Investigating students’ engagement in a hybrid learning environment

A Eliveria¹, L Serami², LP Famorca³, JS Dela Cruz⁴

¹ Eastern Samar State University, Guiilan, Eastern Samar, Philippines
² King’s College of the Philippines, Bambang, Nueva Vizcaya, Philippines
³ Saint Louis University, Baguio City, Philippines
⁴ University of the Cordilleras, Baguio City, Philippines

¹aidaf.ae95@gmail.com, ²leodser@gmail.com, ³lpfamorca@slu.edu.ph, ⁴delacruzpen@gmail.com

Abstract. Higher learning institutions (HEIs) are using different learning modalities to encourage better performance from students in accomplishing course requirements. A hybrid learning environment introduces opportunities for educational leaders, teachers and learners in finding alternative approaches to enhance traditional brick and mortar setting. A hybrid learning environment was introduced to a group of information technology (IT) and computer sciences (CS) students through a learning management system. The mixed methods study sought to investigate students’ participation and enthusiasm in a hybrid learning environment. A survey was presented to the students at the end of the semester. The resulting analysis revealed that students prefer online activities but acknowledged that in-class activities help students learn and understand course work. Results further revealed students’ insight of how a successful hybrid learning environment should be handled. The results from this research can provide understanding to help guide future attempts of a hybrid learning environment.

1. Introduction

The persistent improvement of the internet and the continuous development of new knowledge to be shared and delivered has afforded higher education institutions (HEIs) another means to improve and expand the delivery of curricula to learners. The conduct of education in the 21st century applies technology in the learning process. New learning environment and teaching technologies use information and communication technologies such as e-learning, open and distance learning, web-based learning, blended learning and hybrid learning have been introduced in many courses. It allows learners to learn anywhere, usually at anytime, as long as they have a computer and e-learning application [1]. [2] claimed that systematic and strategic combination of ICT tools into academic courses introduces a new way to approach instructional goals.

Hybrid learning, also known as blended learning, is a new approach in delivering programs to learners. As discussed by [3], hybrid learning offers an increased flexibility for students with the online component while maintaining the personal connection with teachers and students in the classroom. However, [4] contests that hybrid learning is not realized by a simple transfer of teaching materials online, but rather involves redesign of delivery and pedagogy. Figure 1 shows the model that the study
used in delivering a hybrid learning environment. Activities were divided as in-class activities and online activities. A class regularly meets 3 times a week for face-to-face meetings where each meeting is equivalent to 1 hour. In-class activities included lectures, attendance, laboratory exercises, computer-assisted examinations, seatwork, recitation and submission of assignment, case studies, research work and a project. Online activities were posted for the week but activities were controlled to a 1-hour duration. The online component included online quiz, posting of assignment, case study, research work and project specification, repository of lecture materials, posting of related course video materials, homework, links to related websites.

Several HEIs in the Philippines have started to implement web-based learning environments capable of delivering online education in a blended learning academic setting [5]. With the current thrust and direction of HEIs towards personalized learning, hybrid learning is gaining popularity [6] and HEIs are using hybrid instruction to improve pedagogy, enhance students’ learning outcomes and achievements, and improve cost-effectiveness [7][8]. A hybrid learning environment enables institutions to conduct a learner-centered approach to teaching where learners are given space and flexibility to indulge with effective learning activities [9] [10]. Several local universities are acknowledging the supposed benefits of hybrid learning and educational leaders are consenting educators to investigate further.

This study addresses the general research question: to identify the students’ engagement of hybrid learning. Specifically, the researchers would like to look into the significant difference between the level of engagement of students in brick and mortar and learning management system, significant factors that can be drawn from students’ engagement in hybrid learning and the relationship between predictor factors and the level of engagement of students.

The results of the study can provide educators the necessary requirements needed to engage students towards a successful delivery of a hybrid learning environment. Educational leaders could use the information to establish policies and guidelines in the delivery of hybrid learning.

2. Related Literature

Hybrid learning became renowned in the early 2000’s and many researchers conducted studies to measure its effectiveness. [11] defines hybrid or blended learning as the integration of face-to-face classroom instruction learning with distance/e-learning. [12] added that hybrid learning is a blended or mix of conventional face-to-face instruction and web-based distance learning. Hybrid learning refers to the addition of online learning as a supplement to the brick and mortar face-to-face instructional method [13] [14]. According to [15] effective practice has demonstrated, that the best hybrid instruction allows the students to interact with content and engage in learning activities before, during, and after the face-to-face class. It could be further described as a method of instruction that combines online with face-to-face learning activities that are integrated in a “planned, pedagogically valuable” way and where some of the face-to-face time is replaced by online activities [16]. In a hybrid learning setting, part of the learning activities and assignments are transferred from the face-to-face classroom to the distance learning environment [17].
The prevailing attitude by HEIs has been to introduce and adopt e-learning merely as an addition to face-to-face teaching rather than as an integral component [18]. Apparently this approach introduces many of the problems related with technology use, and with the failure to realize full potential of technologies when combined to educational challenges [18] [19].

