Oblinger's (2005) *Educating the Net Generation* speaks to the need to make learning contextual. They point to research-based recommendations produced by the Board on Children, Youth, and Families' 2004 National Research Council report focused on keeping young people in school, engaged, and motivated. Two key ideas emerged: (1) forming good connections between learners and the social contexts in which they learn and (2) making curriculum and instruction relevant to their experiences, cultures, and long-term goals.

Claxton (2007) further suggests that activities and curricula must have the following factors to engage learners: (1) Relevancy: the topic connects with students' interests and concerns; (2) Responsibility: students have genuine control over what, why, how, and when they organize their learning; and (3) Reality: solving problems or making progress genuinely matters to someone (p. 12).

Multimedia & Technology

When it is simply not possible to move past the classroom to speak with and learn from experts in the field, technology helps students interact globally with people and events.

Technology brings learners accessible and relevant subject matter and experts and is a tool for engaged learning. Both students and researchers issued a common call for new tools in the classroom toolbox, expanding beyond standard computer stations and overhead projectors to facilitate deeper research and learning and to build relationships among learners and experts (Brown, 2000; Parsons, McRae, & Taylor, 2006; Kvavik, Caruso, & Morgan, 2004; Project Tomorrow, 2010; Barnes, Marateo, & Ferris, 2004).

Barnes, Marateo, and Ferris (2007a) synthesized a list of multimedia tools from the literature; but, these represent only a few of the technological methods that can help students engage their learning, explore, and construct new knowledge. Their list includes WebQuests, blogs, wikis, YouTube, video documentaries, and a variety of other multimedia projects. Such examples show how students might incorporate technology into autonomous learning activities while ensuring time is devoted to information literacy and higher-order, critical thinking skills. Although Project Tomorrow's *Speak Up 2009* (2010) suggests that the value of some technologies is hotly debated by educators, students who use cell phones, IPhones™ and Blackberries ™ and other mobile devices for research, collaborative communication, or social-based learning activities have been shown to increase their engagement by as much as 78% (Project Tomorrow, 2010, p. 8).

Multimedia and technology (cameras, video, and video editing, projectors, SmartBoards, sound recording equipment, animation and gaming software, and the ubiquitous PowerPoint™) have proven helpful in engaging students in learning about subjects, in exploring ways to present their learning, and in helping students control their learning (Dunleavy & Milton, 2009; Barnes, Marateo, & Ferris, 2007; Project Tomorrow, 2010). Kvavik, Caruso, and Morgan (2004) state, "Students recognize a number of benefits of classroom IT. Included are convenience,

management of classroom activities, time savings, improved learning, better and more effective communications, and better presentation of their class assignments" (p. 12).

In a recent paper titled "Unleashing the Future: Educators "speak up" about the use of emerging technologies for learning" (2010), teachers report that technology increases factors of student engagement – including cognitive, affective, behavioral, academic, and social engagement. The reported outcomes of increased access to technology in classrooms increases aspects of student engagement, such as taking initiative and responsibility for learning, using resources wisely, time on task, and having interest and desire to pursue information and learn in and beyond classrooms.

> As a result of using technology in the classroom, students are more motivated to learn (51%), apply their knowledge to practical problems (30%), and take ownership of their learning (23%). Teachers also report that, by using technology, students are developing key 21st Century skills including creativity (39%), collaboration (30%) and skills in problem-solving and critical thinking (27%). Furthermore, the learning experience becomes more meaningful for the student as teachers have newfound time to differentiate instruction (31%) to a greater degree, and have more information to how their students are doing academically (29%) (Project Tomorrow, 2010, p. 2).

In *Celebrating School Improvement* (2006), Parsons, McRae, Taylor (2006) report that students in K-12 schools used technology to gather information, analyze information, and share information (pp 110-111). The positive outcomes included higher achievement and quality of work, and, "perhaps more important, student motivations and time spent on task were reported to have increased significantly with the integration of technology into Alberta's classrooms" (p. 112). A second element of "multimedia and technology" for improved learner engagement was

to create a "rich learning environment" that allowed cross-curricular, interactive, and exploratory learning.

> The term *rich learning environment* not only includes physical devices, such as experiment kits or computers, but also the teaching technique, the type of activity pupils engage in, and the method of assessment. Associating science and technology studies with a rich, flexible, computer-embedded learning environment may enable pupils to attain higher academic achievements and overcome their cognitive and affective difficulties (Barak, Waks, & Doppelt, 2000, as cited in Barak & Doppelt, 2002, p. 22).

