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The MOOCs are Coming! Revolution or Fad in the Business School?

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Abstract:

The massive open online course (MOOC) phenomenon has been the subject of extraordinary hype over the last 12 months. This paper represents the first academic study of student satisfaction with a MOOC—this one experienced as part of an information systems class in an MBA program. We developed a causal model based on the literature was and measured 1) student satisfaction with the learning experience and 2) students' desire to take more courses this way. Using structural equation modeling, the analysis indicated that content in terms of quality and course materials, along with the opportunity for college credit, were the dominant factors in satisfaction, which, in turn, influenced the desire for more courses. The paper ends with a call for action by university administrators to proactively manage this new technology rather than adopt a "wait and see" attitude.

Keywords: Online Learning, MOOCs, E-learning, Course Content, College Credit, PLS.

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I. INTRODUCTION

In April 2012, the Dean of the Honors College at the City University of New York wrote a provocative article in *The Chronicle of Higher Educatio*n challenging educators to use technology to innovate or face irrelevance and possible extinction (Kirschner, 2012). In the same month, Coursera launched after a remarkable trial of massive open online courses the semester before.

There has been considerable, even spectacular, hype around the emergence of this technology and its potential to reshape society. The *Wall Street Journal* has already discussed potential sustaining revenue models (Korn & Lewitz, 2013), Gartner evaluated their implications in "consultant speak" using their "Hype Cycle" (Tapson, 2013), and, in *The New York Times*:

> [there is a] *budding revolution in global online higher education. Nothing has more potential to lift more people out of poverty—by providing them an affordable education to get a job or improve in the job they have. Nothing has more potential to unlock a billion more brains to solve the world's biggest problems. And nothing has more potential to enable us to reimagine higher education than the massive open online course, or MOOC…* (Friedman, 2013)

Standford faculty set up three classes in the fall of 2011 in artificial intelligence, databases, and machine learning that attracted hundreds of thousands of students and lead to the launch of Coursera (Coursera, 2014) and Udacity (Udacity, 2014). At the same time, an MIT and Harvard venture evolved into edX (edX, 2014) as a non-profit consortium for online education (Cooper & Sahami, 2013). Both groups have now grown substantially.

But, it has been a wild ride. Just one year later (and again in *The New York Times*):

> *early results for such large-scale courses are disappointing, forcing a rethinking of how college instruction can best use the Internet.* (Lewin, 2013)

This paper reports the results of the first (to the best of the authors' knowledge) academic study regarding student satisfaction with these classes as they might be used to supplement business school teaching and the effect of that satisfaction on the desire to take classes this way. It is the first study relating to information systems and business school programs—it seems be the first relating to satisfaction with a MOOC in any field.

II. BACKGROUND

Driven by competition and information sharing, an increasing emphasis is being placed on learning in today's global knowledge-based economy (Zhang & Nunamaker, 2003; Urdan & Weggen, 2000).

Massive open online courses (MOOCs) are not the first occurrences of either a potential disruptive technology or distance learning. It is almost certain they will not be the last of either one either. Early forms of distance learning sent printed materials through the mail, which were subsequently enhanced with radio and television. This allowed participants to watch demonstrations and see the professor, but the problem with educational television was that there was no way to evaluate the students' work (Nasseh, 1997). The format of the materials changed in the late 20th century with CDs being the medium of choice, but, in time, another technology, the Internet, took over, which allowed students to use computers and the Internet to take online courses while (or while not) enrolled at a college or university. In 2002, MIT began to place much of its course material on the Internet for all use in a project called Open Course Ware (Vest, 2002). In the Fall of 2011, a Stanford professor enrolled over one hundred thousand students in his open class. These early developments helped establish the playing field for the development of the current phenomenon of distance learning, MOOCs.

Coursera now claims over 100 partner universities worldwide (up from 67 in 2013) and over ten million "courserans"—students who have enrolled in at least one course. Also, edX, MIT and Harvard's Open Course Ware venture (along with 26 other leading universities from around the world, up from 10 a year ago) offers large numbers of courses, as does Udacity, the other major player (Cooper & Sahami, 2013).

However, completion rates for the students enrolled in MOOCs appear to be astonishingly low. The following data (Table 1) relates to 26 MOOCs and is adapted from Press (2013).

Table 1. Completion Rates

	Minimum	Maximum	Mean	Median
Number enrolled	12,000	180,000	64,926	52,052
Number completed	313	22,000	4,457	2,777
Percent completed	0.7	19.2	6.6	5.3

Hill (2012) suggests two barriers that must be overcome for MOOCs to be self-sustaining are 1) "delivering valuable signifiers of completion such as credentials, badges or acceptance into accredited programs" and 2) "authenticating students in a manner to satisfy accrediting institutions or hiring companies that the student identify is actually known". Being offered some sort of valuable signifier of completion may help raise the completion rate of these courses. Currently, The University of Washington has been working with Coursera to create customized MOOCs offered to UW students to gain credit or a certification to those that wish to pay a fee and take the course (Hill, 2012).