A learning management system (LMS) is an option for institutions to implement a hybrid learning environment. Recognizing and identifying face-to-face activities and to be complemented with the right online activities becomes a valuable measurement of hybrid instructional design [20]. Successful integration of face-to-face learning supplemented by online delivery of learning creates environments that are “highly conducive to student learning” [5].

3. Methodology/Procedure
A mixture of qualitative and quantitative research is used in this study. Through a learning management system (LMS), a hybrid learning environment was created and administered to 180 undergraduate students enrolled in information technology and computer science. There were 105 (58%) students in Information Systems Fundamentals class, 24 (13%) in Data Communications and Computer Networks class and 51 (28%) in Network Technology with Administration and Maintenance class for an entire semester which lasted for 16 weeks. The population consisted of 105 first year students, 5 second year students, 66 third year students and 4 fourth year students, of which 106 (59%) students are first time users of the LMS.

Students are required to attended regular face-to-face meetings. During in-class sessions, students were always reminded of the corresponding online component of the in-class activity while the LMS sent corresponding emails to remind students of activities for both online and in-class. The LMS is designed with notification areas where students can verify accomplishments of activities as well as progress indicators within the course. Additionally, students were provided with an option to verify activity completion status. These features were made available to students through the LMS in order to avoid students missing online activities which eventually resulted to missing the corresponding in-class activities. Figure 2 shows how the activities and resources are presented in the LMS. Summative assessment of coursework was performed throughout the semester and grades were computed based on completion rates and academic performance.

Figure 2. The interface of the LMS showing the different activities and resources

4. Measure
At the end of the semester, an online survey was administered to the students. The instrument was a combination of different e-learning surveys such as Web-Based Learning Environment Instrument (WEBLEI), Constructivist On-Line Learning Environment Survey (COLLES) and The Distance and Open Learning Environment Survey (DOLES). Several items were modified and combined to fit the
requirements of the study. The instrument consisted of two parts which are the end of semester survey which comprised of 3 categories and 17 items and the post course survey which comprised of 3 categories and 13 items. To establish strict compliance, the survey was administered as a pre-requisite for students to accomplish in order to gain access to the reviewers and other materials needed for the final exams. A reliability analysis was carried out on the post course 13 items. Cronbach’s alpha showed the questionnaire to reach acceptable reliability, $\alpha = 0.80$. The high reliability of the scales for the survey instrument is most likely due to utilization of recognized surveys.

The results from the end of semester survey and the post course survey were subjected to descriptive analysis obtaining mean and standard deviation and results from the post course survey were subjected to one sample $t$-test. Additionally, results of the survey were introduced to IBM Watson Analytics for further analysis and interpretation of the relationship of the items. To obtain a more personal observation, students were asked to comment on the course using the hybrid learning environment. Results from students’ comments were subjected to cleaning and text analysis. RapidMiner Studio trial version was used to perform the text analysis.

5. Results and discussion

The methodology used was a combination of qualitative and quantitative techniques. Quantitative analysis was performed through one sample $t$-test and hypothesis testing. Performing a one-sample $t$-test on the post course survey revealed that there is a significant difference on student’s level of engagement between traditional brick and mortar and learning management system. Results revealed student satisfaction on on-line activities over the in-class activities, however results revealed that students acknowledge that in-class activities helped them learn and understand the topics more than on-line activities. Table 1 shows the values from the $t$-test.

| Table 1. One-sample $t$-test results | N  | Mean | SD  | SE  |
|-------------------------------------|----|------|-----|-----|
| I liked the online activities       | 180| 4.52 | .728| .054|
| I liked the classroom activities    | 180| 4.15 | .801| .060|
| The online activities helped me learn and understand the topics | 180 | 4.32 | .758 | .057 |
| The classroom activities helped me learn and understand the topics | 180 | 4.34 | .750 | .056 |

When queried why students enjoy learning in a hybrid learning environment, Watson analytics revealed the following discoveries (1) the combination of “I felt a sense of satisfaction and achievement about hybrid learning” and “I like the online activities”, (2) the combination of “I understand why this course mixed online and classroom activities” and “I like the online activities” and (3) the combination of “the online and classroom activities complemented each other” and “I like the online activities”. The discoveries revealed that students were more engaged with online activities posted in the learning management system. Figure 3 shows the resulting graph for these discoveries. Spearman’s correlation revealed further that “I like the online activities” ($\rho = 0.389$, $\alpha = .000$) is significantly correlated to students’ engagement with hybrid learning environment (“I enjoy learning in a hybrid learning environment”).

Students were solicited a general comment on their experience, use and feedback of the hybrid learning environment. Results revealed that adequate technology skills and confidence is a prerequisite for students to achieve an acceptable learning experience ($t = 3.659$, $p = .000$). LMS activities and features (structure and organization) as well as coordination and timing between classroom activities and online activities are influences for student engagement ($t = 2.836$, $p = .005$). Technology quality especially internet connection is a lingering dispute for students since students are accessing the LMS from different locations away from the campus ($t = -1.31$, $p = .896$). Text analysis revealed a rather
biased result as students’ comments focused on the online influence of the hybrid learning environment and these results cannot provide a conclusive finding. A separate comment for online experience and in-class experience could have been in place. Figure 4 shows the text analysis results.

