discretion to define the number of points per question. Depending on the structure of the question, partial credit can be granted for the correct sections of each answer. The grades can also be exported to Microsoft Excel.

As explained above, the study used the learning and assessment tool Connect for the online assignments (comprised of homework assignments and quizzes), which were allotted 10% (5% for homework assignments and 5% for quizzes) of the total/overall course grade, as seen in Table 1.

Table 1. Grade weights and tentative schedule

	% Grade	Dates and time	Location
Homework	5%	Every 2 weeks	Online
Quizzes	5%	TBA week in advance	Online
Exam 1	20%	TBA 2 weeks in advance	In Class
Exam 2	20 %	TBA 2 weeks in advance	In Class
Exam 3	20%	TBA 2 weeks in advance	In Class
Final Exam	30%	**TBA by administration**	In Class

Only 10% of the grade was allocated to the online assignments so there would be minimal effect on students' overall grade. In total, there were 10 homework assignments and 5 quizzes (see samples of the questions for these assignments and quizzes on Appendix 1) that were assigned to students using Connect. Homework assignments were given every 2 weeks, with each assignment due every fortnight (2 weeks). Each homework assignment had a minimum of 50 questions that students were required to answer.

For these online assignments, students received immediate feedback upon answering. If their answer was correct, Connect "locks in" the answer and students move to the next question. If the answer is wrong the students have the option of entering a new answer, the second answer is taken as final. In answering the questions, students are allowed to use all the Connect helping tools, at their disposal. These numerous tools (see Appendix 2) are available to offer students help as they complete their assignments.

For each online quiz students were given a time limit (20 minutes) with a maximum of 5 questions. For these questions, Connect helping tools are disabled, which eliminates the possibility of cheating until the quizzes were submitted. To further reduce the possibility of cheating, each quiz was created using the process of pooling, with random questions assigned to each student.

The course grading scale used is a standard grading scale used in the university, see Table 2.

Table 2. Grading scale

Percent	**95 & above**	**90-94**	**86 - 89**	**83 - 85**	**80 - 82**	**77 - 79**	**73 - 76**	**69 - 72**	**63 - 68**	**62 & below**
Letter Grade	**A**	**A-**	**B+**	**B**	**B-**	**C+**	**C**	**C-**	**D**	**F**

7. Analysis

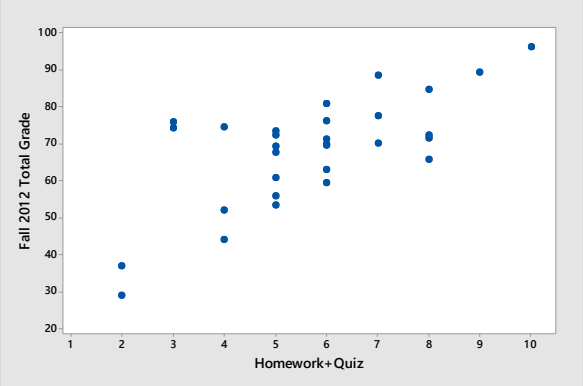
The first goal of the data analysis of this study investigated whether there was a relationship between the Connect online assignments grades and the total course grade for the pre-calculus course taught in the Fall semester. To test if such a relationship existed a scatter plot of the grades was created and linear correlation analysis was conducted. We used simple and multiple linear regression analysis to predict the total grade in the course based on the online assignments and the quizzes in two different ways. The first, in the multiple regression, we predicted the total course grade based on 2 individual grades, the homework assignments and the individual grade of quizzes. The second, in the simple linear regression analyses, we predict the total course grade based on the total grade achieved in the homework assignments and the quizzes together.

For the second goal of the analyses, we wanted to see if there was significant difference between the average of total grades in the Fall and the average of total grades in the Spring semester. We used two independent sample t-tests to compare the grades between the two courses taught in the Spring and the Fall.

8. Results

For the first goal of the study, the first undertaking was to look for graphical representation of the data to see if there is any familiar pattern that data could form. The scatter plot of online assignment grades and the total course grades for the Fall semester pre-calculus course, as seen in Figure 1, reveals pattern of positive linear correlation.