In a province-wide evaluation of school projects that integrated technology into core curriculum, Parsons, McRae, and Taylor (2006) found that "Report after report further substantiated current research that ICT-based curricula and problem-based learning combine to engage students as never before in learning and working together" (p. 112). Students were engaged, staying after school and during lunch hours to work on projects together. Similar stories of engagement come from Barak and Doppelt's (2002) study of students given the opportunity to work with LEGO™ robotics technology. These otherwise disengaged and low-achieving students, when provided a "rich, modern, and flexible technological learning environment, … created authentic technological projects, using their own imagination and documented their own work in rich portfolios" (Barak & Doppelt, 2002, p. 28). They also developed a genuine passion for learning and a solid set of learning and research skills: "Findings all indicated improved pupil self-esteem and self confidence. Pupils changed their attitudes towards their everyday learning and their future intentions to continue studying" (Barak & Doppelt, 2002, p. 28).

Brown (2000) calls these rich learning environments *learning ecologies*. "An ecology is basically an open, complex, adaptive system comprising elements that are dynamic and

interdependent" (p. 14). He argues the need to develop "learning ecologies" in classrooms by having the right tools and environments for learning,

> (There is) an interesting shift that I believe is happening: a shift between using technology to support the individual to using technology to support relationships between individuals. With that shift, we will discover new tools and social protocols that help us help each other, which is the very essence of social learning. It is also the essence of lifelong learning a form of learning that learning ecologies could dramatically facilitate" (p. 17).

It is important to note that not everyone agrees that digital technology is the best option for cognitive and affective engagement in children. One study by OECD (2008) suggested that many researchers and educators believe harm can come to learners who are too entrenched in technology. OECD (2008) reports that negative consequences of technology in learning are frequently reported, but there is limited empirical research about the positives. However, our review suggests that research is beginning to show positive correlations between technology and student engagement.

> (This research) presents and discusses the main research findings in controversial areas such as the effects of technologies on i) cognitive skills development, ii) social values and lifestyles, and iii) educational performance. This section reveals how little is known and examines how empirical research has contributed more to highlighting the negative impacts of technology than to unveiling and documenting its positive sides. Accordingly, a plea for more empirical research as well as for more cumulative efforts is made (OECD, 2008, p. 2).

Engaging and Challenging Instruction

Two aspects seem to encourage engagement – engaging pedagogy and engaging curriculum. According to the research, we need to change how we teach as well as what we teach if we are to engage learners – moving from didactic to constructivist pedagogy. Constructivist instruction requires strong respectful relationships and safe learning environments, especially as teacher-student relationships shift from expert-disciple towards peer-based collaborative learning.

Several authors note that this shift might require an uncomfortable change in locus of control over process and, at times, content. Given the freedom and sense of safety to do so, "Students can find material that challenges the faculty member's worldview and expertise; they can uncover stories and research results that the faculty member has never heard about. It can be uncomfortable when the instructor no longer controls the subject matter the students will use" (Windham, 2005, p. 8.16).

> Affecting a deeper transformation to school and classroom practices calls upon all of us to begin looking at school improvement as a collaborative *knowledge-building activity* where teachers themselves are actively engaged in co-constructing ideas that contribute directly to school improvement and development" (Dunleavy & Milton, 2009, p. 18).

Meyer and Turner (2006) speak to emotion and motivation to learn in classrooms and talk about creating safe environments conducive to learning and "academic risk-taking" (p. 377). Claxton (2006) also discusses the need to make it safe to speak up, challenge, and engage in learning.

> Expanding the capacity to learn means creating a climate in which that feeling of enfranchisement and entitlement is systematically broadened and strengthened – not

> weakened, undermined or simply ignored. In such a climate, students' questions are welcomed, discussed and refined, so the disposition to question becomes more and more robust; more and more evident across different domains; and more and more sophisticated (Claxton, 2006, p. 7).

Creating an engaging learning environment includes ensuring students feel able and safe to challenge teachers as part of the learning process. It also means students will need to learn interpersonal skills to engage in dialogue respectfully and constructively, as well as learn the subject content. Students want more autonomy to engage in and design their own learning (Glenn, 2000; Tapscott, 1998; Hay, 2000; Carlson, 2005). They want to learn and utilize their learning preferences and styles and want support to do so. The research call to change our pedagogy is clear, but the ways we can change are still being developed.

Contrary to the suggestion that today's students are asking for a diluted or moderated curriculum, research shows that students prefer to be held to high expectations: they also desire quality, rigorous, and meaningful curriculum and high academic goals. Students' desires for instructional challenge were reported by a majority of authors reviewed, including Willms, Friesen, and Milton (2009), Dunleavy and Milton (2009), Oblinger and Oblinger (2005), Windham (2005), Parsons, McRae, and Taylor (2006), Barak and Doppelt (2002), Shernoff, Csikszentmihalyi, Schneider, and Shernoff (2003), and Barnes, Marateo, and Ferris (2007).

