

Running Head: ONLINE LEARNING

Learning Online: Unintended Consequences for Engagement?

Amber D. Dumford

Angie L. Miller

Indiana University

### Abstract

A rapidly increasing number of colleges and universities are looking for ways to deliver course content online. This paper investigates the effects of taking courses through an online medium on students' engagement using data from the 2015 administration of the National Survey of Student Engagement (NSSE). A series of 10 OLS regression analyses, controlling for certain student and institutional characteristics, suggested several significant effects of taking online courses for first-year students as well as seniors. Students taking more courses using an online medium showed higher use of learning strategies and quantitative reasoning yet lower collaborative learning, student-faculty interactions, effective teaching practices, discussions with diverse others, and quality of interactions. The change in these engagement indicators based on the percentage of classes taken online reveals that the online environment might encourage certain types of engagement but not others.

*Keywords:* online education, higher education, student engagement, learning outcomes

### Learning Online: Unintended Consequences for Engagement?

A rapidly increasing number of colleges and universities are looking for ways to deliver course content online. Online technology (email, course management systems, discussion boards, video conferences, social media, etc.) can offer efficient and convenient ways to achieve learning goals for distance education students (Chen, Lambert, & Guidry, 2010; Junco, Elavsky, & Heiberger, 2013; Junco, Heiberger, & Loken, 2010; Parsad & Lewis, 2008). As technology swiftly develops and more students pursue the distance learning route for a variety of reasons, it is important to further develop assessment and evaluation techniques for the “virtual university” (Stallings, 2002). However, assessment of online learning programs should also take into account some of the unique aspects of this type of learning environment.

Online learning has several characteristics that have can an impact on faculty implementation and the subsequent student experience. Restauri, King, and Nelson (2001) cite the importance of considering the logistical component of online learning, suggesting that improperly functioning technology can hinder learning and engagement if students and instructors must devote time and resources to simple content access. Furthermore, Shuey (2002) indicates that it can be difficult for instructors to adapt certain activities (such as performance assessments, continuous assessment, and proctored tests) to the online format without losing content knowledge or interaction between classmates and/or instructors. More recently the importance of incorporating social media into the classroom is becoming apparent (Evans, 2014; Junco, Elavsky, & Heiberger, 2013; Junco, Heiberger, & Loken, 2010; Tess, 2013). Another consideration in the evaluation of online learning programs is that distance education students often have different background characteristics in terms of gender, age, academic discipline, and prior education, which contributes not only to their preference for an online course format but

also to their success in any academic setting (Richardson, Morgan, & Woodley, 1999).

Investigations of differences between online and face-to-face course formats also need to explore whether differences in outcomes should be attributed to the online medium itself or to differences in student-level characteristics (Wojciechowski & Palmer, 2005).

Since student engagement, defined as student involvement in educationally purposeful activities (Kuh, 2001), has been shown in many studies to be the strongest predictor of students' learning and personal development (Astin, 1993; Pace, 1980; Pascarella & Terenzini, 2005), understanding how the online environment affects engagement should inform the implementation of online programs. There are many elements that contribute to student engagement, both inside and outside of the classroom (Kuh, 2001). Academic behaviors, including the use of learning strategies, quantitative reasoning, higher-order learning, and reflective and integrative learning can increase content knowledge as well as overall cognitive processing and are all linked to various aspects of achievement and success (Ormrod, 2011; Pascarella & Terenzini, 2005). Interactions with peers through collaborative learning and discussions with diverse others are also important elements of student engagement (Cabrera, Crissman, Bernal, Nora, Terenzini, & Pascarella, 2002), along with student-faculty interactions and effective teaching practices utilized by faculty (Kuh & Hu, 2001a). Additionally, there are environmental features that contribute to student engagement, such as the quality of interactions with students, faculty, and other types of staff, as well as an overall perception of a supportive environment (Baird, 2005). While numerous researchers have explored the impact of the widespread adaptation of digital technologies on students' educational attainment and learning outcomes (Braten & Streamso, 2006; Kuh & Hu, 2001b; Robinson & Hullinger, 2008; Zhou &

Zhang, 2008), relatively little is known about how these alternate learning experiences and practices impact student engagement.

