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TECHNOLOGY AND ME—WHAT DO STUDENTS THINK?

Background and Introduction

As part of the strategic management, strategic planning is all about the big picture of what and how an organization is viable and capable of deciding and acting/responding in coping with the changing nature of the origination's internal and external conditions (Poister, Edwards, Pasha, & Edwards, 2013).

The studied organization is a public university in South Texas, U.S.A. Strategic planning is purposely to add public value—serving the community by offering an easy access to education. Even though the institution is not intended to make profits, it still relies on revenues of student tuition and fees in addition to other funds (e.g., government). Its strategic planning considered competitions in the neighboring area, both private and public schools. This may have explained why the mission statements on various organizational levels (e.g., university, college/school, department, and program) were (re)aligned not long ago. Human resources management is often included in the strategic planning (Liang, Marler, & Cui, 2012). Because each instructor is a content or subject matter expert in his/her field, either academically or professionally prepared, the recruitment planning is usually done in a joint effort with the management of the concerned departments or offices to recruit new talents that fit. As the institution stands right in the middle of a merger, its strategic planning tends to be logical incremental until the merger is completed and the new administration takes over. Yet, the strategic planning remains effective (predicting the organizational performance) partially because of the rational planning planted in the strategic management.

In this strategic management endeavor, students as the largest group of the stakeholders also play a critical role. This is not only because of the larger student

numbers but also due to the fact that these stakeholders' direct contribution to the funding the university receives. As with the advances of technology in the world today and its ubiquitous impact on arrays of businesses and industries, technology has already received a considerable amount of attention in higher education (Goode, 2010; Lei & Gupta, 2010).

According to The National Survey of Computing and Information Technology 2013, administered by The Campus Computing Project (2013), two of the top 4 priorities (or reported as „very important") from the senior university IT officers' perspective are concerned with student users. They are „providing adequate user support" (72% of the surveyed IT officials representing 451 universities and colleges in the United States) and „leveraging IT for student success" (also 72%).

As suggested by the survey results, understanding students' needs and expectations of technology use is one of top priorities of the senior management team of an institution of higher education. Although due to its unique mission, purpose, and context, each university may have a list of respective need (and wish). Learning from its end-uses or constituents (e.g., students) is likely to have the university administration focus on the need and put scarce resources in better use in an effort to create a more efficient social outcome--making all concerned parties better off.

Research Questions

1. To what degree is perceived academic success achieved through the adopted course management system or CMS (variable named, SVC) predicted by university support of CMS (USC), instructor communication through CMS (ICC), instructor use of CMS (IUC) and student affinity for technology (AFF)?
2. To what degree is preferred face-to-face (in-person) interaction/communication with instructor (FIM) predicted by instructor communication through email (ICE), instructor communication through CMS (ICC), and environment that facilitates most learning (ENV)?
3. To what degree is separation of school life and social life (SEP or P) predicted by environment that facilitates most learning (ENV), when controlling for student affinity for technology (AFF or A)?

Review of Literature

From the students' lens, Ward, Peters, and Shelley (2010) studied the quality of online learning experiences in comparison with the faculty perspective. They found students who take synchronous interactive online courses and face-to-face courses rate the class quality significantly higher than those who take asynchronous online classes on the following dimensions of effective instruction (p. 71):

- Encouraging student-faculty contact
- Encouraging cooperation among students
- Encouraging active learning
- Providing prompt feedback to students
- Emphasizing time on task
- Communicating high expectations
- Respecting diverse talents and ways of learning

Their study appeared to imply that (a) students equate more immediacy in communication and feedback from faculty with high course quality and (b) students enjoy more by taking a class that affords some type of instant student-instructor contact, either virtually or physically, than an asynchronous class.