The research noted above suggests that students desire engagement. Perhaps here Csíkszentmihályi's seminal work *Flow: The Psychology of Optimal Experience* is worth noting more specifically when speaking to the potential of student engagement. Csíkszentmihályi theorizes that people are most happy in a state of *flow,* which he defines as complete absorption with the activity and situation in which they are engaged. Sometime students note they "are in a

zone." This *zone* – the flow state – is *intrinsic motivation* at its best, where people are so fully immersed in doing that they are totally engaged and fulfilled. During such times, concerns like time, food, and in the case of students behavior issues are typically forgotten. Teachers have reported to us that such *flow* states are possible when students are fully engaged.

The research also pushes for interdisciplinary curriculum – the "what" we teach. The new, "more engaging" curriculum reported in the research primarily calls for cross subject exploration and collaboration, often called "Century 21 Skills" in recent literature. Such curriculum is preferred by students. Students interviewed by Dunleavy and Milton (2009) stated that engaging learning includes considering teacher's ideas and having opportunities to "see how subjects are interconnected, learn from and with each other and other people in their community, and have more opportunities for dialogue and conversations" (p. 10). Unlike curriculum of the last 150 plus years, which focused on learning and mastery of individual "specialties" or "majors," the new curriculum is intentionally interdisciplinary.

Changes in curriculum referred to in the literature also include the addition of new "literacies." Expected outcomes of education are no longer limited to acceptable (according to standardized testing) levels of knowledge in core disciplines. New literacies and skills are required –critical thinking, interpersonal relationship skills, creativity, information, media and technology skills – all infused into core content as both process and outcome. For example, the call for rigorous instruction in "Information Navigation" (Brown, 2000) or "digital information literacy" (Oblinger & Oblinger, 2005; Windham, 2005; Barnes et al., 2007) shows up repeatedly in the research.

While they are frequent users of electronic tools, Net Geners typically lack information literacy skills, and their critical thinking skills are often weak (Oblinger & Oblinger

> (2005). They may be digital natives, but they do not necessarily understand how their use of technology affects their literacy or habits of learning. For educators, providing the technological bells and whistles needed to engage Net Geners may not be as effective or as critical as improving their information literacy and critical thinking skills (Barnes, Marateo, & Ferris, 2007a, p. 28).

Engagement does not mean core knowledge and traditional literacy (aka 3Rs) should be discarded; instead, students want to learn these in more engaging ways, while also learning how they learn. They desire quality instruction delivered in socially, emotionally, and intellectually engaging ways.

Assessment for Learning

Willms, Friesen, and Milton's (2009) research found that *five* effective teaching practices promise to increase engagement in learning – (1) creating thoughtful, intentional designs for learning; (2) making learning meaningful; (3) building relationships; (4) improving teaching practice in the presence of peer teachers; and (5) using assessment to improve learning and guide teaching (pp 33-37). Given the opportunity to "co-create assessment criteria with their teachers, … students figure out the criteria of powerful work, they are able to use the criteria to guide their own learning, both in school and beyond" (p. 35).

Assessment for learning (AFL) calls for teachers to use formative assessment practices to monitor student success and engage in regular sharing conversations with students about how they are learning. AFL is noted to increase student engagement and is more about "learning for further development" and less about "marking to standard expectations" or meeting externally dictated accountability measures. Standardized testing often leads teachers to teach to the test instead of to learner's needs, interests, and abilities (Armstrong, 2006) and removes

responsibility and accountability from the learner, a side effect that can disengage learners. Barrett (2005) provides "ten research-based principles of Assessment for Learning (AFL) to guide classroom practice:

- AFL should be part of effective planning of teaching and learning
- AFL should focus on how students learn
- AFL should be recognized as central to classroom practice
- AFL should be regarded as a key professional skill for teachers
- AFL should be sensitive and constructive because any assessment has an emotional impact
- AFL should take account of the importance of (and foster) learner motivation
- AFL should promote commitment to learning goals and a shared understanding of the criteria by which they are assessed
- AFL develops learners' capacity for self-assessment so that they can become reflective and self-managing
- AFL should recognize the full range of achievements of all learners
- Learners should receive constructive guidance about how to improve (as cited in Barrett, 2005, p. 17)

Barak and Doppelt (2002) and Barrett (2005) both recommend alternatives to standardized testing. Student portfolios were the most frequently suggested method for assessment for learning because they actively helped learners explore and articulate what they wanted to learn and how they would demonstrate they learned it.

The time is right to study the potential of electronic portfolios to engage students in active participation in assessing and managing their own learning. In 2005, the level of

> available technologies makes possible an international study…to support student learning, engagement and collaboration. We have the technology. We have the vision. We need to better understand what works, especially with adolescent learners and their teachers (Barrett, 2005, p. 23).