A few studies have suggested that technology can have positive effects on student engagement (Chen, Lambert, & Guidry, 2010; Hu & Kuh, 2001; Junco, Elavsky, & Heiberger, 2013; Nelson Laird & Kuh, 2005; Robinson & Hullinger, 2008) and time spent in co-curricular activities (Junco, 2012). For example, one study showed that using asynchronous technology tools promoted reflection, which leads to higher order thinking (Robinson & Hullinger, 2008). Another study suggested that online courses increase the need for students to work collaboratively (Thurmond & Wambach, 2004). Given these previous findings, the current study investigates the engagement of students who access their learning content through an online medium at varying levels, exploring patterns of engagement for online learners and those in face-to-face settings through the percentage of classes in which a student is enrolled online. While research has also found differences in the educational effectiveness of online courses by discipline (Dominguez & Ridley, 2001), little research has compared the differences in engagement levels for online and traditional classroom environments. Therefore, this research will address gaps in the literature through the examination of students in online and face-to-face settings across several different aspects of student engagement. Through its design, it will also address the fact that many higher education students are taking a mixture of online and traditional classroom courses (Moore & Kearsley, 2011), and explore how the degree of online course exposure contributes to student engagement, while controlling for those elements previously suggested to differ as well – student characteristics, institutional characteristics, and discipline (Wojciechowski & Palmer, 2005).

## Methods

### Participants

The National Survey of Student Engagement (NSSE) annually collects information from first-year and senior students about the nature and quality of the programs and activities in which they are engaged while at their higher education institutions. Updated in 2013, much of the terminology on the survey was adapted or developed with the goal of being inclusive of both online and traditional learning environments. For instance, the words “in the classroom” were changed to “in your courses” to avoid the reference to a physical space. This study uses 2015 NSSE data from 300,543 online and traditional first-year students and seniors attending 541 U.S. institutions. None of these institutions were considered primarily online institutions (those offering the vast majority of courses online). The participating institutions varied across geographic region, Carnegie classification, and enrollment size. First-year students made up 42.6% of the respondents, while the remaining 57.4% were seniors. The sample was 35.0 % males and 65.0% females, with 88.5% reporting full-time enrollment status. In addition, the sample included 17,080 students (7.2%) taking all of their courses completely online and 180,525 students (76.1%) taking none of their courses online.

### Measures

Students can be classified into online vs. traditional students using two NSSE items. The first item asks students to report the number of courses they are taking in the current term, and then a follow-up item asks how many of those courses are entirely online. Using these two items, a “percentage of courses online” variable was created by dividing the number of online courses by the number of total courses. For instance, if a respondent reported the same number of online courses as total courses, he/she would be 100% online; if a respondent reported that

none of his/her current courses are online, he/she would be 0% online; and if a respondent reported taking 4 courses, 3 of which were entirely online, he/she would be 75% online. This variable was the independent variable of interest in the study.