Saeed, Yang, and Sinnappan (2009) conducted a survey study on students' technology preferences and their relationship with emerging web technologies (e.g., blog) and reported that (a) student use of Blackboard (a course management system) is strongly correlated with use of email, (b) student use of instant messenger is highly associated with use of podcast, (c) students who prefer podcast also show a significant preference to vodcast, and most importantly, (d) use of traditional technologies (i.e., Blackboard and email) is not related to any use of emerging technologies at all. The three Australian researchers further observed that students as a whole tend to adopt a variety of technologies, including academic technologies and social media, in their learning endeavors. However, this observation does not necessarily suggest that each student prefer using both academic technologies and social media in learning.

Pardasani, Goldkind, Heyman, and Cross-Denny (2012) investigated students' perception of distance education with an emphasis on student perceived emotional connectedness. Their interviews with student participants revealed that (a) students perceive more emotionally connected with the professor in the more frequent physical presence of the instructor and (b) students perceive less emotionally connected with the instructor when the instructor is less frequently present in the same video-conferencing classroom and prefer more face-to-face contact hours with the instructor.

In their structure equation modeling analysis, Wang, Shannon, and Ross (2013) suggested that the university take institution-wide measures to support online learning, including adopting a learning management system that features ease of use as this design feature increases student technology self-efficacy, which in turn, positively impacts student learning outcome.

Along similar lines as the notion of technology self-efficacy aforementioned, students high (or positive) in attitude toward technology, in spite of age, tend to take deep and strategic approaches to learning (e.g., monitoring and organized studying), as opposed to the shallow approach that is often adopted by students low in attitude toward technology (Jelfs & Richardson, 2013). However, the question as of whether student attitude toward technology is correlated with or even predicts student learning outcome remains unanswered in Jelfs and Richardson's study (2013).

The present survey research is intended for university administrators and researchers who are interested in learning how large-scale institutional data may inform decision makers in their strategic planning. In particular, those who serve in Hispanic serving institutions (HSI) in the States may benefit more from this quantitative inquiry.

Method

As part of 2013 EDUCAUSE Center for Applied Research (ECAR) Project, a Web questionnaire was administered at the target state university in South Texas that serves mainly Hispanic students (over 90% of the entire student population). A sample of over 1,900 students from the studied institution alone participated in the self-reported study in Spring 2013 with a margin of error around ± 3%. The questionnaire was comprised of

four instruments/sections in addition to student demographics. They are (a) devise use and ownership, (b), technology and the college experience, (c) learning environment, and (d) personal computing environment. This survey research is expected to explore factors affecting student perceived academic success in an online learning enterprise, explain why students prefer face-to-face or in-person interaction with the instructor, and further the understanding of students' separating (school) work from (personal) life. Data were collected earlier in 2013 at one time occasion by the university's Chief Information Officer's office in a joint effort with EDUCAUSE ECAR. Because Blackboard Learning Management System was adopted in every single course (regardless of the modality) at the target university, the survey was embedded in the Blackboard system. Students had to log in to Blackboard in order to participate in the study. Later, the archival data were then imported to SPSS v.19 for further analysis using multiple regression with dummy coding.

Results and Findings

Question 1

To what degree is perceived academic success achieved through the adopted course management system or CMS (variable named, SVC) predicted by university support of CMS (USC), instructor communication through CMS (ICC), instructor use of CMS (IUC) and student affinity for technology (AFF)?

A multiple regression analysis was conducted to evaluate how well USC, ICC, IUC, and AFF predict SVC. The four predictors or independent variables are USC, ICC, IUC, and AFF; the criterion variable or dependent variable is SVC. The causal relationship between these variables can be presented in the following regression equation model:

SVC = .07 * USC + .06 * ICC + .17 * IUC + .02 * AFF + 2.45

The regression equation with all four predictors was significantly related to the student perceived academic success achieved through the adopted CMS (SVC), $R^2 = .21$, adjusted $R^2 = .20$, $F(4, 1683) = 108.96$, $p < .01$. Because the sample multiple correlation coefficient was .45, indicating that approximately 21% of the variance of the academic success through CMS in the sample is accounted for by the linear regression model.

