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Understanding and meeting the needs of the millennials in the classroom: A literature review

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Understanding and meeting the needs of the millennials in the classroom: A literature review

Abstract

Due to unique pressure to improve student engagement and academic achievement, integrating technology has become the focus of much analysis. This paper reviews thirty peer-reviewed journal articles, which discuss the effects of integrating technology into K- 12 classrooms. This review examines the traits of Millennial students, which social media technology have an impact on student achievement and engagement, and what problems might occur with this integration of the technologies. Final discussions indicate that various technology initiatives have great potential to engage students. However, further research is needed to determine if using certain social media technology will improve student academic achievement.

UNDERSTANDING AND MEETING THE NEEDS OF
THE MILLENNIALS IN THE CLASSROOM:
A LITERATURE REVIEW

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Amanda Alexander

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Abstract

Due to unique pressure to improve student engagement and academic achievement, integrating technology has become the focus of much analysis. This paper reviews thirty peer-reviewed journal articles, which discuss the effects of integrating technology into K-12 classrooms. This review examines the traits of Millennial students, which social media technology have an impact on student achievement and engagement, and what problems might occur with this integration of the technologies. Final discussions indicate that various technology initiatives have great potential to engage students. However, further research is needed to determine if using certain social media technology will improve student academic achievement.

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Introduction

In recent years, the use of technology has increased in the field of education. Educators are being pressured to change their teaching methods to meet the demands of today's students, also known as Millennials. Using such tools as social networking sites, one-to-one laptop initiatives, blogging, or video games is a relatively recent phenomenon as a classroom practice. Advocates of technology in the classroom believe that it can offer unique benefits to the millennial students.

There is much agreement that educators should identify generational differences and educational philosophies. For example, previous generations grew up with radio and television as their media source. Today's generation brings unique experiences to the classroom; these Millennials rely on technology to focus on "social networking, music, videos and games" (Berk, 2009, p. 4). Research provides evidence that the Millennial Generation has adapted to being overly stimulated by using multiple forms of technology simultaneously (Berk, 2009; Carlson, 2005). Students are becoming unmotivated and disengaged as a result of educators' use of traditional teaching strategies (Carlson, 2005).

According to the UCLA's Higher Education Research Institute, a 2008 student survey reported more than forty percent of students stated they were bored in classes that used lecture to present materials (Pryor, 2009). Mann and Robinson (2009) report that students found classes with group discussions and practical sessions more engaging than classes using lecture to present information. Additionally, the Millennial Generation is acquiring new skills previous generations did not. These skills revolve around technology. These skills should be fostered in the classroom as educators move away from traditional teaching strategies and focus on the positive characteristics of the Millennial Generation.

The Pew Research Center has engaged in significant research regarding the Millennial Generation and technology. According to a PEW Internet survey (2009), the Internet is largely populated by the Millennial Generation. This survey states the Millennial Generation is most likely to use the Internet for communicating with friends and family, read and write their own information, and use search engines and software for schoolwork. According to their research, this generation is still dominating in online activities, (e.g., social networking sites, online games, reading blogs, and participating in virtual worlds) compared to online activities of older generations (PEW Research, 2010).

This review is a summary of thirty peer-reviewed journal articles that examine characteristics of the Millennial Generation and their needs as students in the classroom. This describes attempts to identify characteristics of the generation, and the student and teaching strategies to meet the motivational needs necessary of the millennial student.

This review will attempt to answer the following questions:

What are the characteristics of the Millennial Generation?

What are the characteristics of the millennial student?

What teaching strategies meet the needs of the millennial student in today's K-12 classroom?

What tools, if any, have a positive impact on teaching strategies that meet the needs of the millennial student?

Methodology

The method for locating and identifying resources involved accessing the University of Northern Iowa and University of Nebraska at Omaha libraries for online databases such as *EBSCOhost*, *Education Full Text (EBSCO)*, *ERIC U.S. Dept. of Education*, and *JSTOR*. Information was selected from peer-reviewed journals and books. In addition, Google Scholar was heavily used for numerous online databases to find related scholarly articles. Resources found within identified journal articles and books were used to continue research.

While searching the online databases, several keyword descriptors were used. These search terms included the following: *baby boom*, *generation x*, *millennial*, *generation*, *generational theory*, *social learning theory*, *blogging*, *1:1 initiatives*, *21st century classroom*, *21st century tools*, *digital learning environments*, *digital natives*, *digital immigrants*, *online learning*, *traditional learning*, *video games*, *distance learning*, *technology*, and *technology integration*.

The above mentioned search engines were limited to search peer-reviewed journals only. The time period was limited to 1995-2012 to get the most current and relevant articles. The evaluation of resources was based on the published year from 1995 to the most current year, the relevance to the topic, and the credibility and reliability of the research methods used.