Other movements in this direction include the American Council on Education's (ACE) moving to certify five Coursera classes. ACE is a higher education organization that more than 2,000 universities and colleges consider when determining to offer a class for credit, but schools do not have to give credit for ACE certified classes. ACE is also considering Udacity classes. Colorado State University-Global Campus is giving credit for a MOOC (Booker, 2013). Some other public universities including Arizona State, the University of Cincinnati, the University of Arkansas, and Georgia State University are considering ways to give college credit. Acceptance at the administration level seems to be gaining some traction: a survey among university presidents with Phi Beta Kappa chapters indicated 60 percent of presidents thought that online courses were a good investment and 66 percent said that their school either offers or plans to offer online courses (Foster, 2013).

Many believe that e-learning is not for everyone. Sharma, Dick, Chin, and Land (2007) conducted a study of corporate e-learning and suggested that organizations might be able to identify "at-risk" learners who may have difficulty succeeding in e-learning by measuring their self-regulation (discipline, time management, etc.) (Britton & Tesser, 1991). By identifying these learners, organizations may target and encourage them to make use of self-regulation, or, in the context of a MOOC, it is conjectured that some will be more suited with the experience than others. Alternatively, learners who are aware of the various self-regulatory attributes that lead to better performance may take remedial steps to ensure they employ appropriate strategies. Furthermore, e-learners might recognize that self-regulation in traditional face-to-face learning can be adapted to e-learning. Sharma et al. go on to discuss "help seeking"—the way in which students sought help when confronted with a problem. They suggested that, under certain conditions, some participants would prefer to gain assistance from manuals, references, online resources, etc., or ask classmates / the instructor for assistance.

Computing and Internet technologies may also impact e-learning students' satisfaction when enrolled in a MOOC. Those experiencing frustrations or anxiety with e-learning courses may be those who are less comfortable with computer technology (Hong, Lai, & Holton 2003). Furthermore, as learners focus on using the technology, they may ignore important self-regulation strategies, which may have a detrimental impact on their performance levels. Thus, in an e-learning context, computer self-efficacy, which is an "individuals' beliefs in their ability to use computers" (Spence, 2004), may affect their satisfaction with the course.

"Online learners, like customers, are satisfied when they receive responsive, timely, and personalized services and support, along with high-quality learning outcomes" (Lorenzo & Moore, 2002 p. 4): this has taken on and increased focus as the number of online classes has proliferated in recent years. Quality is a concern when considering online education—approaches are evolving, and MOOCs are converging or competing with campus-based classes and becoming seen as a significant factor in global trade. Factors influencing quality include quality management, faculty development, online course design, and pedagogy (Lee, 2004; Chao, Sai, & Hamilton, 2010). Lee (2004) also suggests that quality is directly linked to satisfaction. Put another way: instructional quality is related to positive academic outcomes. This suggests that quality via satisfaction will have an effect on students' desire to continue to take classes in this way (Artino, 2008). MOOCs have the possibility of developing new pedagogy and providing students with better and more varied teaching that instructors could hope to develop by themselves (Daniel, 2012). As in a more traditional environment, quality in a MOOC potentially comes from the course materials and their preparation, the excellence of the presentation of these materials, the instructor's and institution's standing, and the cost.

The literature outlined above suggests the research model in Figure 1, and we propose the following research questions from the model:

1. What are the principal factors determining satisfaction with a MOOC?

2. Does satisfaction influence the desire to take more classes this way?

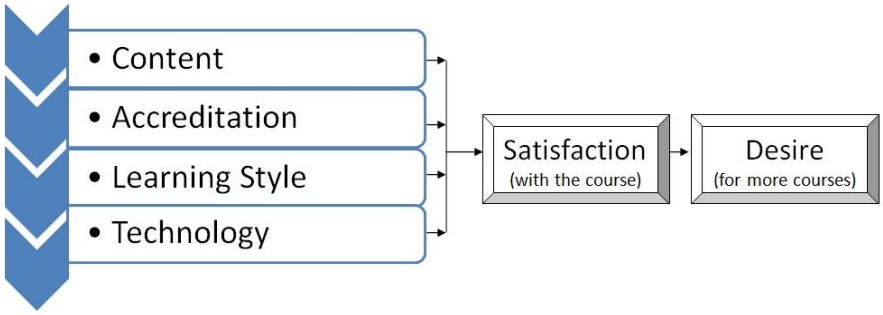

Figure 1. A Research Model

Accordingly, we hypothesize that:

H1a-d: Course quality, course materials, standing, and cost will influence content.
H2a-c: Discipline, time-management, and help-seeking traits will influence learning style.
H3a-d: Content, credit, learning style, and technology will influence satisfaction
H4: Satisfaction will influence desire (to take more courses this way).