The dependent variables were ten scales, which NSSE terms “Engagement Indicators” that were used to measure the engagement levels of students. These scales included higher-order learning (4 items, Cronbach’s  $\alpha = .85$  first-year,  $.86$  senior), reflective and integrative learning (7 items, Cronbach’s  $\alpha = .87$  first-year,  $.88$  senior), quantitative reasoning (3 items, Cronbach’s  $\alpha = .85$  first-year,  $.87$  senior), learning strategies (3 items, Cronbach’s  $\alpha = .77$  first-year,  $.78$  senior), collaborative learning (4 items, Cronbach’s  $\alpha = .81$  first-year,  $.80$  senior), discussions with diverse others (4 items, Cronbach’s  $\alpha = .89$  first-year,  $.90$  senior), student-faculty interactions (4 items, Cronbach’s  $\alpha = .83$  first-year,  $.85$  senior), effective teaching practices (4 items, Cronbach’s  $\alpha = .85$  first-year,  $.87$  senior), quality of interactions (5 items, Cronbach’s  $\alpha = .84$  first-year,  $.81$  senior), and supportive environment (8 items, Cronbach’s  $\alpha = .89$  first-year,  $.89$  senior). These scales show acceptable levels of internal consistency (McMillan & Schumacher, 2001). Each scale was scored on a 60-point scale by converting the response sets to 60-point intervals and then averaging the rescaled items. Consequently, a score of zero would mean a student responded at the bottom of the response set for every item in the scale, while a score of 60 would mean that a student responded at the top of the response set for every item in the scale. Thus, higher scores on the scales mean higher levels of that particular aspect of engagement. For a more detailed discussion of the scale construction process and the individual items in each scale, please refer to the NSSE website at [http://nsse.indiana.edu/html/analysis\\_resources.cfm](http://nsse.indiana.edu/html/analysis_resources.cfm). The survey instrument also collected demographic information from respondents, including gender, transfer status, enrollment status, parents’ education, age, major, race/ethnicity, and

grades. The survey instrument data is then combined with institution-provided data, such as student scores for SAT/ACT, institution control, and size.

### **Analyses**

Ordinary Least Squares (OLS) regression analyses were chosen due to the ordinal nature of the dependent variables and the appropriateness of this method for testing theory with real-world data collected outside of manipulated laboratory settings (Field, 2009; Tabachnick & Fidell, 2001). A series of ten step-wise OLS regression analyses, controlling for certain student and institutional characteristics, were conducted for both first-year and senior students. In each of the analyses, the percentage of online courses was entered as the last step predictor variable by itself. Selected student and institutional characteristics were entered as step one of the model, as previous research (Pascarella & Terenzini, 2005) suggests that there are differences in student engagement and educational experiences for students based on these characteristics. The student-level characteristics included were gender, transfer status, enrollment status, first generation status, age, SAT/ACT, major, race/ethnicity, and grades. Control (private/public) and size were included as the institutional-level characteristics. The 10 engagement indicators were the outcome variables in each of the models. The Variance Inflation Factor (VIF) values for each predictor variable in these regression models were all well below 5 (ranging from 1.0 to 2.5), suggesting that multicollinearity was not an issue in the models (Field, 2009).

### **Results**

The results of the regression models including all first-year students indicate that the proportion of online classes being taken has a statistically significant, negative effect on 4 of the 10 engagement indicators. Specifically, first-year students who take more classes online report lower levels of collaborative learning in their courses, diverse discussions with others, effective

teaching practices, and quality of interactions. In addition, the proportion of online courses taken by a first-year student had a positive effect on learning strategies and quantitative reasoning. This same pattern was not observed amongst seniors. For the models with senior students, the percentage of online courses was a statistically significant negative predictor for 5 of the 10 engagement indicators. Students' ratings of effective teaching practices, student-faculty interaction, discussions with diverse others, quality of interactions, and collaborative learning were lower when they were taking more online courses. The strongest relationship found was between the percentage of online courses taken and collaborative learning for seniors. This was followed by the relationship between student-faculty interaction and percentage of courses online for seniors. Individual statistically significant beta weights for all models are reported in Table 1. In addition, the variance explained for each model is listed in Table 1. The predictor variables accounted for 1.7 to 10.0 percent of the total variance on the engagement indicators. While that may not seem like a very large proportion, the relatively low percentage of explained variance is most likely due to the fact that the models are very simple – focusing on just the percentage of online courses taken and controlling for student and institutional characteristics.