Analysis and Discussion

The Millennial Generation

It is important to examine what is known about the Millennial Generation before considering teaching strategies in the classroom. According to research, the Millennial Generation is the largest generation since the Baby Boomers. Barnes, Marateo and Ferris (2007) state that the Millennial Generation represented nearly seven percent of the population in 2003 with nearly 49.5 million students enrolled in school, according to the 2003 Enrollment Management Report. For the purpose of this literature review, the Millennial Generation birth dates are between 1982 and 2003 (Howe & Strauss, 2000). Research identifies this generation as diverse, independent, empowered, and technologically savvy (Sweeney, 2006). According to Marc Prensky (2001a), today's generation thinks and processes information fundamentally differently. Richard Sweeney (2006), University Librarian for the New Jersey Institute of Technology, summarized what research indicated as identifiers for the Millennial Generation as learners. He states, "They are a huge generation of impatient, experiential learners, digital natives, multitaskers, and gamers who love the flat, networked world and expect nomadic connectivity, 24x7" (p. 1).

Neil Howe and William Strauss identified characteristics of the upcoming Millennial Generation in the publication, *Millennials Rising: The Next Great Generation*. This publication identified seven traits of the Millennials. These seven characteristics describe Millennials as *special*, as they are 1) the "healthiest, largest and most cared-for generation in American history" (Strauss & Howe, 2000, p. 76); 2) *protected and sheltered*, as they are the most sheltered generation in American history after

experiencing events such as school shootings and 9/11; 3) most *confident* and *optimistic* group of individuals; 4) *high achieving*, as they make long-range plans and think carefully about what is important for success; 5) *skilled in collaborative effort*, as they develop strong team instincts and peer bonds; 6) *most pressured from parents*, as they believe competition makes the world better and success is the natural outcome; and 7) the Millennial generation is *conventional*, as they embrace the familiar (Strauss & Howe, 2003; as cited in Gerber & Wilson, 2008).

Learner Characteristics of the Millennial Generation

Howe and Strauss (2003) identified additional traits of the Millennial Generation as learners. These characteristics described the learner's fascination with technology, a need for group activity and extracurricular activities, and their focus on grades (Howe & Strauss, 2003). These characteristics demand a new learning paradigm (Skiba & Barton, 2006).

These additional learner characteristics identified by Howe and Strauss (2000) includes "digital literacy, experiential and engaging learning, interactivity and collaboration, and immediacy and connectivity" (Skiba & Barton, 2006). The Millennial Generation is comfortable with technology. According to Oblinger and Oblinger (2005), what the technology allows them to do is more important than the technology. Millennials do not think "in terms of technology; they think in terms of the activity the technology enables" (Oblinger & Oblinger, 2005, p. 2.10). The Millennial student defines technology as "what is new" (Roberts, 2005). For example, instant messaging (IMing) is not a new technology for these students. Millennial students tend to treat this more as an action, than a technology (Roberts, 2005). Technology has become so prevalent in the

daily life of a millennial student, our “new technologies” are not new to them at all. An understanding of the millennial definition of technology is important as it provides insight into their expectations of technology to support learning (Oblinger & Oblinger, 2005; Roberts, 2005). The use of technology in today's classroom that enables convenience, customization, and collaboration is greatly received by millennial students (Oblinger & Oblinger, 2005; Roberts, 2005).

Being digitally literate means Millennials are both information and multimedia literate (Skiba & Barton, 2006). Oblinger and Oblinger (2005) describes a student in a lecture that is confused by the teacher's lecture and presentation who proceeds to use his or her wireless laptop to seek assistance from other students via text messaging or IMing. The student continues to search the Internet to research information that provides a better explanation of the content and shares with his or her classmates. According to Skiba and Barton (2006), Millennial students are not engaged with information from a textbook, “but by connecting to the Internet” (n.p).

Howe and Strauss (2003) argue that the point of understanding the Millennial Generation is to understand that these students are not like previous generations. Several researchers have identified many of the millennial characteristics provided by Howe and Strauss (2003 as an excellent guide for educators to avoid significant pitfalls (as cited in Wilson & Gerber, 2008).

Teaching Strategies That Meet the Needs of the Millennial Generation

Members of the Millennial Generation occupy today's classroom as students. Their defining characteristics of being driven, high achieving, and technology-savvy should be used to influence teaching strategies to achieve learning with this generation.

Strategies used ten years ago are not efficient in today's classrooms. Educators need a new understanding of these students to address learning skills those earlier generations did not need or have. Monaco and Martin (2007) state understanding these students will help educators develop learning skills didactically and clinically.

Wilson and Gerber (2008) combine several of the Howe and Strauss (2000) generational characteristics, and Sweeney's (2006) learner characteristics with their own classroom experiences. In their study, Mike Wilson and Leslie Gerber provide teaching strategies to meet the needs of millennial students. The purpose of their study is to provide suggestions for educators' strategies to meet the needs of the millennial students. They believe that today's millennial student will "shortly be a colleague in the teaching profession" (p. 40).

Wilson and Gerber (2008) indicate the suggested teaching strategies are derived from classroom experiences and theoretical literature. They recommend four pedagogical "adaptations" to engage Millennials: 1) enhanced clarity of both course structure and assignments; 2) student participation in course design; 3) pre-planned measures to reduce stress; and 4) rigorous attention to the ethics of learning (Wilson & Gerber, 2008). These are suggestions for educators, who will mold teaching strategies to meet the need of the millennial student. Educators should understand these characteristics as they try and connect with their millennial students. According to generational traits, these students strive to learn if teaching strategies fit their needs (Howe & Strauss, 2000).