Figure 1. Scatter plot of online assignment grades vs. course grades



By conducting linear Pearson correlation tests, it was determined that there was significant positive linear correlation between online assignments and course grades, see Table 3.

Table 3.Pearson correlations for online assignments for fall 2012

Variable	Pearson Correlation Coefficient r	P value
Total Grade and Homework Assignments	0.539	P-value = 0.002
Total Grade and quizzes	0.761	P-value < 0.001
Total Grade and Homework Assignments +Quiz	0.696	P-value < 0.001

The r(30)=.539, p=. 002 indicates strong positive linear correlation between Connect online grades and total course grades (i.e. as the Connect online assignments grade increases, the total course grade will increase). The r(30)=.761, p< 0.001 indicates strong positive linear correlation between Connect assignment quiz grades and total course grades(i.e. as the Connect assignment quiz grade increases the total course grade increases). The r(30)=.696, p< 0.001 indicates strong positive linear correlation between Connect homework assignments and the total course grades (i.e. as the homework assignment grades increase the total course grades increase).

Based on the data presented, the authors came up with two models which could be used to predict the total course grade in similar contexts, not included here, but is in the appendix section (see Appendix 3) for those interested in testing these models.

For the second goal of the study, the aim was to compare the students' total course grades from the Fall semester with those of the Spring pre-calculus course. To do this the average of the Fall course grade (68.1) was compared with the class in the Spring which achieved an average of 60.4. An independent two variable T-Test was performed. Students taking the course in the Fall had better grades for the course (M=68.1, SD=14.8) than the students taking the Spring course, t(55)=1.77, p=.041. This indicates significant difference between the averages of the two classes at the five percent level of significance. The course taken in the Fall, where the online Connect was used, had a significantly higher average than the course taken in Spring, which was taught in a traditional manner with no online component. This result seems to indicate that the use of the online component, Connect, improved students' total course grades.

9. Discussion

The results in this study indicate that the students' grades improved when using Connect, supporting the claims that open learning ecosystems improve students' pass rates, elevate their grades [41] and improve in their learning by outperforming their colleagues studying in traditionally taught courses [11] [57]. However, factors such as availability and easy access to the information at anytime, anywhere may account for this apparent improvement, as has been seen in previous studies [44]. Students in this study had the many Connect help tools provided as they did their homework and quizzes, which the students in the traditional format class did not. These help tools were excellent guides to the information that was needed to understand how to solve the problems and answer the questions they were given and this information was available whenever they needed it. They received immediate feedback, as to whether their answers were correct or not. They were given a range of tools to look at from resource icons that they can just click on and were referred to relevant readings that will help them answer the questions, to unlimited access (of course the instructor can set a limit on the number of times students can check their work and their answers, if they chose to) of hints that provide suggestions, to practice questions to being able to directly send a question to the instructor.

In contrast, students doing the assignments in the traditional class setting, without online support, were disadvantaged in many ways. For one, there was a time lag between submitting an assignment and receiving the graded assignment. During such a waiting period there is always a chance that students lose the immediacy of the assignment and do not learn from the feedback when they eventually receive it. No matter how much faculty want to help their students in a traditional setting, the amount of feedback they can provide and the time they can allocate to each question and or student is also limited.

Being able to study at their leisure and their own pace meant that learning extended beyond the classroom. . This means more student engagement with the coursework assigned which in turn means students have the time to think and reflect on what has been presented and learned, leading to better understanding [55] deeper approaches to learning [51], and therefore better outcomes [16]. The students who were availed the opportunity to work on Connect also learned many new skills, not only those that dealt with the technology, but with self-regulated learning [50].

Though the results are positive, generalizations cannot be made from the results of this study due to the limited number of students and courses examined. Examining Connect in courses from different disciplines and with larger sample sizes would help to gain a better picture of the effectiveness of Connect. This would also allow for the models developed by the authors to be tested in a variety of contexts. Having the complete course online using Connect, and not just limiting it to the 10% of homework assignments and quizzes may certainly reflect better results. Other factors that may have impacted students' performance, such as mathematical backgrounds that were not examined. The correlation established between online assessments and the total course grades does not guarantee cause-and-effect relationship between variables [61]. Further research may seek to address factors such as motivation and students' perceptions of online learning for ESL/EFL learners.

