

Texting During Homework: The Millennial Generation's Ability to Thrive Despite Constant Technological Interruptions

Jessica A. Gladfelter¹ & Denise Friedman²

Abstract

Texting is a popular mode of communication for the millennial generation, today's college students. Studies have shown that the majority of students text during class and that these interruptions negatively affect grades. Yet, students continue to believe they can multi-task -- effectively balancing texting and coursework. Unfortunately, outside the classroom, students report even less regulation with their texting -- checking and responding continuously, often for fear of being disconnected from those around them. Students who engage in self-regulatory strategies in the face of cell phone distractions have been found to better sustain attention and use effective behaviors to enhance cognitive learning in the classroom. In the current study, we examined whether these behaviors held outside a classroom environment by texting participants during a homework task. After controlling for self-regulatory skills and GPA, we found those who texted actually outperformed those who did not on cognitive skills (i.e., a reading quiz and essay), with the opposite effect found for grammar.

Keywords: millennials, texting, self-regulation, homework, learning

1.1 Introduction

Educators constantly adapt their teaching techniques and styles to enhance learning in the classroom (Randi & Corno, 2005). Adapting teaching styles to the millennial generation, who make up most of higher education's population today, means professors need to understand millennials educational habits and how those habits are influenced by a rich technological environment.

¹Roanoke College, Department of Psychology, 221 College Lane, Salem VA 24153

²PhD, Department of Psychology, 221 College Lane, Salem, VA 24153.

Email: friedman@roanoke.edu, Phone: 540-375-2476

Millennials place great value on work life balance (Smith, 2010) and use texting as a primary medium for social communication (Harrison & Gilmore, 2012). Therefore, it is critical to specifically examine how texting effects the academic performance of today's college students both in and out of the classroom. While this has been examined in the classroom (e.g., Ellis, Daniels & Jauregui, 2010), no known work to date has examined the impact outside the classroom. The current study explored whether texting had an impact on learning in the less structured homework environment.

1.1.2 The Millennial Generation

Today's college students are a part of the millennial generation, born between 1982 and 2002, and will be a part of higher education through at least 2020 (Ricketts, 2009). Characteristics commonly attributed to the millennial generation include: being raised in a sheltered environment, acting as team-players, exhibiting conventional behaviors, displaying a confident attitude, seeking to be achievers, showing feelings of entitlement, and feeling pressured (Ricketts, 2009; Turner & Thompson, 2014). In addition to these characteristics, millennials value work-life balance and college students continuously strive to achieve that balance between their academic and social activities (Smith, 2010; Blain, 2008; Hershatter & Epstein, 2010).

Millennials are a generation whose uniqueness and defining characteristics have in part been shaped by the presence of technology from birth (Ricketts, 2009), causing them to be labelled as digital natives and referred to as logged on and tuned out (Demetria, 2013). This generation is characterized as proficient not only in technology itself but also at multi-tasking and task-switching between technology and other tasks (Hartman & McCambridge, 2011). Given these perceptions, it is critical in understanding the millennial generation to examine how technology has effected them.

Millennials are expected to be tech-savvy (Emanuel, 2013) yet are often ridiculed for being absorbed with their phones (Godwin-Jones, 2005). Keeping in touch with friends and texting capability are among the top three reasons individuals choose to purchase a cell phone (Nielsen, 2010). It seems millennials use texting frequently for social communication, which would be expected given that developmentally they are theorized to prioritize intimate relationships (Erikson, 1968; Arnett, 2007).

Indeed, about two-thirds of text messages sent are to friends and romantic partners (Harrison & Gilmore, 2012). Therefore, what is seen as absorption with the phone may actually be the millennials' attempt to foster the life portion of the work-life balance.

Daily technological interactions for college students involve the cell phone. Millennial college students sent on average 1,630 text messages per month in 2010 (Nielsen, 2010). That number grew to 3,200 text messages per month in 2011 (Marketing Staff, 2011). Understandably, this frequent use of the cell phone leads to interruptions of daily activities, including learning, with 90% of students admittedly texting during class (Ali, Papakie & McDevitt, 2012). Clearly, educators need to understand the use of, attachment to, and overall impact of technology, especially the cell phone, on the academic performance of their students.