Clarity and Structure.

Wilson and Gerber (2008) suggest that millennial students do not function with a loosely organized curriculum. They suggest educators provide students with clarity by creating well-structured classroom syllabi (Wilson & Gerber, 2008). The authors indicate two of Howe and Strauss's seven characteristics correlate with this suggestion. Howe and Strauss (2000) indicated the Millennial Generation has been sheltered, but not just through protective parental attitudes. The sheltered characteristic indicates the millennial students are accustomed to a structured environment, and they expect this in the classroom as well. Providing a structured syllabus and classroom environment emphasizes the Millennials' goals for achievement. Wilson and Gerber (2008) indicate millennial students expect objective-driven learning environments. This environment allows students order and clarity, offering the most successful learning environment needed by the millennial student. The Millennial student cannot function to the best of his or her ability with lots of improvisation or "open-ended spontaneity" (Moore, Moore & Fowler, 2005).

Student Participation.

According to Wilson and Gerber (2008), allowing collaboration in the classroom capitalizes on several characteristics defined by Howe and Strauss (2000). They suggest allowing collaboration among students by "inviting student input into the design of assignment types, grading systems or rubrics, and teamwork activities" (Wilson & Gerber, 2008, p. 33). This suggestion invites students to invest their own meaning into their learning. As students are invited to collaborate with peers and teachers, multiple millennial characteristics are addressed; for example, their sense of being special and

high achieving. Allowing millennial students to provide input highlights their unique strengths and talents from which the classroom can benefit (Oblinger & Oblinger, 2005; Strauss & Howe, 2000; Wilson & Gerber, 2008). Literature has noted that Millennials are skilled at teaming up as they grew up from various lessons, camps, fieldtrips, or internships (Wilson & Gerber, 2008). The authors surveyed 71 millennial students, ages 13-18. This survey indicated that 51 students preferred working with teams rather than alone; that is 72% of the surveyed group. The majority of students surveyed chose small groups of two or three rather than large groups of five or more people (Wilson & Gerber, 2008). Millennials engage in the use of different social software tools in their daily lives. These tools provide various opportunities to collaborate with others in different scenarios outside of the classroom environment. Meredith Farkas (2007) states social software allows students to communicate and collaborate while creating or engaging with an online community. These communities allow people to learn from the behavior and knowledge of others (Farkas, 2007). Several software have engaged the Millennial Generation from a very young age as they create blogs, instant message with peers, or chat through online three dimensional virtual worlds. Different social software provides an outlet for millennial students. Oblinger and Oblinger (2005) identify that Millennials play games in groups, and online communities form around games. According to the authors, these communities encourage collaboration among the individuals and “provide a context for peer-to-peer teaching and an emergence of learning communities” (Oblinger & Oblinger, 2005, p. 22).

Stress Reduction.

Howe and Strauss (2000) indicate Millennial students are pressured as they are “pushed hard to study, avoid personal risks, and take full advantage of the collective opportunities adults are offering them, Millennials feel a ‘trophy kid’ pressure to excel” (p. 44). Wilson and Gerber (2008) indicate there are strategies to help address the stress on the millennial student. Earlier generations focused on the mastery of information in the classroom. Wilson and Gerber suggest educators provide rigorous opportunities where content and “coverage” expectations favor a deeper exploration of materials. This theory requires teachers to “teach less” content but engage students in deeper discussions of the material. Another suggestion for educators to meet the needs of the stressed millennial students is to prepare a course heavily during the beginning of the semester and “end the class two or three weeks early to allow for extensive but relaxed pre-exam review” (Wilson & Gerber, 2008, p. 36). This reduction of workload addresses the Millennials’ perception of being stressed or pressured. Their high-achieving attitude makes Millennials’ fearful of failing, according to Howe and Strauss (2000). This indicates students are very concerned with their grades and desire to have grades easily accessible. Wilson and Gerber (2008) suggest an online grading system that “is available for students both easily and privately” (p. 36).

Intentional Learner.

Alma Clayton-Pedersen and Nancy O’Neill (2008) state that students use technology in today’s educational setting to primarily search the Internet or use word-processing software. Clayton-Pederson and O’Neill (2008) suggest educators use technology to help students disseminate information or expedite problem solving as well. These authors indicate there are specific technologies used in the classroom, but are not

surprised with students' low expectations of the use of technology in classroom curriculum. Low expectations from students and minimal use of technology by educators limit creativity, options, and engagement for students in the classroom (Clayton-Pederson & O'Neill, 2008). Literature states that a students' personal experience with technology is often broad and should be integrated into curriculum (Clayton-Pederson & O'Neill, 2008).