10. Conclusion

The popularity and effectiveness of on-line learning is anticipated to increase in the future with the adoption of newer technology additions, such as game mechanics, that aim at increasing 'task engagement' and 'decreasing attrition' [20] [34] [35]. Education is being shifted to accommodate for more communication and information access with innovative pedagogies that enable and support the acquisition of knowledge in today's knowledge based societies and lend themselves to developing new skills for lifelong learning motivated by new career paths and working hours [27] [48] [53] [54].

With the demands of today's technology driven academic contexts, teachers need the tools like LMS's that can help them cope, and achieve the goals set for the 21century learning and teaching. They also need the professional development to be able to utilize these course management systems, among the many other tools required by today's technology driven institutions, which requires a great deal of time, effort and trial and error, as was the case with the authors in this study. The end result of the experience, as the authors of this study have found, is that there is no doubt that harnessing technology can enhance learning, whether it is inside or outside of the classroom. The key to enhancing learning tools in the classroom is how effectively they are used [49], and to use them in an effective manner requires a great deal of work, time and patience. As seen, "The effective use of digital resources and provision of opportunities for students to be active participants in building their knowledge and developing their skills is beneficial if the engagement with technology is strongly underpinned by sound educational procedure" [52]. Using technology in class holds the potential to empower not only students but instructors in a variety of ways. It ensures consistency, leaving little, if any, room for human bias and or errors. It also has the potential to deepen the connections between teachers and their students since it allows for more student-instructor face to face interactions.

11. References

[1] S. Al-Aonizi, and M. Ally. The use of e-learning in higher education (Dr. Saudsite model). Paper submitted at the Global Forum for Innovation in University Teaching, Imam Muhammad bin Saud Islamic University, Riyadh, Saudi Arabia, 2014.

[2] B. Albrecht. Enriching student experience through blended learning. *ECAR Research Bulletin*, 2006, 12.

[3] M. Ally. Managing, designing, and implementing "blended learning" for flexible delivery. Workshop handout at the first International Conference in Open Learning, Kuwait., 2013.

[4] J.Q. Anderson, J. L. Boyles, L. Rainie, 2012. [Online] The future impact of the Internet on higher education: Experts expect more-efficient collaborative environments and new grading schemes; they worry about massive online courses, the shift away from on-campus life. *Pew Research Center's Internet & American life Project.* Washington, D.C. Available: http://www.pewinternet.org/files/oldmedia/Files/ Reports/2012/PIP_Future of Higher_Ed.pdf, [Acccessed: 14-Apr-2016]

[5] A. Aycock, C. Garnham, & R. Kaleta, 2002 [Online] Lessons learned from the hybrid course project. Teaching with Technology Today, 8(6). Available: http://www.uwsa.edu/ttt/articles/garnham2.htm. [Accessed 15-May-2015]

[6] R.M. Bernard, E. Borokhovski., R. F. Schmid., R. M. Tamim, & P.C. Abrami. A meta-analysis of blended learning and technology use in higher education: From the general to the applied. *Journal of Computing in Higher Education*, vol. 26, no. 1. doi:10.1007/s12528-013-9077-3, 2014, pp. 87-122.

[7] D. Bikowski, & G. Kessler, Making the most of the discussion boards in the ESL classroom. *TESOL Journal*, vol. 11, no. 3, 2002, pp. 27-29.

[8] S. Bocconi, P.G. Kampylis, & Y. Punie. Innovating learning: Key elements for developing creative classrooms in Europe. Spain: European Union, *European Commission Joint Research Centre Institute for Prospective Technological Studies*, 2012.

[9] S. Bocconi, P.G. Kampylis, & Y. Punie. Framing ICT-enabled Innovation for Learning:Tthe case of

one-to-one learning initiatives in Europe, *European Journal of Education Volume*, vol. 48, no. 1, 2013, pp. 113–130.