1.1.3 Texting and Academic Performance

As texting can make it particularly difficult to multi-task due to the increase in cognitive load (Rosen, Lim, Carrier & Cheever, 2011), it does not come as a surprise that texting during class has been found to harm academic performance (Ellis, Daniels & Jauregui, 2010). Past research has shown participants texting at a high frequency during class scored significantly worse on lecture material than those texting at a low frequency or not texting at all (Rosen, Lim, Carrier & Cheever, 2011). Furthermore, grade point average has been negatively correlated with the frequency of overall texting habits (Junco & Cotton, 2012).

Despite admission of this negative effect on their academic life, students continue to text during class for fear of missing out socially (Boudrye, Schwabe, Friedman & Galluch, 2011), a fear of being disconnected from those around them (Jones, 2014). Additionally, the millennial generation is expected to multi-task (Hartman & McCambridge, 2011) perhaps perpetuating the attempts to text during class. Because texting during class is so prevalent (Ali, Papakie & McDevitt, 2012), it is reasonable to infer texting also interrupts academic tasks performed outside of the classroom. The current study sought to examine texting habits outside the classroom as these behaviors have not received attention in the research thus far. Specifically, the current study focused on a reading and writing task, both commonly used in academic homework situations.

1.1.4 Homework Tasks and Texting

It is common in the educational environment to require reading and writing outside class to reinforce, apply, or introduce concepts. The writing process is formed by three components that are continuously repeated: planning, text production, and reviewing (Galbraith, Ford, Walker & Ford, 2005). These processes require significant concentration and heavily tax the brain due to working memory load (Vanderberg & Swanson, 2007). Given many collegiate tasks require a combination of both reading and writing, it is noteworthy that combining both of these tasks further taxes working memory (Vanderberg & Swanson, 2007). Ransdell, Levy and Kellogg (2002) examined working memory when the writer was distracted by a secondary task, finding that writing fluency was negatively affected. Specifically, participants who had to remember a concurrent load of information while writing, saw their writing fluency, quality, and sentence length decrease. Texting requires reading, writing and remembering aspects of the ongoing social conversation (i.e., working memory) which clearly increases cognitive load further supporting the idea that texting makes multi-tasking difficult (Rosen, Lim, Carrier & Cheever, 2011).

1.1.5 Multi-tasking vs. Task-switching

In order to fully understand how texting effects academic work outside the classroom, an understanding of the nature of the interruption as well as an examination of the attributes which may help students compensate for the interruptions is necessary. When millennial students allow interruption of homework to engage in texting conversations, students are task-switching rather than multi-tasking (i.e., performing multiple tasks at once) which students are attempting when they text in the classroom. Task-switching, moving back and forth between two separate tasks, has been shown to harm performance similar to multi-tasking (Strobach, Liepelt, Schubert, & Kiesel, 2012). However, students may possess tools, such as self-regulation, that could diminish the effect of task-switching on academic performance.

1.1.6 Self-regulation and Academic Performance

Research has shown self-regulation is positively related to higher levels of academic achievement (Rong & Lifang, 2003). Self-regulation encompasses a broad set of techniques including but not limited to: the establishment of goals, thinking during, before and after reading, and self-reinforcement and self-monitoring techniques that can be grouped into internal (thinking to one's self) and external (manipulation of one's environment) categories (Mason, Meadan-Kaplansky, Hedin & Taft, 2013). In the classroom, research has shown that self-regulators text less in class and have more sustained attention (Wei, Wang & Klausner, 2012). It follows that students with better self-regulatory strategies would make wise decisions about if, when, and how to text during homework tasks outside the classroom as well. Self-regulation was therefore controlled for in the current study. Similarly GPA, an accepted reflection of academic success, was also controlled for.

1.1.7 Study Purpose and Goals

The current study sought to examine texting during a home-work task, where there is less structure and supervision than in the classroom and where response rate to texts may be higher. Due to previous findings, self-regulation and GPA were controlled for while examining the effect of texting on learning during homework. The goal, therefore, was to understand how out of class texting behaviors influence learning.

1.2 Method

1.2.1 Participants

42 traditionally aged college students ($M= 19.14$ years old, $SD=1.00$) from a southeast liberal arts college participated in the study. Participants were predominantly female ($n=27$), Caucasian ($n=32$) and underclassmen ($n=30$). The average GPA for participants was 3.14 ($SD=.474$). Due to incomplete survey responses by some participants, only 24 were included in analyses.

1.2.2 Procedure

IRB approval was obtained. After providing informed consent, participants were allotted 30 minutes to read two articles and respond to an essay prompt.