The Association of American Colleges and Universities (AAC&U) presented a multiyear, multilayered initiative called *Greater Expectations* since 2000 (Clayton-Pederson & O'Neill, 2008). The results of this initiative recommended more emphasis should be "placed on educating students to be purposeful and self-directed in multiple ways – on becoming intentional learners" (Clayton-Pederson & O'Neill, 2005, n.p.). To develop an intentional learner, Clayton-Pederson and O'Neill argue students must be engaged in the construction of knowledge. The *Greater Expectations* panel found that curriculum that provides numerous paths would enable students to become intentional learners. Members of the *Greater Expectations* panel suggest millennial students will excel when communicating well in diverse settings and groups (Clayton-Pederson & O'Neill, 2005). For Millennials to become intentional learners, they need to make a connection from the information presented in the classroom and "draw on a wide range of knowledge" (Oblinger & Oblinger, 2005, Clayton-Pederson & O'Neill, 2005). To align this goal of creating intentional learners, attention must be paid to how technology can be used for this purpose.

The use of technology allows millennial students an "enriched learning experience that goes beyond a traditional learning experience" (Clayton-Pederson & O'Neill, 2008). Technology allows students to integrate various tools they use in their

daily lives into the classroom such as blogs, music, video clips. The authors also state the use of multimedia and group work allows students to match their talents and interest in technology to pursue assignments that appeal to the way the student learns best (Clayton-Pederson & O'Neill, 2008). The use of technology provides more flexibility in presenting information to students, providing feedback to students, and addressing different learning styles of the millennial students.

Clayton-Pederson and O'Neill (2008) suggest educators integrate multiple learning objectives into their curriculum. These objectives will address the Millennials' desire for group work, flexibility, and options in the classroom. The authors state that technology will not make this happen alone, but will facilitate these strategies to meet the various needs of the Millennial student. Educators that begin to understand Millennials have a familiarity with technology, and engage them with these technological tools will enable students to become lifelong learners (Oblinger & Oblinger, 2005).

Tools Used to Meet the Needs of the Millennial Student

According to Oblinger and Oblinger (2005), the "talk, text, test" approach does not interest the Millennial Generation. Millennials prefer to work in teams, collaborate, and use technology in the classroom (Skiba & Barton, 2006). Millennial students do best when they are able to engage in their learning and actively construct their knowledge (Oblinger & Oblinger, 2005). Moore, Moore and Fowler indicate there is a positive correlation between student interaction and retention in the classroom (2005). Millennials embrace collaborative learning in the classroom. Skiba and Barton (2006) suggest using interactive devices such as web-based tools and chat rooms to engage students in a common workspace.

At the University of Colorado at Denver, students interact with each other in an online environment that allows them to collaborate, store documents, schedule meetings online, and co-edit documents while chatting in chat rooms (Skiba & Barton, 2006). Students are able to collaborate and share while “requiring the learner to be active participants in the learning process” (Skiba & Barton, 2006, n.p). Several articles indicated that millennial learners are always connected (Skiba & Barton, 2006). The need for connectivity and communication is important for the millennial learners as they are known to be technologically savvy (Kvavik, 2005; Skiba & Barton, 2006).

Expectation of technology in the classroom from the Millennial Student.

According to Jason Frand (2000), Millennial students expect technology to be used within the classroom. A study by EDUCAUSE Center for Applied Research (ECAR) addressed four questions: *what kinds of information technologies do students use, and what are their preferences; what levels of skill are they using these technologies; how does this contribute to their educational experiences, and, what value does the use of technologies add in terms of learning gains* (Kvavik, 2005). This study shows responses of 4,374 students from various campuses across the United States who replied to a 2004 survey. According to the survey, 93.4% of the students surveyed owned a computer and 82% of students owned cell phones. All the students in this study had access to the Internet (Kvavik, 2005). According to the author, students indicated they used technology for educational purposes (Kvavik, 2005). The survey reported 99.5% of students used computers for writing documents and e-mails, 97.2% used computers for surfing the Internet for recreation, and 96.4% used computers for classroom activities (Kvavik, 2005). This study indicated the highest computer use was in support of academic activities

(Kvavik, 2005). This study also indicated that millennial students prefer classes that use technology (Kvavik, 2005). 30% of students surveyed stated they preferred taking courses that use extensive levels of technology (ECAR, 2000; Kvavik, 2005).

Many authors recommend that technology improves learning (Berk, 2008; Kvavik, 2005; Oblinger & Oblinger, 2006; Roberts, 2005; Prensky, 2001a; Prensky, 2001b). Certain software, such as Microsoft PowerPoint, is considered to be at a low level of technology by students. This tool is merely used to present text, graphics, or images to enhance a lecture (Clayton-Pederson & O'Neill, 2005). According to Berk (2009), Microsoft PowerPoint is the duller method of presenting classroom material and one of the most important factors contributing to boredom. Educators are suggested to use a variety of tools to present information that provides students an opportunity to interact and actively participate during class (Berk, 2009). However, Berk (2009) states that by itself, technology alone cannot improve students' learning experience. It is important for educators to understand the purpose of these tools to support learning in the classroom (Kvavik, 2005).

Course Management Systems.