[10] W.G. Bowen, M. M. Chingos, K.A. Lack, & T.I Nygren, 2012 [Online] Interactive learning online at public universities: Evidence from randomized trials. New York, NY: Ithaka S+R. Available: http://www.sr.ithaka.org/sites /all/modules/contrib/pubdlcnt/pubdlcnt.php?file=http: //www.sr.ithaka.org/sites/default/files/reports/sr-ithaka-interactive-learning-online-at-publicuniversities.pdf&nid=464, [Accessed 01-Apr-2014]

[11] W.G. Bowen, & S. lthaka. Interactive learning online at public universities: Evidence from randomized trials. lthaka S+ R, 2012 [Online] Available: http://mitcet.mit.edulwp-contentluploads/2012105/BowenReport-2012.pdf, [Accessed 10-Aug-2014]

[12] D.O. Bruff., D.H. Fisher, K.E. McEwen, B.E. Smith Wrapping a MOOC: Student perceptions of an experiment in blended learning, 2013 [Online] *MERLOT Journal of Online Learning and Teaching* vol.9, no. 2. Available: http://jolt.merlot.org/vol9no2/bruff_0613.htm, [Accessed 02-Nov-2016]

[13] J. Bryson, and A. Jenkins, Understanding and supporting 'blended learning' teaching practices, 2015 [Online] Available: www.edclements.com, [Accessed 02-Nov-2016]

[14] P.S.D Chen, A.D. Lambert, & K.R. Guidry. Engaging online learners: The impact of Web-based technology on college student engagement. *Computers & Education*, vol. 54, no. 4, 2010, pp. 1222-123

[15] H. Coates, R. James, & G. Baldwin, A critical examination of the effects of learning management systems on university teaching and learning. *Tertiary education and management* vol. 11, 2005, pp.19-36

[16] K.F. Colvin, J. Champaign, A. Liu, Q. Zhou, C. Fredericks, & D. E. Pritchard. Learning in an introductory physics MOOC: All cohorts learn equally, including an on-campus class. *The international Review of Research on in Open and Distance Learning* vol. 15, no.4, 2014, pp. 263-283

[17] P. Daniels, Course Management Systems and Implications for Practice. *International Journal of Emerging Technologies & Society*, vol.7, no.2, 2009, pp. 97-108.

[18] C.A. Dell, C. Low, & J.F. Wilker, Comparing student achievement in online and face-to-face class formats. *Journal of Online Learning and Teaching* vol. 6, 2010, pp. 30-42.

[19] S. Deterding, D. Dixon, R. Khaled, & L. Nacke. From game design elements to gamefulness: Defining gamification. In *Proceedings of the 15th International Academic Mind Trek Conference: Envisioning Future Media Environments* ACM, 2011, pp. 9-15.

[20] J. Dickfos, C. Cameron & C. Hodgson, "Blended learning: making an impact on assessment and self-reflection in accounting education", *Education + Training*, vol. 56, no. 2/3, 2014, pp. 190 – 207

[21] Discover the impact of Connect on student engagement, grades, and retention rates at 34 universities. [Online] Available: http://www.mheducation.com/highered/ideas/educator/connect-student-discover.html [Accessed 28-Feb-2016]

[22] C. Dziuban, & A.G. Picciano, The evolution continues: Considerations for the future of research in online and blended learning. *EDUCAUSE Center for Analysis and Research (ECAR) Bulletin*. June 16, 2015

[23] C. Fearon, S. Starr, & H. McLaughlin. Value of 'blended learning' in university and the workplace: Some experiences of university students. *Industrial and Commercial Training*, vol. 43, no.7, 2011 [Online]. Available: http://www.emeraldinsight.com/doijabs/10.1108/00197851111171872 [Accessed 02-Nov-2015]

[24] M. Feeley & J. Parris, An assessment of the PeerWise student-contributed question system's impact on learning outcomes: Evidence from a large enrollment political science course, 2012 [Online] Available: http://ssrn.com/abstract=2144375

[25] G. Fisher. Warming up to MOOC's. *The Chronicle of Higher Education Blogs: ProfHacker*, November 6, 2012 [Online] Available: http://www.chronicle.com/blogs/profhacker/warming-up-to-moocs/44022 [Accessed 05-March-2015]

[26] G. Fischer & S. Konomi. Innovative media in support of distributed intelligence and lifelong learning. In *Proceedings of the Third IEEE International Workshop on Wireless and Mobile Technologies* in *Education*. Los Alamitos, CA: IEEE Computer Society, 2005, pp. 3-10

[27] J. Fleck, 'Blended learning' and learning communities: Opportunities and challenges. *Journal of Management Development* vol. 31, no. 4, , pp. 398-411, 2012 [Online] Available: http:/ jdx.doi.org/10.1108/02621711211219059

[28] D. Garrison & N. Vaughan. Blended learning in higher education: Framework, principles, and guidelines. San Francisco, CA: John Wiley & Sons, 2008.