Participants were either interrupted ($n= 17$) or not ($n= 7$) during the reading and writing tasks. Participants submitted the articles, with any markings, and their essay. Then, participants completed a reading comprehension quiz and demographic questionnaire.

1.2.3 Materials and Measures

1.2.3.1 Articles(Huffington Post, 2013; Kawakami, Furukawa, Katahira & Okanoya, 2013). Two articles examining perceived and felt emotions in relation to music were provided for the participants to read. Participants were asked to read both articles and use what they read when answering the essay prompt.

1.2.3.2 Essay assignment and prompt.A one paragraph essay prompt was provided,instructing the participants to apply the concepts they read about in the articles and create a novel example using the presented concepts.Essays length was specified as 1-3 pages.On average, participants wrote 1.527 pages ($SD = .082$.)

1.2.3.3 Scoring Rubric.Essays were scored on 6 components: focus, reasoning, evidence, organization, mechanics and page length.All of the components were rated from 1 (below basic) to 4 (advanced), with 2 equaling basic competence in that area and 3 equaling proficiency. Essay scoreswere weighted based on the assignment goals.The content portion of the essay was weighted as 10% for focus, 15% for reasoning, and 25% for evidence while the writing quality portion of the essay was weighted as 15% for organization, 30% for mechanics, and 5% for page length.

1.2.3.4 Reading comprehension quiz.A twelve question (8 multiple choice and 4 fill-in-the-blank) comprehension quiz was given to participants. The average score across conditions was 8.675 ($SD = .288$.)

1.2.3.5 Self-regulation scale(Pintrich & De Groot, 1990). A ten item, 4-point agreement Likert scale,was used to assess self-regulation, with higher scores representing greater self-regulation. Participants' average score was 29.152 ($SD = 4.535$.)

1.2.3.6 Demographics questionnaire. Participants were asked to provide their self-reported college GPA, age, gender, ethnicity, and class status.

1.3 Results

An ANCOVA was conducted to examine the effect of texting on reading comprehension, essay content, and essay quality scores. Accounting for GPA [$F(1,20) = .259, p = .616$] and self-regulation [$F(1,20) = 1.685, p = .209, \eta^2 = .078$], a significant difference was found between reading comprehension scores for those who did and did not text, [$F(1,20) = 4.767, p = .041, \eta^2 = .192$]. Participants who did not text during the academic task scored significantly lower on the reading comprehension test ($M = 8.286, SD = 1.380$) than participants who texted ($M = 9.235, SD = 1.251$), see Figure 1.

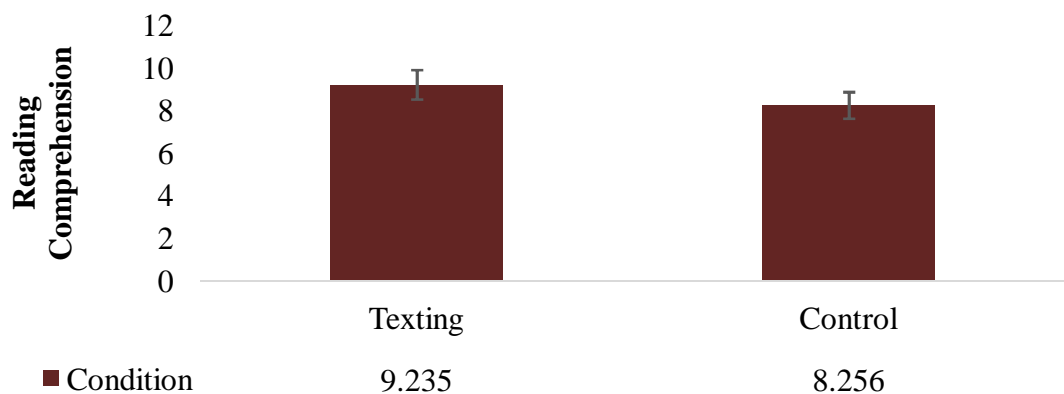


Figure 1: The Effect of Texting when Accounting for Self-Regulation and GPA on Reading Comprehension

Another ANCOVA was conducted to examine the effect of texting on essay writing content. Controlling for GPA [$F(1,20) = .04, p = .844$] and self-regulation [$F(1,20) = .058, p = .812$], a significant difference was found between the writing content scores of those who did and did not text, $F(1,20) = 4.623, p = .0441, \eta^2 = .188$. Those who texted ($M = 1.718, SD = .090$) performed better on the content portion of the essay than those who did not ($M = 1.336, SD = .145$), see Figure 2.