---

Insert Table 1 about here

---

### **Discussion**

The significant relationships for engagement and amount of online course exposure reveal that the online environment might encourage certain types of engagement, such as more use of learning strategies and quantitative reasoning. In contrast, traditional face-to-face environments seem to promote more collaborative learning, student-faculty interaction, effective

teaching practices, quality of interactions, and discussion with diverse others. The finding that online students report higher levels of learning strategies for senior students somewhat supports previous literature (Robinson & Hullinger, 2008). Richardson and colleagues (1999) found that distance learning students had more rigorous approaches to studying, and these approaches to studying were related to academic success in the form of pass rates and final grades. This finding, which was replicated in our study, may be a result of the structure of the online courses themselves. The online format relies on more independent self-regulation from the students to read material, watch videos, and complete a variety of other tasks involved with course assignments, this in turn leading to a necessity for the effective use of learning strategies. First-year students may be benefiting from developing the needed study skills for adapting to these course structures. The lack of this finding for seniors may be due to the fact that by the time students are seniors, they are overall more adept at using learning strategies regardless of course format.

First-year students taking more classes online also reported higher levels of quantitative reasoning use. This could be related to the nature of core courses most likely to be adapted to the online environment. Certain disciplines that are higher in use of quantitative reasoning skills, such as business and nursing, are most commonly offered in the online format (Friedman, 2014). Many course management systems, such as MyMathLab, are geared specifically at STEM fields with online video functions, special functions to accommodate special characters and formulas, and interactive step-by-step problem solving. These systems are also designed to help make the online format simpler for faculty with automatic grading functions and pre-recorded videos.

However, those students with greater exposure to online formats showed less engagement in collaborative learning activities. It may be that the potential isolation that comes with online,

self-directed learning might contribute to fewer opportunities for collaborative learning. This result is somewhat in opposition to other research that has been done on effective uses of student collaboration in online environments (Thurmond & Wambach, 2004). Yet whether a student is learning online or in the traditional classroom setting, the group skills gained while working collaboratively are crucial. It is very important to create the sense of a community of learners in an online course, since technology lacks human component and can lead to feelings of isolation (Cohen, 2003). Assigning group projects or requiring classmate interaction via chats and discussion boards may be a useful approach to integrating collaborative learning activities into web-based courses. Also, since this study is taking the less traditional route of exploring the effects of the percentage of online courses rather than comparing online only students to face-to-face students, students taking a combination of courses online and traditional might be less familiar with navigating the online classroom environment. It may also be the case that students who dislike group interactions self-select into online courses when they are available, as a preference for more individual work.

Online learning environments also seemed to be less conducive to student-faculty interaction for seniors. Although some instructors might feel that online environments necessitate greater, rather than less, interaction with students because research suggests that online courses require more time from faculty (Tomei, 2006), it may be that the interaction is more superficial in this type of context. It takes longer to type multiple email responses to student questions, which may come at any time of the day, than it does to make a single in-class announcement. Answering trivial questions can take instructor time away from sharing course content and developing course activities; thus, interaction may suffer from a student perspective. Interestingly, there may be ways to combat some of these reserved and detached online

interactions with faculty and replace them with more amiable means of communication.

Pakkaew (2013) found that while online students did not care for the communication platforms in the institution-provided course system, they had greater course success when using social media (Facebook) for chat and messaging with instructors and tutors instead. The formality of institution-provided email and course management systems may be hindering student perceptions of faculty interaction. The quality of interactions with other institutional representatives follows this pattern as well.

Similar to the findings for student-faculty interaction, first-year and senior students with more online exposure seemed to rate their faculty members' effective teaching practices lower. Perhaps faculty members that are teaching courses online need to spend more time contemplating the logistical components of incorporating technology and adapting their courses for the online environment (Restauri, King, & Nelson, 2001). This result may also be explained through faculty time requirements, as previously noted that online courses require more time from instructors (Tomei, 2006). The extra time commitment might mean that faculty do not have time to concentrate on improving their teaching or trying different techniques, and instead simply do what they can to get through the course. Furthermore, online instructors are more likely to be in the adjunct category, with other full-time jobs outside of their teaching commitments. Adjunct status can impact many aspects of students' experiences (Umbach, 2007), and in addition to time constraints, adjunct faculty may also be constrained by pre-established syllabi and course assignments, from which they must not stray. This may be negatively impacting engagement in online courses, suggesting that the importance of effective teaching practices extends beyond just learning and development to engagement as well (Kuh & Hu, 2001a).