[29] H. Genc, Paper and Screen: Reading Strategies Used by Low-Proficient EFL Learners *Sino-US English Teaching*, vol. 8, no. 10, 2011, pp. 648-658.

[30] J. Gower, 'Blended learning' and online tutoring: A good practice guide, 2006 [Online] *Education + Training* 48(89). Available: www.emeraldinsight.com/toc/et/48/8%2F9 [Accessed 05-Oct-2015]

[31] D. Herlo. Benefits of using 'blended learning' in 'performer' education master program. *Journal Plus Education* vol. 10, no.2, 2014 [Online] Available: http://search.ebscohost.com/login.aspx?dircct=true&db=ehh&AN=98932949&site=ehost-live&scope=site, [Accessed 20-Oct-2016]

[32] P. Hill. Online educational delivery models: A descriptive view. *EDUCAUSE Review*, vol. 47, no.6 November, 1, 2012, pp. 84-97 [Online] http://www.educause.edu/ero/article/online-educational-delivery-modelsdescriptive-view

[33] K. Huotari, & J. Hamari. Defining gamification: A service marketing perspective. In *Proceedings of the 16th International Academic Mind Trek Conference*. ACM, 2012, pp. 17-22 [Online] Available: https://www.researchgate.net/publication/259841647_Defining_Gamification_A_Service_Marketing_Perspective, [Accessed 04- Feb- 2015]

[34] K.M. Kapp, *The gamification of teaming and instruction: game-based methods and strategies for training and education*. US: John Wiley & Sons, 2012

[35] R. Klamma, M.A. Chatti, E. Duval, H. Hummel, E.H. Hvannberg, M. Kravcik, E. Law, A. Naeve, & P. Scott. Social software for life-long learning. *Journal of Educational Technology and Society*, vol. 10, no. 3, 2007, pp. 72-83 [Online]. Available: http://www.ifets.info/joumals/10_3/6.pdf, [Accessed 15-Dec-2013]

[36] D. Koller. How online courses can form a basis for on-campus teaching. Forbes, November 7, 2012 [Online] Available: http://www.forbes.com/sites/coursera/2012/11/07/how-online-courses-can-form-a-basis-for-on-campus-teaching/ [Accessed 02-Nov-2015]

[37] K. McCutcheon, M. Lohan, M. Traynor, & D. Martin. A systematic review evaluating the impact of online or blended learning vs. face-to-face learning of clinical skills in undergraduate nurse education. *Journal of Advanced Nursing*, vol. 71, no.2, 2015, pp. 255-270.

[38] B.K. McFarlin. Hybrid lecture-online format increases student grades in an undergraduate exercise physiology course at a large urban university. *Advances in Physiology Education*, vol. 32, no. 1, 2008, pp. 86-91.

[39] McGraw-Hill Education at a Glance, 2016 [Online] Available: https://www.mheducation.com/about.html, [Accessed 24-Feb-2016]

[40] C. McLoughlin, & M.J.W Lee. The three p's of pedagogy for the networked society: Personalization, participation, and productivity. *International Journal of Teaching and Learning in Higher Education*, vol. 20, no.1, 2008, pp.10-27 [Online]. Available: http://files.eric.ed.gov/fulltext/EJ895221.pdf [Accessed 16-Feb-2016]

[41] B. Means, Y. Toyama, R. Murphy, M. Bakia, & K. Jones. Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies. Center for Technology in Learning, U.S. Department of Education, Washington, DC, 2010 [Online] Available: https://www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf [Accessed 10-Apr-2016]