Kvavik (2005) suggests the use of course management systems in the classroom. 83% of students from the ECAR survey reported having used a course management system. Students were asked if this tool improved learning, improved classroom management (convenience), or improved both (Moore, Moore & Fowler, 2005). According to the survey, the features that contributed most to their learning were the interactive features (ECAR, 2005). These interactive features included track grades, online quizzes, online reading, and sample online exams. According to the author, course

management systems can enhance learning for the Millennial student by “enabling instructors to convey information more effectively, helping instructors meet the needs of students with varied learning styles, as well as enriching the interactions students have with each other and with their instructors” (Oblinger & Oblinger, 2005, p.9). The use of course management systems in the classroom continues to be a work in progress, says Kvavik (2005).

Kvavik concluded that the results of this survey are significant. Results were expected to indicate students would demand greater use of technology in the classroom, but they did not. According to Kvavik (2005), the millennial student had moderate preference for technology. Millennial students are expected to have good technology skills to support learning, but they found many necessary skills had to be learned in school (Kvavik, 2005). According to the survey, “several students had not gained the necessary skills to use technology in support of academic work outside the classroom” (Kvavik, 2005, p. 99). However, the author states there are favorable and good practices from students to “know that the potential of technology in the classroom is enormous” (Kvavik, 2005, p. 94).

Multiple Media.

Ronald Berk, a Professor of Biostatistics and Measurements at The Johns Hopkins University, synthesized research based on ten national and international surveys of millennials to gain a better understanding of Millennial learning characteristics (Berk, 2009). According to his metaanalysis of these studies, students should be given the opportunity to learn using their strengths (Berk, 2009). According to these surveys of 7,705 freshman college students in the United States, the following statistics were found:

97% owned a computer, 94% owned a cell phone, 99% use the Internet for homework or research, 89% begin their research with search engines, 57% are media creators, 35% own a blog and 57% read blogs, 75% have a Facebook account, and 92% multitask while Instant Messaging (IMing) (Berk, 2009). According to Berk (2009), this information has a direct effect on how students learn. Berk (2009) asserts millennial students spend most of their lives surrounded by technology, and it affects every aspect of their life.

According to these findings, educators should incorporate technology meaningfully into lectures that use music, video clips, video games, blogs, wikis, databases, and search engines (Lenhart & Madden, 2007; Berk, 2009; Wilson & Gerber, 2008). Tim O'Reilly considers these tools "Web 2.0" tools. According to O'Reilly (2005) these tools are second nature to Millennials. John Seeley Brown (2002) argues the use of these Web 2.0 technologies provides new supports to learning. As Marzano (2006) states, these tools create "learner-centered" or "student-centered" atmosphere. Berk (2009) states the role of the traditional teacher in front of the classroom has shifted "to group facilitator, orchestrator of collaborative knowledge creation" (Brown, 2008; as cited by Berk, 2009). The Millennial student desires a "learner-centered" classroom blended with the latest technology (Berk, 2009). Skiba and Barton (2006) state educators should adopt techniques to engage students in the classroom by using three forms of communication: one-on-one, such as e-mail; one-to-many, for example, message boards; and, many-to-many, such as chatrooms, wikis, or blogs. These tools provide students the opportunity to learn using their learning styles and strengths (Skiba & Barton, 2006).

Berk (2009) also encourages educators to allow students to *multitask*. He states that Millennials can listen, type, play a game, and send e-mail simultaneously. A survey

from the Kaiser Family Foundation (2005) found that Millennials report using multiple technologies simultaneously. Technology encourages millennial students to multitask as they browse the web, chat with friends, and complete homework for class (McMahon, 2005). Duffy (2008) provides an opportunity for multitasking in the classroom by giving students a video to watch via YouTube along with specific responsibilities to accomplish while watching. The YouTube video is introduced with questions presented to the class, followed by a list of items to look for as the YouTube video plays, or an activity to make the content more clear. According to Duffy (2008) this allows educators an opportunity to shorten their lectures and provide more interactive opportunities for students to engage and collaborate in their learning (Berk, 2008). Creating a team atmosphere for the millennial student is important, as they prefer working in teams. The use of groups in the classroom gives students the chance to succeed in the classroom. This allows the already *pressured to succeed* Millennial students a more relaxed atmosphere in which they can succeed (Berk, 2009).

Web 2.0 Tools.

According to Tapscott (1998), Millennial students like to incorporate their experiences in their learning and prefer to learn by doing. Research has provided evidence that blogs, a Web 2.0 technology, has become a useful tool for millennial students. Many educators consider blogging to be an influential tool used in the classroom to meet the need of the experiential learners. A blog, or weblog, is an easily editable website that is a collection of entries organized in reverse chronological order (Sawmiller, 2010). Blogging is a tool that allows students to interact and engage in classroom material (Skiba & Barton, 2006). Millennial students are able to reflect on

their learning; this immediately engages them in their learning process (Skiba & Barton, 2006).