![Figure 3. Discoveries in I enjoyed learning in an hybrid learning environment](image)

![Figure 4. Results of the text analysis](image)

The study revealed that students’ engagement in a hybrid learning environment was motivated by online influence ($\rho = 0.389, \alpha = .000$) and the motivation was derived from their level of knowledge in using technology in dealing with coursework ($t = 3.659, \rho = .000$). Figure 5 shows the predictors for a successful engagement derived from Watson’s analytics.

6. Conclusion

A hybrid learning environment is truly a paradigm that challenges the education perspective of students and effectively engages students in accomplishing course requirements and by doing so, increases the level of knowledge creation and perception of students. The identification of level of engagement and factors can support the design and delivery of hybrid learning in the future.

The study hoped to investigate student engagement in a hybrid learning environment. However, findings showed that students focused on the online influence of the environment. This could have been a result in an improper design of the survey instrument or in the interpretation of results. The brick and mortar influence was not properly involved in the results and interpretation. For the hybrid learning environment to be successful, it should exhibit the strengths of both online and classroom engagement.

With the results revealing partial findings, further study should be undertaken to resolve several issues that were encountered such as: (1) a strong distinction between the online influence and classroom influence of a hybrid learning environment, (2) the impact of a hybrid learning environment to students’
study habits, (2) the financial impact of a hybrid learning environment to both teacher and student, and
(3) the influence of teachers in handling and delivering hybrid learning coursework.

![Figure 5](image-url)

**Figure 5.** Predictors for student engagement in a hybrid learning environment

**References**

[1] Ziden AA, Rosli M, Gunasegaran T and Azizan SN 2017 Perceptions and experience in mobile learning via sms. *Int. J. of Interactive Mobile Technologies* vol 11 no 1 pp 116-32

[2] Delialioglu O and Yildirim Z 2007 Students’ perceptions on effective dimensions og interactive learning in a blended learning environment *Educ. Technol. & Society* 10(2) pp 133-46

[3] Owston R, York D and Murtha S 2013 Student perceptions and achievement in a university blended learning strategic initiative *Internet & Higher Educ.* 18 pp 34-46

[4] Vaughan N 2007 Perspective on blended learning in higher education *Int. J. on E-learning* vol 6 no 1 pp 81-94

[5] Estacio RR and Raga Jr RC 2017 Analyzing student online learning behavior in blended course using Moodle *Asian Assoc. of Open Universities J.* vol 12 no 1 pp 52-68

[6] Mirriahi N, Alonzo D and Fox B 2015 A blended learning framework for curriculum design and professional development *Res. in Learning Technologies* vol 23

[7] Graham C 2006 Blended learning systems: definition, current trends, and future directions *Handbook of Blended Learning: Global Perspective, Local Designs* ed Bonk CJ et al (San Francisco, CA: John Wiley & Sons, Inc)

[8] Reynard R 2007 Hybrid Learning: Maximizing Student Engagement (Campus Technology)

[9] Hughes G 2007 Using blended learning to increase learner support and improve retentions *Teaching in Higher Educ.* vol 12 no 3 pp 349-63

[10] Roby T, Ashe S, Singh N and Clark C 2013 Shaping the online experience : how administrators can influence student & instructor perceptions through policy and practice *The Internet of Higher Educ.* vol 17 pp 29-37

[11] Elearnspace 2005 Blended. [http://www.elearnspace.org/doing/blended.htm](http://www.elearnspace.org/doing/blended.htm)

[12] Koohang A and Durante A 2003 Learners’ perceptions toward the web-based distance learning activities/assignments portion of an undergraduate hybrid instructional model *J. Information Technol. Educ.* 2 pp 105-13

[13] Harding A, Kaczynski D and Wood L 2012 Evaluation of blended learning: analysis of qualitative data *Proc. of The Australian Conf. on Science and Mathematics Education* vol 11

[14] Garrison D and Vaughan N 2008 *Blended Learning in Higher Education-Framework, Principles, and Guidelines* (John Wiley & Sons)

[15] Penn State University 2014 *Hybrid Learning at Penn State*

[16] Kochang A, Britz J and Seymour T 2006 Panel discussion hybrid/blended learning: advantages, challenges, design and future directions *Proc. of the 2006 Informing Science and IT Education Joint Conf.* pp 155-7

[17] Garrison D and Kanuka H 2004 Blended learning: uncovering its transformative potential in higher
education *The Internet and Higher Educ.* vol 7 no 2 pp 95-105

[18] Picciano A 2006 Blended learning: implications for growth access *J. of Asynchronous Learning Networks* vol 10 no 3 pp 95-102

[19] Laurillard D 2010 *Re-thinking University Teaching: A Framework for The Effective Use of Education Technology* (London: Routledge)

[20] Kaleta R, Skibba K and Joosten T 2007 Discovering, designing, and delivering hybrid courses *Blended Learning: Research Perspectives* pp 111-43