Table 1 shows both bivariate and partial correlations of the four predictors with the criterion variable, student academic success achieved through the CMS. The results indicated that all the four predictors were significantly positively correlated ($p < .01$) with student academic success achieved through the CMS. Based on the results of the correlational analyses, all the four predictors were useful in explaining the variance in the dependent variable.

Table 1: The Bivariate and Partial Correlations of the Predictors with SVC

Predictors	Correlation between each predictor and SVC	Correlation between each predictor and SVC controlling for all other predictors
University support of CMS (USC)	.204**	.130**
Instructor communication through CMS (ICC)	.274**	.105**
Instructor use of CMS (IUC)	.367**	.241**
Student affinity for technology (AFF)	.311**	.200**
** p < .01		

So far as those surveyed undergraduate students were concerned, institutional support of the course management system through a mobile device, instructor's communication through the course management system, instructor's use of the course management system as a learning resource, and their affinity for technology successfully predict student academic success through the course management system. That is, if the university likes to see undergraduate students succeed academically in taking courses with a Web component using the university-adopted course management system (i.e., Blackboard in this case), the school administration must attend to four issues.

1. The information technology (IT) office should maintain a technical support service to a degree that sustains more a significant increase in students' perceived support in Blackboard.
2. The instructors may emphasize more the use of Blackboard for the communication purposes.
3. The instructors ought to put more course content in the adopted course management system.
4. The university should consider implementing more technology in the daily operations that pertain to the student success and services (e.g., taking classes with technology integrated and transferring to another degree program electronically).

Of the four, instructor's use of the course management system seemed to be the most useful in predicting the student academic success as Table 1 above indicates.

Question 2

To what degree is preferred face-to-face (in-person) interaction/communication with instructor (FIM) predicted by instructor communication through email (ICE), instructor communication through CMS (ICC), and environment that facilitates most learning (ENV)?

A multiple regression analysis was conducted to evaluate how well ICE, ICC, and ENV predict FIM. The three predictors or independent variables are ICE, ICC, and

ENV; the criterion variable or dependent variable is FIM. The causal relationship between these variables can be presented in the following regression equation model:

FIM = .23 * ICE + .28 * ICC – .32 * ENV + 2.42

The regression equation with all three predictors was significantly related to the student preferred face-to-face (in-person) interaction/communication with instructor, R^2 = .17, adjusted R^2 = .17, $F(3, 1847) = 124.293$, $p < .01$. Because the sample multiple correlation coefficient was .41, indicating that approximately 17% of the variance of the preferred face-to-face interaction with instructor is accounted for by the linear regression model.

In order to determine whether there is a statistically significant difference in FIM between face-to-face learning group, hybrid group, Web group, and no preference group with face-to-face group as the reference category and others as dummy categories when controlling for ICE and ICC. The dummy coding was used to treat the environment that facilitates most learning (ENV) variable as a nominal variable. Thus, in terms of the regression model with dummy variables, let face-to-face interaction with instructor (F) be a function of instructor communication through email (E), instructor communication through CMS (C), and environment that facilitates most learning (D), i.e.

$F_i = \alpha + \beta_1 * E_i + \beta_2 * C_i + \beta_3 * D_{1i} + \beta_4 * D_{2i} + \beta_5 * D_{3i} + \sigma_i$

Let „face-to-face group" be the reference category for D. Then, let D_1 be the dummy for hybrid group, D_2 be the dummy for Web group, and D_3 be the dummy for no preference group.

$D_1 = 1, D_2 = 0, D_3 = 0$ for hybrid group;

$D_1 = 0, D_2 = 1, D_3 = 0$ for Web group;

$D_1 = 0, D_2 = 0, D_3 = 1$ for no preference group;

$D_1 = 0, D_2 = 0, D_3 = 0$ for face-to-face group

For face-to-face students (i.e., $D_1 = 0, D_2 = 0, D_3 = 0$), the regression model becomes the following:

$F_i = \alpha + \beta_1 * E_i + \beta_2 * C_i + \sigma_i$

For hybrid students (i.e., $D_1 = 1, D_2 = 0, D_3 = 0$), the regression model becomes the following:

$F_i = \alpha + \beta_1 * E_i + \beta_2 * C_i + \beta_3 + \sigma_i$

$= (\alpha + \beta_3) + \beta_1 * E_i + \beta_2 * C_i + \sigma_i$

For Web students (i.e., $D_1 = 0, D_2 = 1, D_3 = 0$), the regression model becomes the following:

$F_i = \alpha + \beta_1 * E_i + \beta_2 * C_i + \beta_4 + \sigma_i$

$= (\alpha + \beta_4) + \beta_1 * E_i + \beta_2 * C_i + \sigma_i$

For no preference students ($D_1 = 0, D_2 = 0, D_3 = 1$), the regression model becomes the following:

$F_i = \alpha + \beta_1 * E_i + \beta_2 * C_i + \beta_5 + \sigma_i$

$= (\alpha + \beta_5) + \beta_1 * E_i + \beta_2 * C_i + \sigma_i$

A multiple regression analysis was conducted with five predictors to evaluate how the three dummy categories differ from the reference category in predicting preferred face-to-face (in-person) interaction/communication with instructor. The regression model is then,

$F = .24 * E + .28 * C – .32 * D_1 – 1.60 * D_2 – .64 * D_3 + 2.13$

The model was significant, $R^2 = .20$, adjusted $R^2 = .20$, $F(5, 1845) = 94.227$, $p < .01$. When controlling for ICE and ICC, per unit increase in face-to-face interaction with the instructor on average, hybrid group reported a .32 unit less than face-to-face group; Web group reported a 1.6 unit less than face-to-face group; no preference group reported a .64 unit less than face-to-face group. All the beta weights or coefficients reported here are significant ($p < .01$). For face-to-face students ($D_1 = 0$, $D_2 = 0$, $D_3 = 0$), the regression model becomes the following:

F = .24 * E + .28 * C + 2.13

For hybrid students ($D_1 = 1$, $D_2 = 0$, $D_3 = 0$), the regression model becomes the following:

F = .24* E + .28 * C + (2.13 – .32)
= .24* E + .28 * C + 1.81

For Web students ($D_1 = 0$, $D_2 = 1$, $D_3 = 0$), the regression model becomes the following:

F = (2.13 – 1.60) + .24 * E + .28 * C
= .23 * E + .28 * C + .53

For no preference students ($D_1 = 0$, $D_2 = 0$, $D_3 = 1$), the regression model becomes the following:

F = (2.13 – .64) + .24 * E + .28 * C
= .24 * E + .28 * C + 1.49

Based on the results, students' preference of face-to-face interaction or communication with instructors was attributed to instructor's communication through (a) email and (b) Blackboard, the currently adopted course management system and (c) their preferred learning environment (i.e., the course delivery mode that facilitates most learning). Of the three predictors, instructor's communication through Blackboard was deemed the most useful.

When the environment that facilitates most learning variable was broken down into four student groups: face-to-face group, hybrid group, Web group, and no preference group, with face-to-face group as the base category, the results of the conducted regression analysis with dummy variables suggested that the Web group, compared to the face-to-face group, seems to prefer the least of face-to-face interaction or communication with the instructor. Besides, the hybrid group's preference level of face-to-face interact with the instructor seems to be the closest to the face-to-face group, compared to two other groups, Web and no preference groups even though it is still significantly less than the reference group.

Evidently, students who perceive that face-to-face courses facilitate most learning also prefer face-to-face interaction or communication with the instructors. And, students who argue that fully online courses facilitate most learning enjoy face-to-face communication with the instructor the least. In short, when it comes to the preference of face-to-face interaction or communication with the instructor using the face-to-face students group as the baseline, students who prefer fully online courses favor the face-to-face interaction the least, no preference students next, then the students who prefer hybrid courses, and lastly, the students who prefer face-to-face courses.

Question 3

To what degree is separation of school life and social life (SEP or P) predicted by environment that facilitates most learning (ENV), when controlling for student affinity for technology (AFF or A)?