According to a PEW Internet and American Life Project study on teen content creators, 21 million teens, ages 12-17, use the Internet. Of the 21 million teenagers, 57% of teens, or about 12 million, create content for the Internet (Lenhart & Madden, 2007). This survey indicates that one in five teens have created a blog (Lenhart & Madden, 2007). That represents 19% of the 21 million teens using the Internet. Lenhart and Madden (2007) also indicate that 38% of all online teens, or 8 million teens, read blogs on their own time. These findings were based on callback telephone surveys of all youth 12-17 years of age and a parent or guardian (Lenhart & Madden, 2007). According to several research studies, schools need to prepare students for the “new literacies by integrating technology into the curriculum, and blogs are an easy way to begin” (Zawilinski, 2009, p. 653). According to Will Richardson, potential benefits of using blogs are as follows: promote critical and analytical thinking; promote creative, intuitive and associational thinking; increase access to quality information; provide a combination of solitary and social interaction (Richardson, 2006; as cited by Duffy, 2008). Educators can use blogs to support reflections on readings and discussions, provide a collaborative space for students, or an online gallery for work (Duffy, 2008).

According to Carnivale and Young (2006), many schools are trying to connect the Millennial Generation with traditional teaching strategies of an instructor-focused classroom, where information is presented with lecture, by purchasing laptops for students. The purchase of laptops creates a one-to-one environment that benefits the Millennials and the use of technology to meet their needs. One-to-one computing

initiatives provide an environment where students use ubiquitous computing devices in order to learn anytime and anywhere.

Case Studies Using Technology to Meet the Needs of the Millennial Student

According to *The New Lab for Teaching and Learning's Dalton Council Task Force Report in Laptop Technology* (2001), Beaufort County in South Carolina launched a program using laptops for instruction for sixth graders in 1994. By 2000, the program expanded to all middle school students (Gulek & Demirtas, 2001). Similarly, the state of Maine developed a laptop program with one middle school, and later expanded to 241 middle schools the following year. By 2003, the state increased the total of laptops to 36,000 for 33,000 students and 3,000 teachers (Gulek & Demirtas, 2005). In 2005, the average writing score on the Maine Educational Assessment was 3.44 points higher than in 2000 (Silvernail & Gritter, 2007). According to this research, students not using a laptop had the lowest scores, while students using laptops for the writing assessment had the highest scores (Gulek & Demirtas, 2005; Silvernail & Gritter, 2007). The report states the implementation of one-to-one laptops for students aided students in becoming better writers in general, not just while using laptops (Silvernail & Gritter, 2007).

In 1996, Microsoft and Toshiba provided laptops and software to schools across the United States launching the *Anytime Anywhere Learning Project*. By the year 2000, “800 schools with 1,25,000 students and teachers participated in the laptop program” (Gulek & Demirtas, 2005, p.6). Microsoft's laptop immersion program evaluated student and teacher outcomes. Gulek and Demirtas (2005) examined the Harvest Park Middle School's one-to-one immersion program and student achievement. The purpose of this study was to identify the success of student academic achievement with the

implementation of a ubiquitous computing environment. The authors identified specific research questions which include whether or not the 1:1 initiative programs have an impact on students' grade point average, end-of-course grades, students' essay writing skills, and/or students' standardized test scores. According to the study, Harvest Park Middle School, located in Pleasanton Unified School District in Pleasanton, California, is home to a diverse population and a high-income community. Gulek and Demirtas (2005) identify the middle school this way: "as a school experiencing rapid growth over a short period of time, the challenge of Harvest Park was to maintain the same high level of academic excellence, while building an infrastructure that would meet the demands of its student population" (p. 7).

For this study, all students were eligible to participate. Parents purchased the laptops used by students or rented a loaner laptop if purchasing was not affordable. According to the authors, laptops were used on a daily basis during the school year and the most common applications in the classroom included essay writing and online grading, researching information on the Internet, and developing PowerPoint presentations for projects (Gulek & Demirtas, 2005).

The results of the study indicated that students in the laptop immersion program at Harvest Park Middle School attained higher GPAs than non-participating students: sixth grade students attained a 3.50 grade point average versus the 3.13 grade point average of a non-laptop student, according to data from the 2003-2004 school year (Gulek & Demirtas, 2005). As for end-of-course grades, results indicated a notably higher percentage of laptop students received "A" grades. Results of the district-wide writing assessment indicated a higher number of 1:1 students scored proficient compared to their

district-wide results. Finally, results from the standardized tests for Harvest Park Middle School indicated a higher percentage of students enrolled in the one-to-one laptop program met or exceeded state standards compared to the non-laptop students (Gulek & Demirtas, 2005).

The analysis of data was conducted in a three-layered approach (Gulek & Demirtas, 2005). The initial analysis examined if there was a notable difference between laptop and non-laptop students. The outcome of the data resulted in further analyses using inferential statistics to determine if there were differences between laptop and non-laptop students prior to enrolling in the laptop immersion program. According to the authors, the inferential statistics yielded no significant result prior to the program enrollment, but the analyses provided significant results after enrolling in the laptop immersion program. Finally, the authors applied model-based longitudinal analysis to data (Gulek & Demirtas, 2005).