Finally, the results of this study suggest that both first-year and senior students who take more online courses have fewer opportunities for discussions with diverse others. While this result on first consideration may seem to be counterintuitive because the online environment allows students who are very different from the traditional college student to take courses (often being older, more likely to work full-time, and from a lower socioeconomic background), the anonymity of the online environment may really be the cause of this finding. Students could be reporting few interactions with diverse other because they just do not know that they are happening. Being online takes away some of the knowledge of who is different from you in the course, in terms of background. The problem with this is that students have to know about the diversity in order to benefit from a diverse interaction. Faculty can circumvent this issue by having students in their courses introduce themselves and disclose more about their personal background or possibly introduce video aspects into the course.

### **Limitations**

While this study has several strengths, some limitations of the study should also be considered. The first limitation is that in terms of data collection, this study was not designed as a project to look strictly at online education. NSSE is a national project that was designed to be a good measure of student engagement (Kuh, 2001). Although the researchers involved in updating NSSE for 2013 took the increasing presence of online education into consideration when revising item language, some of the questions still might be more easily interpreted from a traditional classroom perspective. Another limitation is that since participation in NSSE is voluntary for institutions, they are not selected randomly or to create a representative sample of institutions. Although this is a concern, when compared to national data, the institutions in NSSE 2015 do mirror that of the national picture (National Survey of Student Engagement, 2015).

Furthermore, given the research design, this study was unable to test for causal relationships between online learning and engagement. The results can only confirm whether or not they are associated. Finally, although this research has the advantages of large sample size and ease of online data collection, it does rely on self-reported measures, which may not always be objective. However, most studies looking at self-reports of students in higher education suggest that self-reports and actual abilities are positively related (Anaya, 1999; Hayek, Carini, O'Day, & Kuh, 2002; Pike, 1995).

### **Conclusion**

With the proliferation of online learning in higher education, there is an increased need to understand the engagement and gains of students who only have an opportunity for an online atmosphere. While there may be some benefits of online learning in the realm of engagement, it seems that there are also some sacrifices online learners make when it comes to an engaging educational experience. These findings open the door to more inquiry. Further research might look at specific online tools and techniques, both general and discipline-specific, which lead to these different types of engagement and learning in order to improve online education for distance learners. As the technology used in distance education continues to evolve rapidly, research must persistently address the impact of online learning in higher education. More research is also needed on whether there are disciplinary differences between academic majors and the use of online curriculum, and if these patterns are similar to those for face-to-face learning settings.

### References

- Anaya, G. (1999). College impact on student learning: Comparing the use of self-reported gains, standardized test scores, and college grades. *Research in Higher Education, 40*, 499-526.
- Astin, A. W. (1993). What matters in college? Four critical years revisited. San Francisco, CA: Jossey-Bass.
- Baird, L. (2005). College environments and climates: Assessments and their theoretical assumptions. *Higher Education: Handbook of Theory and Research, 10*, 507-537.
- Braten, I., & Stroomso, H. I. (2006). Epistemological beliefs, interest, and gender as predictors of Internet-based learning activities. *Computers in Human Behavior, 22*(6), 1027-1042.
- Cabrera, A. F., Crissman, J. L., Bernal, E. M., Nora, A., Terenzini, P. T., & Pascarella, E. T. (2002). Collaborative learning: Its impact on college students' development and diversity. *Journal of College Student Development, 43*(1), 20-34.
- Chen, P. D., Lambert, A. D., & Guidry, K. R. (2010). Engaging online learners: The impact of web-based learning technology on student engagement. *Computers & Education, 54*, 1222-1232.
- Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*, 155-159.
- Cohen, V.L. (2003). Distance learning instruction: A new model of assessment. *Journal of Computing in Higher Education, 14*(2), 98-120.
- Dominguez, P. S., & Ridley, D. R. (2001). Assessing distance education courses and discipline differences in effectiveness. *Journal of Instructional Psychology, 28*(1), 15-19.
- Edwards, M.E., & Cordray, S., & Dorbolo, J. (2000). Unintended benefits of distance-education technology for traditional classroom teaching. *Teaching Sociology, 28*, 386-391.