Summing up student engagement

Barnes, Marateo, and Ferris (2007a) cite Glenn (2000): "Net Geners need self directed learning opportunities, interactive environments, multiple forms of feedback, and assignment choices that use different resources to create personally meaningful learning experiences" (p. 2). Claxton (2007) summarizes his recommendations of strategies that promote learning engagement. He recommends the following eight ideas to successfully create "epistemic cultures" that support learning how to learn.

1) Language – speak "learnish" (talk about process of learning, nature of oneself as a learner, one's improvements and intentions as a learner.)
2) Activities – a potentiating milieu (learning is both attractive and challenging; activities and topics that stretch the learners)
3) Split-screen thinking – the warp and weft (keeping both content and process in mind; make sure students understand *how* they just learned some content; embed meta-cognition into lesson plans)
4) Wild topics – rich, real, responsible (problems or projects are real, relevant, and make a positive difference in some way – real life feedback and benefits for all)
5) Transparency and involvement – students as epistemic co-workers (students are made aware of what's going on, given significant input or control in assessing their own learning and learning styles)

6) Transfer thinking – looking for wider relevance and application (explicitly discussing where current learning could be useful: What else could we do with this? Where else would this be useful knowledge?)
7) Progression – stronger, broader, deeper into subjects and learning
8) Modeling – walking the learning talk (Claxton, 2006, pp. 9-14)

When Dunleavy & Milton (2009) discuss the requirements for intellectual engagement, they note how difficult it is to "pinpoint which classroom practices will be most effective in supporting it" (p. 13). However, they summarize the following list of common instructional "designs for learning that begin with the goal of intellectual engagement:"

1. Emphasize conceptual learning and opportunities for students to work with authentic ideas and problems, develop a deep understanding of ideas, sort through misconceptions, learn new ideas and create or improve upon ideas, see conceptual connections across disciplines.
2. Require high levels of student participation and provide time for in-depth work.
3. Incorporate authentic assessment as a strategy that helps students set goals and assess their own learning.
4. Use work that is relevant, interesting, and connects with students' aspirations; is rigorous and allows students to think as "professionals" and create professional" quality outcomes; is challenging and allows students to experience a sense of deep intellectual and emotional investment in learning; is built from diverse and improvable ideas; and is informed by the current state and growing knowledge bases of different subject disciplines.
5. Promote students' sense of ownership and responsibility for their own learning.

6. Invite students to be co-designers of their learning in classrooms; support student voice and autonomy.
7. Provide a high level of social support for learning and encourage students to take risks, ask questions, and make mistakes.
8. Foster collaboration and community building.
9. Engage students in becoming literate with technologies as social networking-knowledge building tools.
10. Connect students with opportunities to develop abilities in critical thinking, intellectual curiosity, reasoning, analyzing, problem solving, communicating, etc.
11. Bridge students' experience of learning in and outside of school by exposing them to digital technologies in knowledge building environments (Dunleavy & Milton, 2009, pp. 13-14).

Dunleavy, Milton, and Crawford (2010) sum up their research from the students' perspective:

> Students want to experience work that is meaningful, not easy: they want to work with ideas that matter, solve real problems, learn from each other, people in their communities, and experts in the subjects they are studying, engage in dialogue in their classes, and know that their learning contributes to making a difference in the world. They consistently demand to be respected (p. 1).

To summarize improving student engagement, the themes and ideas that surface most often in the literature are: embedded collaboration, integrated technology, inquiry-based learning, assessment for learning, and making learning interdisciplinary and relevant to real life. As Barak and Doppelt (2002, p. 22) note, "Imparting creative thinking … requires not only

changing the teaching methods and learning environment, but also adopting new assessment methods such as portfolio assessment, which is based on records of pupils' activities." Ramaley and Zia (2005, p. 8.15) add, "Significant changes in teaching and learning are possible, particularly when interactive technologies are involved.

The changes noted in our review promise to better engage student learners. Research suggests that successful, student-engaging classrooms combine these five aspects:

1. Learning that is relevant, real, and intentionally interdisciplinary – at times moving learning from the classroom into the community.
2. Technology-rich learning environments – not just computers, but all types of technology, including scientific equipment, multi-media resources, industrial technology, and diverse forms of portable communication technology (Project Tomorrow, 2010).
3. Positive, challenging, and open – sometimes called "transparent" learning climates – that encourage risk-taking and guide learners towards co-articulated high expectations. Students are involved in assessment for learning and of learning.
4. Collaboration among respectful "peer-to-peer" type relationships between students and teachers (horizontal organization model); Professional Learning Communities working together to plan, research, develop, share, and implement new research, strategies, and materials.
5. A culture of learning – teachers are learning *with* students. Language, activities and resources focus on learning and engagement first, and achievement second.

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