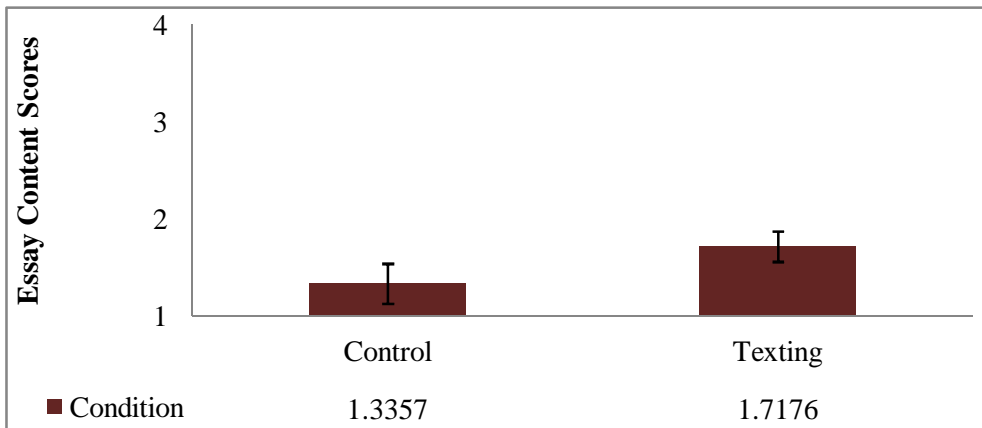


Figure 2: The Effect of Texting, Accounting for Self-Regulation and GPA, on the Weighted Essay Content Score

A final ANCOVA was conducted to examine the effect of texting on writing quality. After controlling for GPA [$F(1,20) = 4.922, p = .038, \eta^2 = .197$] and self-regulation [$F(1,20) = 6.678, p = .018, \eta^2 = .25$], a significant difference was found for writing quality scores between those who texted and those who did not, $F(1,20) = 5.962, p = .024, \eta^2 = .230$. Those who texted ($M = 1.609, SD = .330$) displayed lower quality of writing than those who did not text ($M = 1.914, SD = .123$), see Figure 3.

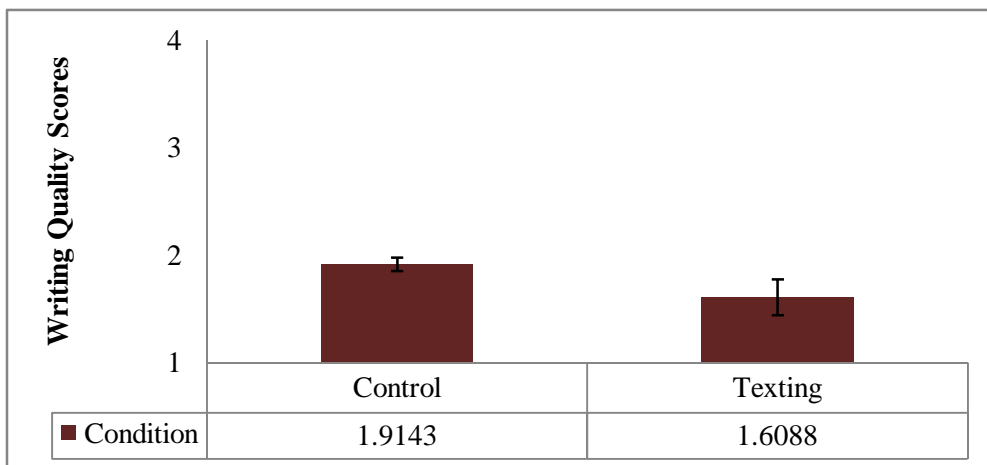


Figure 3. The Effect of Texting, Accounting for Self-Regulation and GPA, on the Weighted Writing Quality Score

1.4 Discussion

Contrary to past work (Ellis et al., 2009; Fox, et al., 2009), we did not find the same negative impact of texting, at least outside the classroom. In fact, participants who texted during the task outperformed participants who did not text on comprehension and essay content. Finding a learning advantage under high cognitive load with a set time (30 minutes) to complete the task was unexpected. This is especially true as students were in a less structured environment with less pressure to avoid texting. The time limit, paired with the decreased structured and increased expectation to be available for texting (by friends), may have contributed to the lower scores on writing quality, especially as proofing is often done at the end of a writing task and none of the students in the texting condition finished before the time limit.