Evans, C. (2014). Twitter for teaching: Can social media be used to enhance the process of learning? *British Journal of Educational Technology*, 45(5), 902-915.

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). London: Sage Publications.

Friedman, J. (2014). Online education by discipline: A graduate student's guide. Retrieved from <http://www.usnews.com/education/online-education/articles/2014/09/17/online-education-by-discipline-a-graduate-students-guide>.

Hayek, J. C., Carini, R. M., O'Day, P. T., & Kuh, G. D. (2002). Triumph or tragedy: Comparing student engagement levels of members of Greek-letter organizations and other students. *Journal of College Student Development*, 43(5), 643-663.

Hu, S., & Kuh, G. D. (2001). Computing experience and good practices in undergraduate education: Does the degree of campus "wiredness" matter? *Education Policy Analysis Archives*, 9(49). <http://epaa.asu.edu/epaa/v9n49.html>.

Junco, R. (2012). The relationship between frequency of Facebook use, participation in Facebook activities, and student engagement. *Computers & Education*, 58(1), 162-171.

Junco, R., Elavsky, C. M., & Heiberger, G. (2013). Putting Twitter to the test: Assessing outcomes for student collaboration, engagement, and success. *British Journal of Educational Technology*, 44(2), 273-287.

Junco, R., Heiberger, G., & Loken, E. (2010). The effect of Twitter on college student engagement and grades. *Journal of Computer Assisted Learning*.  
doi: 10.1111/j.1365-2729.2010.00387.x.

Kuh, G. D. (2001). *The National Survey of Student Engagement: Conceptual framework and overview of psychometric properties*. Bloomington, IN: Indiana University, Center for Postsecondary Research.

- Kuh, G. D. & Hu, S. (2001a). The effects of student-faculty interaction in the 1990s. *Review of Higher Education*, 24(3), 309-332.
- Kuh, G. D., & Hu, S. (2001b). The relationships between computer and information technology use, student learning, and other college experiences. *Journal of College Student Development*, 42, 217–232.
- McMillan, J.H., & Schumacher, S. (2001). *Research in education: A conceptual introduction*. New York: Longman.
- Moore, M.G., & Kearsley, G. (2011). *Distance education: A systems view of online learning*. Belmont, CA: Wadsworth.
- National Survey of Student Engagement (2015). *NSSE 2015 Overview*. Bloomington, IN: Indiana University, Center for Postsecondary Research.
- Nelson Laird, T. F., Shoup, R., & Kuh, G. D. (2005). Measuring deep approaches to learning using the National Survey of Student Engagement. Paper presented at the annual meeting of the Association for Institutional Research, Chicago, IL.  
[http://nsse.iub.edu/pdf/conference\\_presentations/2006/AIR2006DeepLearningFINAL.pdf](http://nsse.iub.edu/pdf/conference_presentations/2006/AIR2006DeepLearningFINAL.pdf).
- Ormrod, J.E. (2011). *Human learning* (6<sup>th</sup> ed.). Upper Saddle River, NJ: Pearson.
- Pace, C. R. (1980). Measuring the quality of student effort. *Current issues in Higher Education*, 2, 10-16.
- Parsad, B., & Lewis, L. (2008). Distance education at degree-granting Postsecondary Institutions: 2006–2007 (NCES 2009–044). National Center for Education Statistics, Institute of Education Sciences. Washington, DC: US Department of Education.  
<http://nces.ed.gov/pubs2009/2009044.pdf>.
- Pascarella, E. T. & Terenzini, P.T. (2005). *How college affects students: A third decade of research* (Vol. 2). San Francisco, CA: Jossey-Bass.