III. THE RESEARCH ENVIRONMENT

We obtained the data for this study in a particular environment that a) has an impact on the findings, and b) affects the results' generalizability. This notwithstanding, we believe that the study and its results will be particularly useful to business schools and IS departments where the use of such technology is being considered; it may well have wider implications for university administrations.

We sourced the respondents to the survey from an IS management class taught by one of the authors as part of an MBA program at a tier 2 school in South-East United States. As part of the class, we asked the students to sit in on, and fully participate in, a MOOC running for a part of the scheduled semester class time. In other words, their participation in the MOOC could not be considered voluntary.

The MOOC

The topic of the MOOC was directly relevant to the MBA course and, under different circumstances, would have been a topic for about two weeks' coverage; in this case, we asked the students to participate in the MOOC for four weeks (up to and including a mid-term paper) in lieu of attending the normal face-to-face class sessions of their MBA class. They were given an option to vote against this, however, no one put forth any opposition. We recognize, however, that [the "non-voluntary" approach to taking the MOOC as part of the course] may have some effect on the data gathered. The semester occupies 15 weeks and the usual class activity includes a short presentation from the instructor and then class presentations and discussions on case studies used to illustrate the presentation material. In many ways, this was similar to the way the MOOC operated—a presentation by the professor followed by online discussion related to the case studies under discussion and to wider implications of the presentation issues.

The MOOC used for part of the coursework in the MBA class ran for the first time in Spring 2013. The instructor was a highly regarded academic from a leading university who had written a textbook related to the topic. The MOOC was a Coursera class, and had an initial enrolment of several thousand. While no credit was given for their participation, in terms of work expected from the MBA students enrolled in the Coursera class, the following is an extract from the syllabus:

> *…as part of this course, it is planned that you will take part in another course being run on Coursera. You will not need to attend classes…during that time (see the schedule) but you will need to enroll and participate in the external course. You are to write an individual report on your experiences in this course in*

two parts—Part A "Coursera—The future of education—a discussion" (approx. 2000 words) and Part B "Implications of [changes in] technology" (approx. 1000 words). In each part, you are expected to conduct a literature review and relate your experiences to that review. You will also be asked to complete a short survey on your Coursera experience.

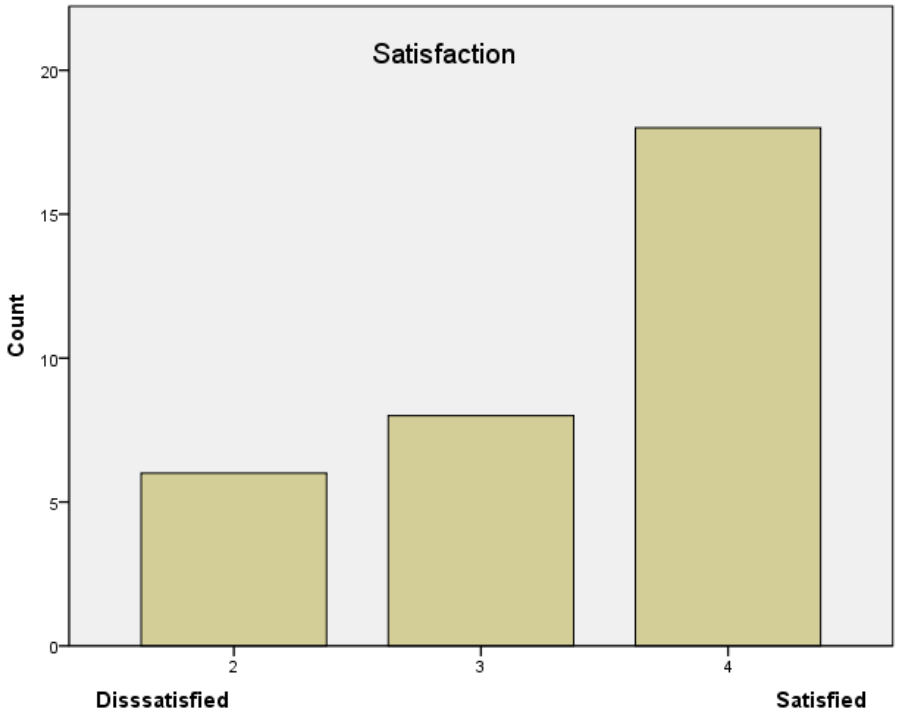

Figure 2. Overall Satisfaction with the MOOC

Due to the small sample sizes and the non-normal distributions of the participants, we conducted a series of non-parametric tests to determine if there was any difference in the means for "satisfaction" as reported in Figure 2 for each of these groups. None of the demographic groupings shown in Table 2 had means with a significant difference as determined by the independent samples Mann-Whitney U test. Table 2 presents the results. The two closest to a significant difference being significant were gender and technology, and may be more so given a larger sample size.