Additional analyses were conducted for students in different stages in the immersion program. The outcomes were reported at the end of their first, second, and third years of enrollment in the program. These students were followed as cohorts that were based on the number of years enrolled in the program (Gulek & Demirtas, 2005). The evaluation of student outcomes concluded: laptop students spend more time engaging in collaborative work than non-laptop students; laptop students participate in more project-based instruction; laptops lead to more student writing and to writing of higher quality; and, laptop students become collaborators, direct their own learning, report a greater reliance on active learning strategies, readily engage in problem solving

and critical thinking, demonstrate more flexible and deeper uses of technology, and spend more time doing homework on computers (Gulek & Demirtas, 2005).

Weston and Bain (2010) studied the Maine Learning and Technology Initiative (MLTI). They identified this initiative as the nation's "highest profile 1:1 effort". It was launched in 2001 with a \$120 million price tag (Weston & Bain, 2010). The research states 17,000 seventh and eighth graders and their teachers in 240 schools received laptops within the first full implementation school year in 2002-2003 (Weston & Bain, 2010). As for the outcome of MLTI, Silvernail and Gritter (2005) stated, "Overall performance on the 8th grade Maine Education Assessments has not changed appreciably since the inception of the MLTI" (as cited by Weston & Bain, 2010, p. 6). More evidence of a minimal impact of the 1:1 initiative was found in teacher surveys. Weston and Bain (2010) stated, "Less than twenty percent of the teachers strongly agreed that having a laptop computer has helped in classroom practices" (p. 6).

Another study of the Maine Learning and Technology Initiative by Dawn Lane (2003) provided evidence of an impact on student engagement. Lane (2003) created a multiple year evaluation and various surveys. This evaluation focused on how students were using the MLTI and its impact on student engagement. All seventh and eighth graders were allowed to participate in the surveys. The research states 8007 responses were received, that is 46% of all seventh and eighth grade students (Lane, 2003). The final samples of responses were reduced to 7584 responses after 423 duplicate responses were removed. 44% of all seventh and eighth grade student responses were used in this study (Lane, 2003).

The initial research question, *how are students using the MLTI*, is addressed by stating only 10% of students reported using computers in school at least five hours a week before receiving their laptops. Since the initiative, the number of students using computers in school jumped to 61%. Lane identifies the impact of MLTI on students and their learning. Using a web-based student survey, students rated their level of agreement with nine different statements pertaining to the impact of the laptops on learning. According to this survey, 88% of students wanted to use their laptops more often, 89% of students believed laptops make schoolwork more fun and 91% of students preferred using the laptops as tools for doing school work (Lane, 2010). Lane states that this information is important because “for many students the less interested they are in school, the less likely they are to learn” (Lane, 2010, p. 13). This data provides some positive effects on student interest; information showing increased academic achievement needs further research.

Another high profile initiative is the Texas Technology Immersion Pilot, or TIP, a state-sponsored one-to-one computing program in twenty-two schools costing \$14.5 million (as cited by Weston & Bain, 2010). This program used a four-year evaluation comparing immersion classrooms with control classrooms (). The author’s findings were reported using the *Theoretical Framework for Technology Immersion* (Shapley, Sheehan, Sturges, Caranikas-Walker, Huntsberger & Maloney, 2006). According to the framework, the experimental design allowed “an estimate of the effects of the intervention, which is the difference between the experimental and control groups” (Shapley et. al., 2006, p. 23). The Texas Assessment of Knowledge and Skills (TAKS) measured student achievement. This standardized test reported that the immersion of technology has no significant effect

on reading achievement for seventh or eighth graders in the pilot schools (Shapley et. al., 2006). The test did identify a significant effect on TAKS mathematic scores for seventh and eighth graders. Despite the results from the TAKS assessment, Shapley and peers stated there was no evidence linking “technology immersion with student self-directed learning or their general satisfaction with schoolwork” (p.7).

According to research, a great deal of focus has been dedicated to increasing standardized test scores (Rockman, 2004). However, there is disconnect between standardized assessments and assessing benefits of one-to-one laptop initiatives. Current standardized assessments may not be equipped to measure 21st century skills, and skills that are connected with one-to-one learning (Rockman, 2004). According to Rockman (2004), when schools choose to integrate laptops into the classroom, they should create their own assessment to measure student achievement.

Conclusions and Recommendations

This review attempted to identify characteristics of the Millennial Generation students, discover teaching strategies that can be used in today's K-12 classroom to meet the needs of the Millennial Generation and what tools, if any, have a positive impact on teaching strategies that meet the needs of Millennials. After reviewing thirty peer-reviewed journal articles that identify traits and characteristics of millennial students and teaching strategies for the K-12 classroom, numerous technologies seem to possess significant potential to impact learning for a millennial student. The use of technology in the classroom appears to present a new and effective approach of teaching for educators.

The seven generational characteristics, provided by Strauss and Howe (2000) and listed in this literature review, indicated that millennial students are special, protected, confident, optimistic, skilled in collaborative effort, pressured and conventional (Strauss & Howe, 2000). The characteristics have demonstrated that Millennials are very different from previous generations. Millennial learning and communication preferences should become major factors in planning for teachers. These characteristics are important as they impact the learning styles of the millennial student (Oblinger & Oblinger, 2005).