[42] B. Means, Y. Toyama, R. Murphy, & M. Bakia. The effectiveness of online and blended learning: a meta-analysis of the empirical literature. *Teachers College Record*, vol. 115, no.3, 2013, pp.1-47 [Online] Available: http://www.tcrecord.org/library/content.asp?contentid=16882 [Accessed 10-May-2015]

[43] J.L. Moore, C. Dickson-Deane, K. Galyen. E-Learning, online learning, and distance learning environments: Are they the same? *Internet and Higher Education*,vol. 14, 2011, pp. 129-135 [Online]. Avaiable: https://scholar.vt.edu/access/content/group/5deb92b5-10f3-49db-adeb-7294847f1ebc/e-Learning%20Scott%20Midkiff.pdf [Accessed 23-Aug-2016]

[44] C. Neuhauser Learning style and effectiveness of online and face-to-face instruction. *The American Journal of Distance Education*, vol. 16, no. 2, 2002 [Online] Available: http://www.rhartshorne.com/fall-2012/eme6507-rh/cdisturco/eme6507-eportfolio/documents/neuhauser.pdf [Accessed 12-Jan-2014]

[45] T. Nguyen. The effectiveness of online learning: Beyond no significant difference and future horizons. *Journal of Online Learning and Teaching*, vol. 11, no. 2, 2015, pp. 309-319.

[46] M. Owen, L. Grant, S. Sayers, & K. Facer. *Social software and learning.* Bristol, England: Futurelab. 2006 [Online] Available: http://www.futurelab.org.uk/downloadlpdfs/research!opening_educatiou/Social_Software_report.pdf [Accessed 10-March-2014]

[47] R. Owston. The World Wide Web: A technology to enhance teaching and learning? *Educational Researcher*, vol. 26, no.2, 1997, pp. 27-33.

[48] M. Paechter & B. Maier, Online or Face-to-Face? Students' Experiences and Preferences in E-Learning. *Internet and Higher Education*, vol. 13, no.4, 2010, pp. 292-297.

[49] S.Patrick, & A. Powell. A Summary of research on the effectiveness of K 12online learning, effectiveness of online teaching and learning," iNACOL, 2009 [Online] Available: http://www.inacol.org/research/docs/NACOL_Reseac]hEffectiveness-Ir.pdf [Accessed 05-April-2014]

[50] D. Prescott. Situated learning, pedagogic models and structured tasks in blended course delivery. In K. Alshahrani & M. Ally (Eds.), *Transforming education in the Gulf region: Emerging learning technologies and innovative pedagogy for the 21st century.* New York: Routledge, 2016, pp. 22-35.

[51] Y. Punie. Learning Spaces: an ICT-enabled model of future learning in the Knowledge-based Society. *European Journal of Education*, vol. 42, no.2, 2007, pp. 185-199.

[52] Y. Punie & M. Cabrera. *The future of ICT and learning in the knowledge society.* Luxembourg: European Communities, 2006 [Online] Available: http://ftp.jrc.es/EURdoc/JRC47246.TN.pdf [Accessed 11-April-2015]

[53] S. Riffell, & D. Sibley. Using web-based instruction to improve large undergraduate biology courses: An evaluation of a hybrid course format. *Computers & Education*, vol. 44, no.3, 2005, pp. 217-235.

[54] K.E. Rudestam, & J. Schoenholtz-Read. The flourishing of adult online education: An overview. In K. E. Rudestam, & Schoenholtz-Read (Ed.), *Harr.d.booh of online learning*. Los Angeles, CA: Sage, 2010, pp. 1-18

[55] M. Shachar, & Y. Neumann. Twenty years of research on the academic performance differences between traditional and distance learning: Summative meta-analysis and trend examination, *MERLOT Journal of Online Learning and Teaching*, vol. 6, no.2, pp. 318-334, 2010 [Online] Available: http://jolt.merlot.org/vol6no2/shachar_0610.pdf [Accessed 12-June-2014]

[56] The Impact of Connect on Student Success: McGraw-Hill Connect Effectiveness Study, 2016 [Online] http://ecommerce prod.mheducation.com.s3.amazonaws.com/unitas/highered/platforms/connect/ces-2016-impact-of-student [Accessed 11-April-2016]