Table 2. Demographics Effects on Satisfaction

	Significance
Gender	.346
Age (=<31 v =>32)	.579
Work experience (< 1 yr v => 1 yr)	.869
Prior online classes (=<1 v =>2)	.477
Technology (passable v expert)	.222

Figures 3 and 4 below present the responses to two measurements items about whether some or all participants preferred face-to-face classes. These tables demonstrate the expected preference for the more traditional environment.

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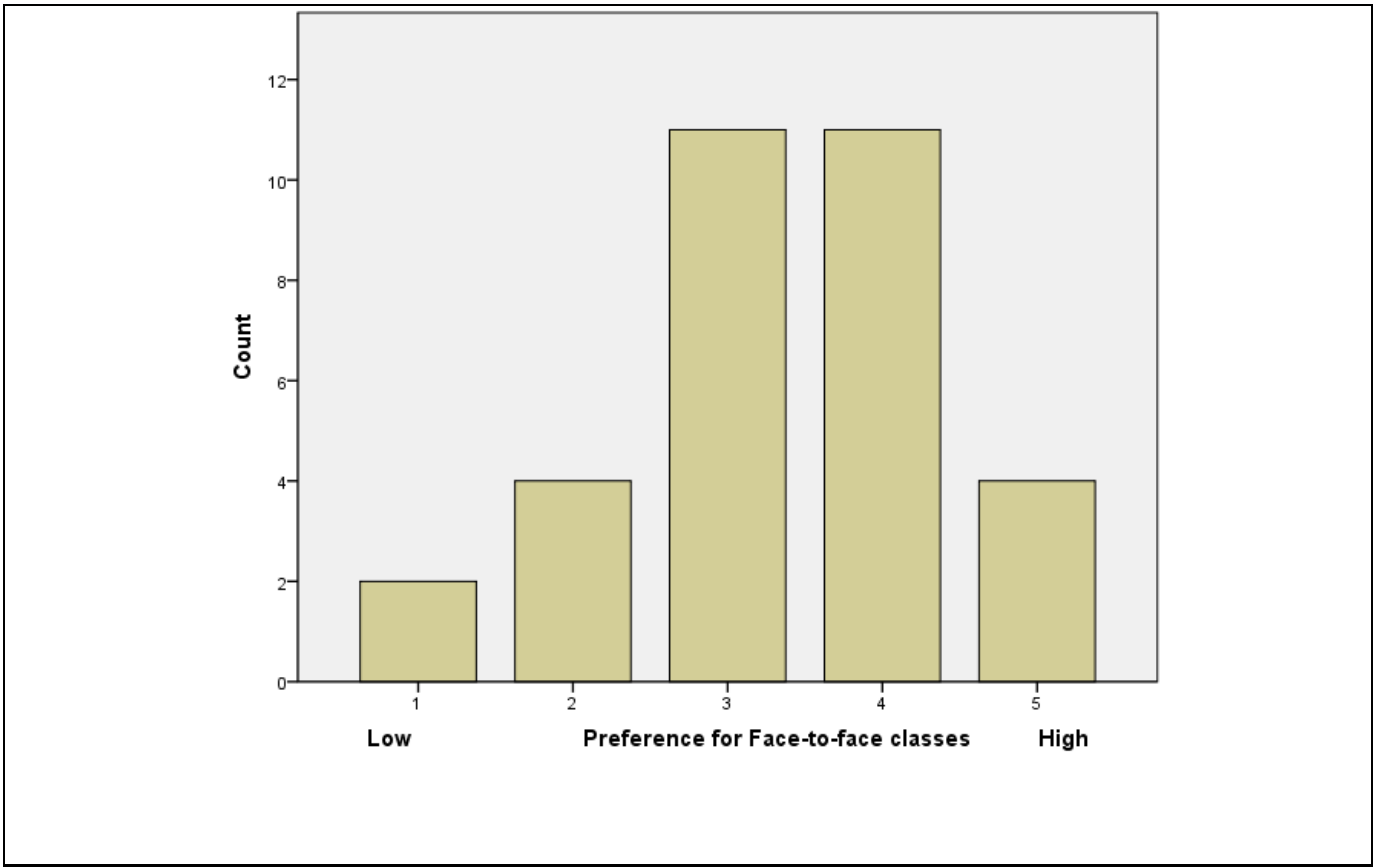