As self-regulation scores were above the midpoint of the scale for participants, on average, it may be the case that students who make it to college have learned effective studying strategies. We anticipate self-regulating strategies prompted students who received text messages during the homework task to gain additional exposure to the material through re-reading portions of the articles after receiving texting interruptions. Recalling where they left off, re-reading the previous section or sentences to gain context, and continuing, consistent with the definition of self-regulation as thinking during, before, and after reading (Mason, Meadan-Kaplansky, Hedin & Taft, 2013), likely gave texters an advantage over students who were not interrupted and were probably less likely to engage in these strategies. Perhaps the text message interruption triggered the use of the self-regulation strategies and resulted in higher content scores on the reading comprehension quiz and content portion of the essay.

Additionally, because many students study while using technology (Rosen, Carrier & Cheever, 2013), they are likely to be adept at this form of task-switching. Therefore, those students who were interrupted and forced into a task switching situation likely benefited from experience, as negative effects of task-switching diminish with practice (Strobach, Liepelt, Schubert, & Kiesel, 2012). Millennials may be skilled at switching back and forth between texting and doing out of class work, as the environment is less-regulated. This skill may explain our conflicting findings with the research on decreased academic performance when students use the cell phone in the classroom (Ellis, Daniels & Jauregui, 2010).

The only task that non-texters out performed texters in was writing quality. It is possible that texters' mechanics were influenced by texting lingo (Carr, 2012) as they attempted to switch back and forth between social correspondence with a peer and an academic writing. An alternate explanation may be that due to a 30 minute time limit, texters did not have as much time to look over their work as non-texters because task-switching took up additional time.

1.4.1 Conclusions and Implications

Despite students receiving lower grades due to texting in class, millennials' continuous attempts to balance classwork and texting, is consistent with their self-labelling as multi-taskers(Worley, 2011). These behaviors may persist, in part, because millennials are succeeding academically while texting outside of the classroom and harbor the false belief that these skills will transfer over. Successfully texting while performing tasks outside the classroom may give students the false confidence to text in the classroom. It is, therefore, important for educators and students to note that while texting during a homework task, the task pauses when students respond to a text message, creating a task-switching scenario. However, in the classroom the professor continues to lecture despite student texting behaviors creating a true multi-tasking situation, likely accounting for the differences in academic success when texting in and out of the classroom. Discussing these findings with students when covering cell phone policies might be useful.

When considering what allows students to be able to task-switch, going back and forth between texting and homework, self-regulation may have the answer. Those who implement self-regulation alter methods and tools used to self-regulate as their environment changes (Winne, 1997). This adaptability may allow self-regulators to thrive academically despite interruptions from the technological environment they live in. It may be the ability to adapt can help handle the interruptions. If self-regulation does play an important part in allowing students to succeed at task-switching, then it becomes critical for educators to help grow and facilitate these regulatory skills.

1.4.2 Limitations and Future Directions

First year freshmen were excluded from our study due to the lack of a college GPA. Future studies should continue to explore self-regulation and GPA as well as other factors that may contribute to a texter's academic success outside the classroom.