[57] B. Tolley. Creating successful blended-learning classrooms, 2014 [Online] Available: www.edweek.org/tm/articles/2014/10/08/ctq_tolley_b

lended_learning.htrnl?qs=bill+tolley [Accessed 11-June-2015]
[58] L. Triacca, D. Bolchini, L. Botturi, & A. Inversini. Mile: Systematic usability evaluation for e-Learning web applications. *AACE Journal*, vol. 12, no.4, 2004 [Online] Available: https://doc.rero.ch/record/5377/files/1_Botturi_AACE_2004.pdf [Accessed 01-September-2014]
[59] M.F. Triola. Correlation. *Elementary statistics* (9th ed.). Boston, USA: Pearson/Addison-Wesley, 2005, pp.497-498
[60] E. Vázquez-Cano & M. García. Analysis of risks in a Learning Management System: A case study in the Spanish National University of Distance Education (UNED). *New Approaches in Educational Research*, vol.4, no.1, 2015, pp. 62-68.
[61] D. Xu & S.S Jaggars. The impact of online learning on students' course outcomes: Evidence from a large community and technical college system. *The Economics of Education Review*, vol. 37, 2013, pp.46-57.

11. Acknowledgements

We would like to thank Ms. Madhu Ashok Bathija for the work that she did in this paper.

12. Appendixes

Appendix 1
Sample Questions for Homework and Quizzes
Factor completely:

1. $64x^6 - y^6$

a) $64(x-y)^6$
b) $(8x^3 - y^3)(8x^3 + y^3)$
c) $64(x^3 - y^3)(x^3 + y^3)$
d) $(2x-y)(2x+y)(4x^2 - 2xy + y^2)(4x^2 + 2xy + y^2)$

2. $9x^3 - 21x^2 + 18x$

a) $3x(x^2 - 7x + 6)$
b) $3(x^3 - 7x^2 + 6x)$
c) $3x(x-6)(x-1)$
d) $3x(x+6)(x+1)$

3. Perform indicated operations and simplify the rational expressions

$$\frac{x^2-1}{3x^2+6} \cdot \frac{4x^3+8x}{x^2-5x-6}$$

a) $\frac{4x(x-1)}{3(x-6)}$ b) $\frac{4x^5+4x^3-8x}{2x^4-15x^3-18x^3+6x^2-30x-36}$ c) $\frac{4x(x+1)}{3(x-6)}$ d) $\frac{4x^5+4x^3-8x}{2x^4-33x^3+6x^2-30x-36}$

Appendix 2
Connect Tools Available to Help Students as They Complete Their Assignments

eBook- Students will be able to access their eBook during the assignment by clicking the eBook Links icon that appears with each question. A student who uses this will see relevant readings that may help the student answer that question. This is a good option for practice and homework assignments, or open-book quizzes and tests.
Hint- If a student is unsure of how to go about answering a question, the View Hint link will offer a suggestion.
Allow students to check their work- When a student clicks the "check my work" link after answering a question, a "check" icon will appear if the answer is correct, or an "x" icon if the answer is incorrect. The actual answer won't be given.
Allow students to ask the instructor- Students can ask their instructors questions about the assignment. They will receive a message in their section homepage with the student's question, and an image of the activity in question, for reference. Instructors can respond directly to that student, or to the entire class if the information is relevant to everyone.

Show special character palette- This is selected if the course is a foreign language, so that students can answer the questions using the appropriate characters.

Show the solutions with the answer- This option appears for certain science, math and engineering questions. On those questions, students will be able to see the solutions. If a question is algorithmic, they can try answering it again with new algorithmic values.

Guide students to the answer- This option appears for certain science, math and engineering questions. On those questions, students can follow step-by-step guides to the solutions and can try answering the questions again with new algorithmic values.

Practice questions- This option is for available for most science, math and engineering algorithmic questions. It allows your students to practice non-scored versions of the assignment questions, with different values. This is best used on assignments intended for increased exposure to, and understanding of, the concepts (rather than assignments meant to assess understanding).
Note: Instructors can apply a percent deduction for using these tools if they chose to)
(Source: The information above was provide by the McGraw Hill Education Representative, Personal Communication)

Appendix 3
Two Models
Model 1:
Course Grades = 33.52 + 0.83 *(Homework) + 11.48 *(Quizzes)
Model 2:
Course Grades = 37.91 + 5.29 *(Homework +Quizzes)
The following illustrates the use of these two models.