Figure 3. Prefer Traditional Classes

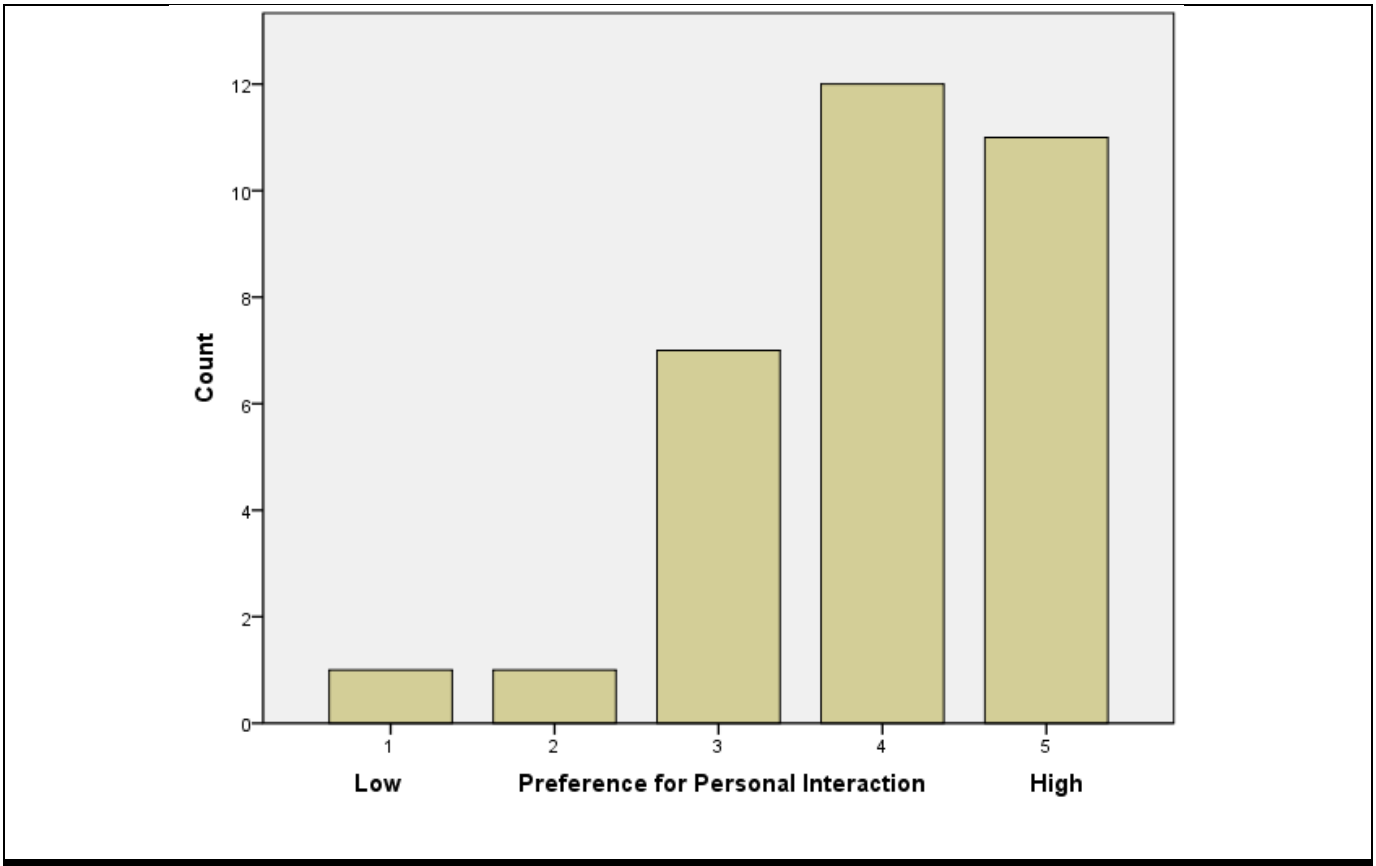

Figure 4. Prefer Personal Interaction

IV. RESEARCH METHODOLOGY

We developed a survey tool, reflecting the measurement constructs outlined above, from a published validated instrument (Sharma et al., 2007). The lead researcher, who is experienced in scale development, adapted it to this study. Other scholars reviewed the survey and tested it for ambiguity and length prior to its administration to the MBA class of 33 people. We entered the survey data into Excel and reviewed for outliers and normality. We rejected one survey as unusable (N now = 32) and, in light of the data's non-normal nature (and the relatively small sample size), we conducted the non-parametric tests as outlined above with SPSS.

The survey instrument consisted principally of a series of statements that we asked the participants to rate on a five-point scale (typically from "strongly disagree" to "strongly agree"). In developing the scales, we used several techniques to somewhat mitigate potential common method bias: some questions were negatively worded, some required the participants to write in a number rather than check an item on the Likert scale (e.g. "I would like to take __ classes this way"), and we assessed the principal measure of satisfaction, in addition to the Likert scale item, by having the participants chose a point on a line between two extremes (e.g., "I was disappointed—delighted" (Podsakoff & Todor, 1985). Table 3 provides the correlations between the Likert scale measure (F59) and the three measures where the respondents chose a spot on a line. Another concern regarding common method bias relates to self-reporting; however, self-reports are clearly appropriate for job satisfaction and many other private events (Chan, 2009). Therefore, we considered it appropriate in this case.