Howe and Strauss continue to identify learning styles that includes preferring to work in teams, liking structure and order, and being visually literate (Howe & Strauss, 2003). Student characteristics are changing because Millennials have the tools to organize, analyze, and find information instantly. The classroom atmosphere should shift from teacher-led to student-centered instruction. There are many publications insisting educators use technology to facilitate student learning. The use of technology in today's classroom addresses the various needs of the millennial student. Technology has become

necessary for current life for the millennial student. According to case study reports, students indicated the more they use technology within their classes, the more they report an increase of interest in their schoolwork (Lane, 2003). There are expectations of the millennial student that include the use of technology in an educational setting. As students have high expectations for technology, it is no surprise that students have high expectations of technology to support their learning (Roberts, 2005). As the traits of the millennial students are identified, teaching strategies to meet the needs should be discussed as well.

The strategies suggested in this review were suggestions from various authors based upon their experiences with millennial students. Research does not provide concrete evidence of teaching strategies to enhance academic achievement for the millennial student, but results indicated higher levels of engagement from students as they incorporated technology into the classroom (Wilson & Gerber, 2008). Educators should use technology to exploit the technological skills that students use outside the classroom. Authors provided strategies to engage the millennial student by adapting technology in various curricular areas. However, Oblinger and Oblinger (2005) state that it is assumed Millennials prefer technology. The research presented from Oblinger and Oblinger showed that students desire interactive instruction. The use of technology for the sake of using technology proves useless in the classroom. Kvavik (2005) reports what technology students have, how they use it, and the benefits of using it. This study from the EDUCAUSE Center for Applied Research indicates improvement is needed to appropriately adapt technology in the classrooms to meet the needs of today's students.

Results from the AAC&U *Greater Expectations* study provided strategies to meet the needs of millennial learners and how technology can be integrated in the classroom.

According to Barnes, Marateo and Ferris (2007), the current educational system does not teach students how to learn. New technologies allow educators many tools to teach millennial students what to learn and how to learn (Day, 2007). Millennials are characterized as being overly confident in their ability to use technology such as search engines and the Internet. This characteristic offers teachers an opportunity to focus on the students' strengths of technological strength and address their weakness of analyzing information found on the Internet. Social media technologies, such as blogs, allow students and educators to build learning networks based on common interests and needs. Evidence provided in these articles suggests educators who use Web 2.0 tools promote student engagements and academic achievement. Luehmann and Tinelli (2008) claimed and provided evidence that blogging supports student learning through collaborative action through posts and comments. These tools coincide with generational traits and learning characteristics of the Millennials.

There is minimal research providing evidence indicating the implementation of a laptop immersion program will increase academic achievement (Weston & Bain, 2010). However, research provides evidence of increased student engagement with the laptop immersion programs. Alicia Moore (2003) states technology must be a part of the classroom environment to meet the needs of the millennial students. It is not the technology that engages the learner, but the activity used for learning that engages the millennial student. Educating students is the primary goal of educators; how we reach

that goal depends on the understanding we have of the students (Oblinger & Oblinger, 2005).

Implementing a laptop initiative will not be successful to engage the students or encourage academic success if technology is used just for the sake of it. Laptop immersion programs must have a purpose to enhance the learning and show a connection to classroom content (Moore, 2003). According to Gregory Roberts (2008), professor at the University of Pittsburg-Johnstown, “the definition of technology for millennial students is not confined to computers or the Internet” (p.22). The Millennial student identifies technology as a tool that meets the need for access to information and communication (Roberts, 2008). The use of technology, whatever digital device, assists millennial students meet many of their needs.

Educators, administrators, and society should identify technology as a tool for the classroom. The published research on integrating technology in the classroom is emerging with significant information. This information recognizes how technology meets the needs of the millennial student as an engagement and academic tool. There is already much potential in the integration of educational reforms, for example the one-to-one laptop initiatives or social networking in the classroom. Educators should identify technology as a tool that enhances a life long learning experience. More research is needed to identify a link between technologies and student academic achievement. However, research has provided proof technology can be used to enhance engagement in the classroom and meet various needs of the millennial student. Various teaching strategies have been recommended in several books and articles (Brown, 2005; Kvavik, 2005; Moore, Moore & Fowler, 2005; Oblinger & Oblinger, 2005; Wilson & Gerber,

2005). These authors indicated the strategies were based on personal experience and surveys suggesting student preferences to meet their learning styles in the classroom. More concrete research is needed to indicate the success of various teaching strategies adapting technology and any academic success among students.

In closing, recognizing the traits of the Millennial Generation should not be the only driving force behind an educational reform. However, understanding the needs of students within the classroom should be a priority. The world continues to change daily, and society adapts to it; a classroom should not be any different. Bringing attention to the change of students in the world of education engages both the educator and student in a conversation that promises change. Current publications provide different interpretations and insights of classroom trends and characteristics of students. It is important to acknowledge the literature identifying millennial characteristics and teaching strategies to continue the conversation of generational differences, and the need to improve the learning environment for the student and teacher.

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