For example, if we have two students who both scored 6 out of possible10 on online homework assignments and quizzes combined: student one had 3 out of 10 for

homework assignments and 3 out of 10 for quizzes (i.e 6 out of 10), while student two had 4 out of 10 on quizzes and 2 out of 10 for homework (i.e.6 out of 10). In both cases the total quiz and homework assignment is 6 out of 10. For those two examples, Model 2 would predict the same total course grade of 69.65 for both students, while model 1 would predict different grades for the two student: student one's total course grade would be 70.45 and for student two, the total course grade would be 81.1.

In Model 1 (see analysis 1 below) we used the individual scores for online homework and online quizzes. The p-value for the homework variable was 0.002 while the p-value for the quiz variable was close to zero (see Figure 4). Therefore Model 1 is significant at one percent level of significance. In Model 2 (see analysis 2 below) we combined online homework and quiz grades as one variable and the p-value for the new variable was close to zero, therefore Model 2 is significant at one percent level of significance.

Both models could be used for predicting the total course grades for students in similar contexts and or courses that use Connect. The models could predict total course grades in similar classes by obtaining the Connect grade and plugging it into the model equations. For example in Model 2: if a student scored 8 out of the possible 10 on the Connect assignments the grade would be, Total Grade = 37.91 + 5.29 * (8) = 80.23. Basically knowing only the Connect grade to be 8 (as in this example) we can predict the total course grade to be 80.23. This could be significant for future classes where we can monitor students' progress in Connect and inform students of potential failure/success in the course. The authors realize that the two models could predict totally different grades and it is left to the reader to decide which model to use.

1. Regression Analysis-Fall 2012 Total Grade versus Homework and Quizzes

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	2	3704.94	1852.47	18.79	0.000
homework	1	16.75	16.75	0.17	0.683
quizzes	1	1854.19	1854.19	18.81	0.000
Error	27	2661.79	98.58		
Lack-of-Fit	10	1653.93	165.39	2.79	0.030
Pure Error	17	1007.86	59.29		
Total	29	6366.73			

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
9.92899	58.19%	55.10%	48.04%

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	33.52	5.95	5.63	0.000	
homework	0.83	2.02	0.41	0.683	1.76
quizzes	11.48	2.65	4.34	0.000	1.76

Regression Equation

Fall 2012 Total Grade = 33.52 + 0.83 homework + 11.48 quizzes

2. Regression Analysis-Fall 2012 Total Grade versus Homework + Quiz

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	1	3087	3087.35	26.36	0.000
Homework+Quiz	1	3087	3087.35	26.36	0.000
Error	28	3279	117.12		
Lack-of-Fit	7	1668	238.35	3.11	0.021
Pure Error	21	1611	76.71		
Total	29	6367			

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
10.8222	48.49%	46.65%	38.19%

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	37.91	6.20	6.12	0.000	
Homework+Quiz	5.29	1.03	5.13	0.000	1.00

Regression Equation

Fall 2012 Total Grade = 37.91 + 5.29 Homework +Quiz

Fits and Diagnostics for Unusual Observations

Obs	Fall 2012 Total Grade	Fit	Resid	Std Resid	
28	75.88	53.79	22.09	2.15	R
30	96.00	90.82	5.18	0.54	X

R Large residual

X Unusual X

3.Two-Sample T-Test and CI: Spring 2012 Total Grade, Fall 2012 Total Grade

Two-sample T for Spring 2012 Total Grade vs Fall 2012 Total Grade

	N	Mean	StDev	SE Mean
Spring 2012 Total Grade	30	60.4	18.7	3.4
Fall 2012 Total Grade	30	68.1	14.8	2.7

Difference = μ (Spring 2012 Total Grade) - μ (Fall 2012 Total Grade)

Estimate for difference: -7.71

95% upper bound for difference: -0.41

T-Test of difference = 0 (vs <): T-Value = -1.77 P-Value = 0.041 DF = 55