Table 3. Correlations

	F59	F61A	F61B	F61C
Pearson correlation	1	.543**	.869**	.640**
Sig (two tailed)		.002	.000	.000
N	32	31	32	31
** Correlation is significant at the 0.01 level (2-tailed)				

As we note in Section 3, one of this paper's authors was the instructor for the MBA class and participated in the course (although not the survey) along with the students. Schultze (2000) raises some questions about ethnography when the researcher is closely involved with the subjects as might be considered the case in a professor-student relationship. Although not directly relevant in this case, the issue of validity, as it relates to the representativeness of the data and the truthfulness of its interpretation, deserves a brief mention. During the period the students participated in the MOOC they were not in contact with the instructor except on rare occasions regarding course administration or via the discussion forum in the MOOC. Her issue of plausibility leading to acceptable research in such an environment addresses the rhetorical strategies authors rely on to compose a text that positions their research in a way that is relevant to the concerns of the intended audience. In this case, we fed the results analyzing the survey data back to a small focus group of the participants to seek confirmation of the interpretation and to provide a more complete picture for dissemination to an academic audience.

In an attempt to gain statistically valid findings from this small data set, we chose partial least squares (PLS) to perform as comprehensive an analysis as possible in testing the hypotheses. PLS is a component-based structural equation modeling technique, which is an appropriate method when research deals with emerging theory and/or the sample size is limited (Sosik, Kahai, & Piovoso, 2009). In addition, PLS is a preferred method for when the research is interested in the ability to predict endogenous variables (Chin, 1998; Hair, Sarstedt, Ringle, & Mena, 2011). In addition, PLS is robust regarding violations of multivariate normality, which are typical in small sample sizes (Peng & Lai, 2012). However, the major determinant for selecting a component-based structural equation model over a covariance one lies in PLS' ability to estimate more conservative path coefficients estimates (Chin, 1998; Rexhausen, Pibernik, & Kaiser, 2012). The latent constructs in the model are composed of reflective indicators. We selected the latent construct indicators based on the IS literature, academic experience, and participant feedback during the time they were involved in the MOOC.

V. ANALYSIS

For this study, we followed the PLS guidelines prescribed by Peng and Lai (2012) and Hair et al. (2011). We used SmartPLS 2.0.M3 to estimate our research model. Table 4 shows the item loadings, composite reliability (CR), average variance extracted (AVE) and variance inflation index (VIF) of the reflective constructs. Almost all loadings were above the .708 threshold (Hair et al., 2011). We assessed discriminant validity by examining the cross loadings of the indicators. This test requires that an indictor's outer loading on the associated constructs should be greater than all its loadings on other constructs (Hair, Hult, Ringle, & Sarstedt, 2013). We found no issues as a result of this test.

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Peng and Lai (2012) recommend testing the overall quality of a model by utilizing the goodness-of-fit proposed by Tenenhaus, Vinzi, Chatelin, and Lauro (2005). Calculating the goodness of fit is achieved by the following function(it essentially takes into account measurement variability and variance explained):

$$GOF = \sqrt{(\text{Average Communality} \times \text{Average } R^2)} = \sqrt{(.701 \times .611)} = .66$$

This omnibus test has drawn some criticism by some scholars such as Hair et al. (2011). One of the arguments against this test is the fact that R^2 values depend on the research context. For example, if the research is exploratory, lower values of R^2 are accepted, while this may not be the case for testing established theory. However, in our study, the average communality for the reflective models was above the threshold of .7 and the average R^2 for the endogenous variables had a moderate value. As such .66 is a moderate value when considering the context of this exploratory study. The individual endogenous variable range from moderate to substantial based on Chin's (1998) and Peng and Lai's (2012) recommendations. The variables with a moderate R^2 were learning style (.375) and desire (.452), while satisfaction (.816) and content (.802) had a substantial R^2.

In order to test path stability, we ran bootstrapping with 200, 500, and 1,000 resampling times to assess whether the magnitude and significance path of the structure model were consistent (Peng & Lai, 2012). Table 4 presents the results from the 500-bootstrapping run. The results support six out of the twelve hypotheses, of which H1a, H1b, H2a, H3a and H4 are significant at the .01 level, and H3b is significant at the .10 level (see Table 5).