1.5 References

- Ali, I.A., Papakie, R.M. & McDevitt, T. Dealing with the distractions of cell phone misuse/use in the classroom-a case example. *Competition Forum*, 10(2). 220-230.
- Arnett, J.J. (2007). Emerging Adulthood: what is it, and what is it good for? *Child Development Perspectives*, 1(2), 68-73.
- Blain, A. (2008). The millennial tidal wave: Five elements that will change the workplace of tomorrow. *Journal of the Quality Assurance Institute*, 22(2), 11-13.
- Demetria, G. (2013, February 17). Kids Are Logged On-and Tuned Out. *Patriot-News*, The (Harrisburg, PA).
- Ellis, Y., Daniels, B., & Jauregui, A. (2010). The effect of multitasking on the grade performance of business students. *Research In Higher Education Journal*, 81-10.
- Emanuel, J. e. (2013). Digital Native Librarians, Technology Skills, and Their Relationship with Technology. *Information Technology & Libraries*, 32(3), 20-33.
- Erikson, E.H. (1968). Identify youth and crisis. *Behavioral Science*, 14(2) 154-159.
- Fox, B.A., Rosen, J. & Crawford, M. (2009). Distractions, distractions: does instant messaging affect college students' performance on a concurrent reading comprehension task? *CyberPsychology & Behavior*, 12(1). 51-53.
- Godwin-Jones, R. (2005). Emerging technologies messages, gaming peer-to-peer sharing: language learning strategies & tools for the millennial generation. *Language Learning & Technology*, 1(9), 17-21
- Hartman, J., & McCambridge, J. (2011). Optimizing Millennials' Communication Styles. *Business Communication Quarterly*, 74, 22-44.
- Harrison, M.A. & Gilmore, A.L. (2012). U txt WHEN? College students' social contexts of text messaging. *The Social Science Journal*, 49, 513-518.
- Hershatter, A., & Epstein, M. (2010). Millennials and the world of work: An organization and management perspective. *Journal of Business & Psychology*, 25(2), 211-223.
- Jones, T. (2014). The Elon journal of undergraduate research in communications. *The Elon Journal of Undergraduate Research in Communications*, 1(5), 74-81,
- Junco, R. & Cotton R.S. (2012). No A 4 U: the relationship between multitasking and academic performance. *Computers and Education*, 58(1), 505-514.
- Marketingcharts staff. (2011). 18-24-yr-olds send 3K texts per month. *Marketing Charts*. Retrieved from <http://www.marketingcharts.com/wp/direct/18-24-yr-olds-send-3k-texts-per-month-19310/>
- Mason, L.H., Meadan-Kaplansky, H., Hedin, L. & Taft Raol (2013). Self-regulating informational text reading comprehension: Perceptions of low-achieving students. *Exceptionality*, 21(2), 69-86
- Nielsen. (2010). Newswire. U.S. teen mobile report calling yesterday, texting today, using appstomorrow. Retrieved from http://blog.nielsen.com/nielsenwire/online_mobile/u-s-teen-mobile-report-calling-yesterday-texting-today-using-apps-tomorrow/
- Ransdell, S, Levy, C.M. & Kellogg, R.T. (2002). The structure of writing processes as revealed by secondary task demands. *Educational Studies in Language and Literature*, 2, 141-163.

- Randi, J. & Corno, L. (2005). Teaching and learner variation. *Pedagogy---Learning for Teaching*, 47-69.
- Rickes, P. C. (2009). Make Way for Millennials! How Today's Students' are Shaping Higher Education Space. *Planning For Higher Education*, 37(2), 7-17.
- Rosen, L.D., Lim, A.F., Carrier, M. & Cheever, N.A. (2011). An empirical examination of the educational impact of text message-induced task switching in the classroom: Educational implications and strategies to enhance learning.
- Rosen, L.D., Carrier, L.M. & Cheever, A.N. (2013). Facebook and texting made me do it: media-induced task-switching while studying. *Computers in Human Behavior*, 3(29), 948-958.
- Schwabe, L., Boudrye, J., Adkins, D., & Galluch, P. (2011, October). Smartphone usage in college students: Implications and impact. Presentation at Mid-Atlantic Regional Conference for Undergraduate Studies in Sweet Briar, Virginia. Smith, K. T. (2010).
- Strobach, T., Liepelt, R., Schubert, T., & Kiesel, A. (2012). Task switching: effects of practice on switch and mixing costs. *Psychological Research*, 76(1), 74-83. doi:10.1007/s00426-011-0323-x
- Turner, p., & Thompson, e. (2014). College retention initiatives meeting The needs of millennial freshman students. *College Student journal*, 48(1), 94-104.
- Vanderberg, R. & Swanson, H.L. (2007). Which components of working memory are important in the writing process? *Reading & Writing*, 20, 721-752.
- Wei, F., Wang, Y.K. & Klausner, M. (2012). Rethinking college students' self-regulation and sustained attention: does text megating during class influence cognitive learning? *Communication Education*, 3(61), 185-204.
- Winne, P.H. (1997). Experimenting to bootstrap self-regulated learning. *Journal of Educational Psychology*, 89(3) 397-410
- Work-Life Balance Perspectives of Marketing Professionals in Generation Y. *Services Marketing Quarterly*, 31(4), 434-447. doi:10.1080/15332969.2010.510724
- Worley, K. (2011). Educating college students of the Net generation. *Adult Learning*, 22(3), 31-39.