Given the nature of the ENV variable, the causality between ENV and SEP was further investigated using dummy variables of ENV. Specifically, ENV was studied using face-to-face group as the reference category and the three others as dummy categories. Thus, in terms of the regression model with the dummy variables, let separation of school life and social life (P) be a function of student affinity for technology (A) and environment that facilitates most learning (D). Then, let D_1 be the dummy for hybrid group, D_2 be the dummy for Web group, and D_3 be the dummy for no preference group. The regression equation model is then as follows:

$P_i = \alpha + \beta_1 * A_i + \beta_2 * D_{1i} + \beta_3 * D_{2i} + \beta_4 * D_{3i} + \sigma_i$

Thus,

$D_1 = 1$, $D_2 = 0$, $D_3 = 0$ for hybrid group;

$D_1 = 0$, $D_2 = 1$, $D_3 = 0$ for Web group;

$D_1 = 0$, $D_2 = 0$, $D_3 = 1$ for no preference group;

$D_1 = 0$, $D_2 = 0$, $D_3 = 0$ for face-to-face group.

A multiple regression analysis was conducted to evaluate how well AFF (or A) and ENV predict SEP (or P). The causal relationship between these variables can be represented in the following regression equation model:

$P = .01 * A - .35 * D_1 - .13 * D_2 - .31 * D_3 + 3.449$

According to the regression analysis, the regression equation model above was statistically significant, $R^2 = .02$, adjusted $R^2 = .02$, $F(4, 1747) = 8.451$, $p < .01$. Because the sample multiple correlation coefficient was .19, suggesting that approximately 2% of the variance of the separation of school life and social life (SEP) is accounted for by the linear regression model.

When controlling for student affinity for technology (AFF), per unit increase in separation of school life and social life on the average, hybrid group reported a .35 or 35% unit less than face-to-face group; Web group reported a .13 unit less than face-to-face group; no preference group reported a .31 unit less than face-to-face group. For face-to-face students ($D_1 = 0$, $D_2 = 0$, $D_3 = 0$), the regression model becomes the following:

$P = .01 * A + 3.449$

For hybrid students ($D_1 = 1$, $D_2 = 0$, $D_3 = 0$), the regression model becomes the following:

$P = .01 * A + 3.099$

For Web students ($D_1 = 0$, $D_2 = 1$, $D_3 = 0$), the regression model becomes the following:

$P = .01 * A + 3.319$

For no preference students ($D_1 = 0$, $D_2 = 0$, $D_3 = 1$), the regression model becomes the following:

$P = .01 * A + 3.139$

All the coefficients or beta weights reported above were significant ($p < .01$), except for the Web group ($p = .33$).

Based on the results, students' separation of school life and social life was attributed to their affinity for technology and their preferred environment that facilitates most learning. The equation model is as follows:

P = .01 *AFF – .06 * EVN + 3.394

When controlling for environment that facilitates most learning, per unit increase in students' affinity for technology appeared to lead to a 1% increase in separation of school life and social life on average. Holding affinity for technology constant, per unit increase in environment that facilitates most learning seemed to result into a 6% decrease in separation of school life and social life on the average. However, of the two predictors, affinity for technology was deemed the more useful as it was the only variable that significantly contributed to the variance explained in the dependent variable. In short, students who demonstrate a higher affinity for technology tended to separate school life and social life more.

With all being said above, when the environment that facilitates most learning variable was broken down into four student groups: face-to-face group, hybrid group, Web group, and no preference group, with face-to-face group as the base category and controlling for the affinity for technology, the results of the conducted regression analysis with three dummy variables suggested that the hybrid group, compared to the face-to-face group, seems to agree the least the notion of separating school life and social life, followed by the no preference group, and then the Web group.

Evidently, the face-to-face group tended to separate school life and social life more than the Web group. However, the difference was not statistically significant. Students without any preference in the course delivery mode that facilitates most learning agreed to the school life and social life separation to a degree less than those students who perceived the face-to-face classes facilitate most learning. The degree to which students who took hybrid classes agreed to notion of separating school life and social life was the least, compared to two other student groups: Web and no preference groups. In other words, when compared to students taking face-to-face classes, those taking hybrid courses separate school life and social life to a lesser degree.