Table 4. Overview of Indicators and Measures or Reliability and Validity

	Outer Loadings	
	Point Estimation	*t*- Value
Quality (α = 0.775 , AVE = .605, CR = .856 , VIF = 1.40)		
E35	0.714	6.46
E36	0.915	34.37
E45	0.577	3.03
E52	0.860	21.28
Materials (α = .896 , AVE = .658 , CR = .920 , VIF = 1.39)		
E28	0.772	7.62
E30	0.830	16.40
E32	0.922	24.25
E33	0.720	5.49
E34	0.723	4.48
E47	0.878	24.37
Standing (α = .841, AVE = .734 , CR = .892 , VIF = 1.97)		
D38	0.894	7.11
E39	0.773	4.44
Cost (α = .635, AVE = .732 , CR = .845 , VIF = 2.15)		
E40	0.839	5.08
E41	0.872	5.70
Dicipline (α = .834, AVE = .594, CR = .878, VIF = 1.10)		
D18	0.861	7.95
D19	0.839	6.09
D24	0.639	3.28
D25	0.672	4.22
D26	0.815	6.93
Time Management (α = .713 , AVE = .626 , CR = .833 , VIF = 1.23)		
B6	0.855	3.03
D21	0.707	2.46
D22	0.805	2.75
Help Seeking (α = .296 AVE = .587, CR = .739, VIF = 2.23)		
B11	0.793	2.19
B12	0.738	1.80
Content (α = .843 , AVE = .763, CR = .906, VIF = 1.66)		
E53	0.916	41.65
E54	0.892	17.91
E55	0.808	12.21
Credit (α = .498 , AVE =.665, CR = .799, VIF = 2.23)		
E42	0.794	9.72
E44	0.837	6.65
Learning Style (α = .786 , AVE = .627, CR = .865, VIF = 1.67)		
D27	0.920	40.48
E29	0.934	51.92
E50	0.731	6.14
E56	0.502	2.19
Technology (α = .890, AVE = .739, CR = .919, VIF = 2.71)		
C13	0.753	2.66
C14	0.870	3.46
C15	0.886	3.44
C16	0.920	2.83

α - Cronbach's alpha; AVE - average variance explained; CR = composite reliability
VIF - variance inflation factor

Table 5. Path Coefficients and R^2 of the Structural Model

Constructs and indicators	Path coefficient			
	Point estimate	*t*-Value	Hypothesis	
Content (R^2=.802)				
Quality	0.510	3.378	H1a	Supported
Materials	0.349	2.113	H1b	Supported
Standing	0.052	0.418	H1c	Rejected
Cost	0.112	0.965	H1d	Rejected
Learning (R^2= .375)				
Dicipline	0.644	3.068	H2a	Supported
Time Management	(0.115)	0.471	H2b	Rejected
Help Seeking	0.098	0.615	H2c	Rejected
Satisfaction (R^2= .816)				
Content	0.734	4.434	H3a	Supported
Credit	0.238	1.818	H3b	Supported*
Learning Style	0.000	0.001	H3c	Rejected
Technology	(0.038)	0.354	H3d	Rejected
Desire (R^2 = .816)				
Satisfaction	0.673	9.015	H4	Supported

* Supported at significance of P < .10

We used Stone-Geisser Q^2 to assess the predictive significance of the exogenous variables (Geisser, 1975; Stone, 1974). Blindfolding is the recommended technique for assessing Q^2 when running a PLS model (Table 6). The omission distance (D) parameter should range from 5 to 10 (Vinzi, Chin, Henseler, & Wang, 2010). In this study, we used an omission distance of 5 and a mean case replacement option to run the blindfolding procedure. All Q^2 values were greater than zero, which indicates that the structural model has sufficient predictive power (Peng & Lai 2012). Additionally, we calculated the effect size (f^2) for each of the exogenous variables. The effect size illustrates the impact an exogenous variable has as it relates to the endogenous variable R^2. This helps one assess the substantive impact the exogenous variable has with respect to the endogenous (Hair et al., 2013). Results indicate we have an effect ranging from small to large across the different variables (see Table 6)

Table 6. Effect size and Predictive Relevance

Content		0.505
	Quality	0.37
	Materials	0.20
	Standing	0.01
	Cost	0.05
Learning		0.140
	Dicipline	0.32
	Time Management	0.01
	Help Seeking	0.01
Satisfaction		0.557
	Content	0.81
	Credit	0.14
	Learning Style	-
	Technology	0.01
Desire		0.445
	Satisfaction	-

Figure 5 shows the PLS research model.