- Pike, G. R. (1995). The relationship between self-reports of college experiences and achievement test scores. *Research in Higher Education, 36*(1), 1-22.
- Pukkaew, C. (2013). Assessment of the effectiveness of internet-based distance learning through the VClass e-Education platform. *International Review of Research in Open and Distance Learning, 14*(4), 255-276.
- Restauri, S.L., King, F.L., & Nelson, J.G. (2001). Assessment of students' ratings for two methodologies of teaching via distance learning: An evaluative approach based on accreditation. ERIC document 460-148, Reports-Research (143).
- Richardson, J.T.E., Morgan, A., & Woodley, A. (1999). Approaches to studying distance education. *Higher Education, 37*, 23-55.
- Robinson, C. C., & Hullinger, H. (2008). New benchmarks in higher education: Student engagement in online learning. *Journal of Education for Business, 84*(2), 101–108.
- Shuey, S. (2002). Assessing online learning in higher education. *Journal of Instruction Delivery Systems, 16*, 13-18.
- Stallings, D. (2002). Measuring success in the virtual university. *The Journal of Academic Librarianship, 28*, 47-53.
- Tabachnick, B.G., & Fidell, L.S. (2001). *Using multivariate statistics* (4th ed.). Needham Heights, MA: Allyn & Bacon.
- Tess, P. A. (2013). The role of social media in higher education classes (real and virtual) – A literature review. *Computers in Human Behavior, 29*(3), A60-A68.
- Thurmond, V., & Wambach, K. (2004). Understanding interactions in distance education: A review of the literature. *International Journal of Instructional Technology & Distance Learning, 1*, 9–33. [http://www.itdl.org/journal/Jan\\_04/article02.htm](http://www.itdl.org/journal/Jan_04/article02.htm).

- Tomei, L.A. (2006). The impact of online teaching on faculty load: Computing the ideal class size for online courses. *Journal of Technology and Teacher Education, 14*, 531-541.
- Umbach, P.D. (2007). How effective are they? Exploring the impact of contingent faculty on undergraduate education. *Review of Higher Education, 30*(2), 91-123. doi: 10.1353/rhe.2006.0080
- Wojciechowski, A., & Palmer, L.B. (2005). Individual student characteristics: Can any be predictors of success in online classes? *Online Journal of Distance Learning, 8*(2).
- Zhou, L., & Zhang, D. (2008). Web 2.0 impact on student learning process. In K. McFerrin et al. (Eds.), *Proceedings of society for information technology and teacher education international conference* (pp. 2880–2882). Chesapeake, VA: AACE.

Table 1

*Selected results from the OLS regression models: Explained variance ( $R^2$ ) and the effects<sup>a</sup> of the percentage of online courses on the ten engagement indicators.*

Engagement Indicator	First-Year $R^2$	First-Year $\beta$	Senior $R^2$	Senior $\beta$
Higher-Order Learning	.021***	NS	.027***	NS
Reflective & Integrative Learning	.034***	NS	.070***	NS
Learning Strategies	.036***	.009*	.044***	NS
Quantitative Reasoning	.050***	.013***	.100***	NS
Collaborative Learning	.037***	-.025***	.080***	-.087***
Discussions with Diverse Others	.017***	-.011**	.020***	-.013**
Student-Faculty Interaction	.036***	NS	.075***	-.048***
Effective Teaching Practices	.025***	-.008*	.028***	-.022***
Quality of Interactions	.038***	-.019***	.027***	-.012**
Supportive Environment	.021***	NS	.027***	NS

*Note.* \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

<sup>a</sup>Controlling for Student characteristics: gender, transfer status, enrollment status, first generation status, age, SAT/ACT, major (Arts & Humanities as reference group), race/ethnicity (White as reference group), grades (mostly A's as reference group) & Institutional characteristics: control (private/public) & size