Conclusion

From the students' viewpoint, this quantitative investigation is intended to probe into three endogenous factors: (a) academic success, (b) preference of face-to-face interaction with the instructor, and (c) perception of work and life separation, by accounting for plausible factors in the context of a distance education enterprise. Three research questions were framed to guide the survey research. Using multiple regression with dummy coding, three key findings are as follows. First. Students perceived that their success in the class is mostly attributed to instructors' use of course management system in comparison to three other factors (e.g., student affinity for technology). Second. Students preferred more face-to-face interaction/communication with the instructor mainly due to the fact that they perceive that face-to-face classes facilitate most learning, in comparison to three other student groups (i.e., online, hybrid, and no preference). Third. Students taking face-to-face classes perceived the separation of school work and personal life more than three other student groups. That is, when compared with other student groups, face-to-face students tend to put significant distance between their

personal life (i.e., social networking) and school life. This may suggest that the university administration be strategic in planning social networking tools in online instruction because apparently not all the students enjoy integrating social media into the curriculum or making the line between work and life blurry. As a result, one issue may arise. Which classes would social networking/media tools be a better fit to? Profiling students using two-step cluster analysis in an attempt to collect their needs and expectations in regard to the learning with an online component embedded may be a viable option, as Yukselturk and Top (2013) recommended.

References

Dahlstrom, E., Walker, J. D., & Dziuban, C. (2013). *ECAR study of undergraduate students and information technology, 2013.* Louisville, CO: EDUCAUSE Center for Analysis and Research. Retrieved from https://net.educause.edu/ir/library/pdf/ERS1302/ERS1302.pdf

Goode, J. (2010). Mind the gap: The digital dimension of college access. *The Journal of Higher Education, 81*(5), 583–618.

Jelfs, A., & Richardson, J. T. E. (2013). The use of digital technologies across the adult life span in distance education. *British Journal of Educational Technology, 44*(2), 338–351.

Lei, S. A., & Gupta, R. K. (2010). College distance education courses: Evaluating benefits and costs from institutional, faculty and students' perspectives. *Education, 130*(4), 616–631.

Liang, X., Marler, J. H., & Cui, Z. (2012). Strategic human resource management in china: East meets west. *Academy of Management Perspectives, 26*(2), 55–70.

Pardasani, M., Goldkind, L., Heyman, J. C., & Cross-Denny, B. (2012). How much does the distance in distance education matter? Our students speak. *Social Work Education, 31*(4), 406–421.

Poister, T. H., Edwards, L. H., Pasha, O. Q., & Edwards, J. (2013). Strategy formulation and performance. *Public Performance & Management Review, 36*(4), 585–615. doi:10.2753/PMR1530-9576360405

Saeed, N., Yang, Y., & Sinnappan, S. (2009). Emerging web technologies in higher education: A case of incorporating blogs, podcasts and social bookmarks in a web programming course based on Students' learning styles and technology preferences. *Educational Technology & Society, 12*(4), 98–109.

The Campus Computing Project (October, 2013). *The National Survey of Computing and Information Technology 2013.* Retrieved from http://www.campuscomputing.net/sites/www.campuscomputing.net/files/CampusComputing2013_1.pdf

Wang, C.-H., Shannon, D. M., Ross, M. E. (2013). Students' characteristics, self-regulated learning, technology self-efficacy, and course outcomes in online learning. *Distance Education, 34*(3), 302–323.

Ward, M. E., Peters, G., & Shelley, K. (2010). Student and faculty perceptions of the quality of online learning experiences. *The International Review of Research in Open and Distance Education, 11*(3), 57–77.

Yukselturk, E., & Top, E. (2013). Exploring the link among entry characteristics, participation, behaviors and course outcomes of online learners: An examination of learner profile using cluster analysis. *British Journal of Educational Technology, 44*(5), 716–728.