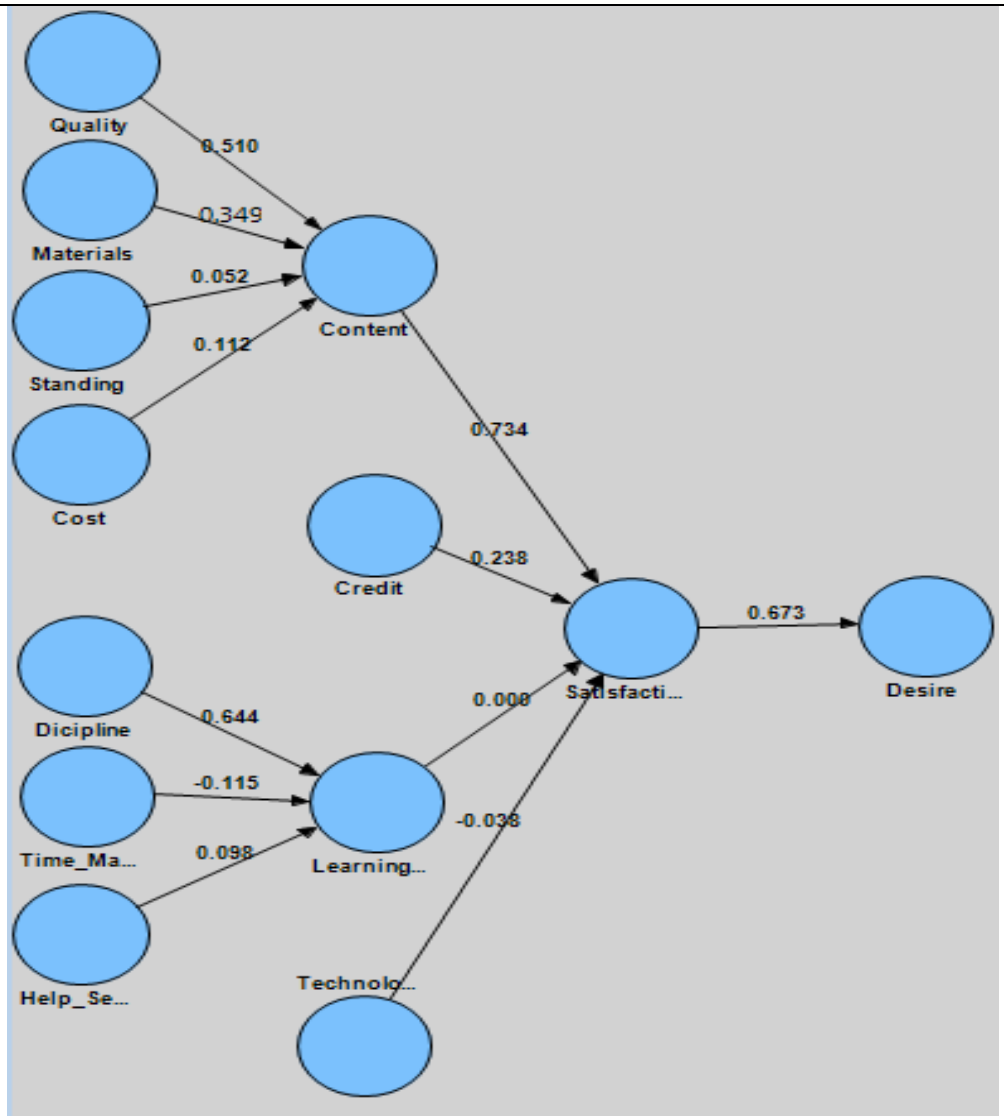

Figure 5. PLS Model Showing Path Coefficients

We acknowledge the complexity of this section but are confident that employing this form of analysis, and at this depth, provides a statistical base to support further discussion and our conclusions arising from this small study.

VI. DISCUSSION

Our analysis provides some useful points for discussion. Remember that this study relates primarily to the acceptance of MOOC technology as a supplement to a course rather than as a stand-alone offering. We measured "satisfaction" via a response to the statement "Please rate your overall satisfaction with the Coursera course", and a series of statements such as "Overall, I am quite [frustrated to contented] with the Coursera course". We measured each of these statements on a five-point scale. Our analysis indicates that there was strong support for the hypothesis that satisfaction with a MOOC is primarily related to the content of the course—in particular to the quality of the offerings and course material. There was also support for satisfaction being related to the possibility of the course being accepted for college credit. For these students, using the MOOC facility in this way as part of a required course in their MBA program, satisfaction seems to be an indicator of the desire to take more MOOC offerings as part of a regular college program.

Somewhat surprisingly (given the results reported in Sharma et al., 2007). the analysis did not support the hypotheses that satisfaction was driven by learning style or by the technology. This may well be a function of this particular study and these respondents. As MBA students, and in particular MBA students who were given an instruction to participate in the course and were required to complete work based on their experiences with it, it seems reasonable to speculate that, as far as learning style was concerned, even if they may not have particularly enjoyed the experience (leading to satisfaction), they just got on and did what was required. In respect to

technology, perhaps it, at least for these students, has reached a point where it is acceptable for this kind of interaction and learning, at least for some of the time (and maybe the technology has moved on since 2007). One person from the focus group said:

> *I felt the MOOC utilized the tools such as discussions well. The layout of the course was great in that navigation was easy and the structure was solid. The use of Google Hangouts also offered an opportunity for further interaction which I saw as another positive.*

It is also possible that students in similar programs given the opportunity to take courses via MOOCs may decide that the benefits and attractions of doing so ("I didn't need to come to class", or "I could do the work when it suited me") will outweigh the shortcomings and hindrances of not being physically present ("I like to sit in class and interact with other students and the professor").

More surprisingly, however, in the light of the significant path co-efficient between satisfaction and the desire to take more classes this way and the preference for these students to take a face-to-face program as opposed to an Internet-based one, was the number of classes that many students would like to take as part of their current program (see Figure 6).

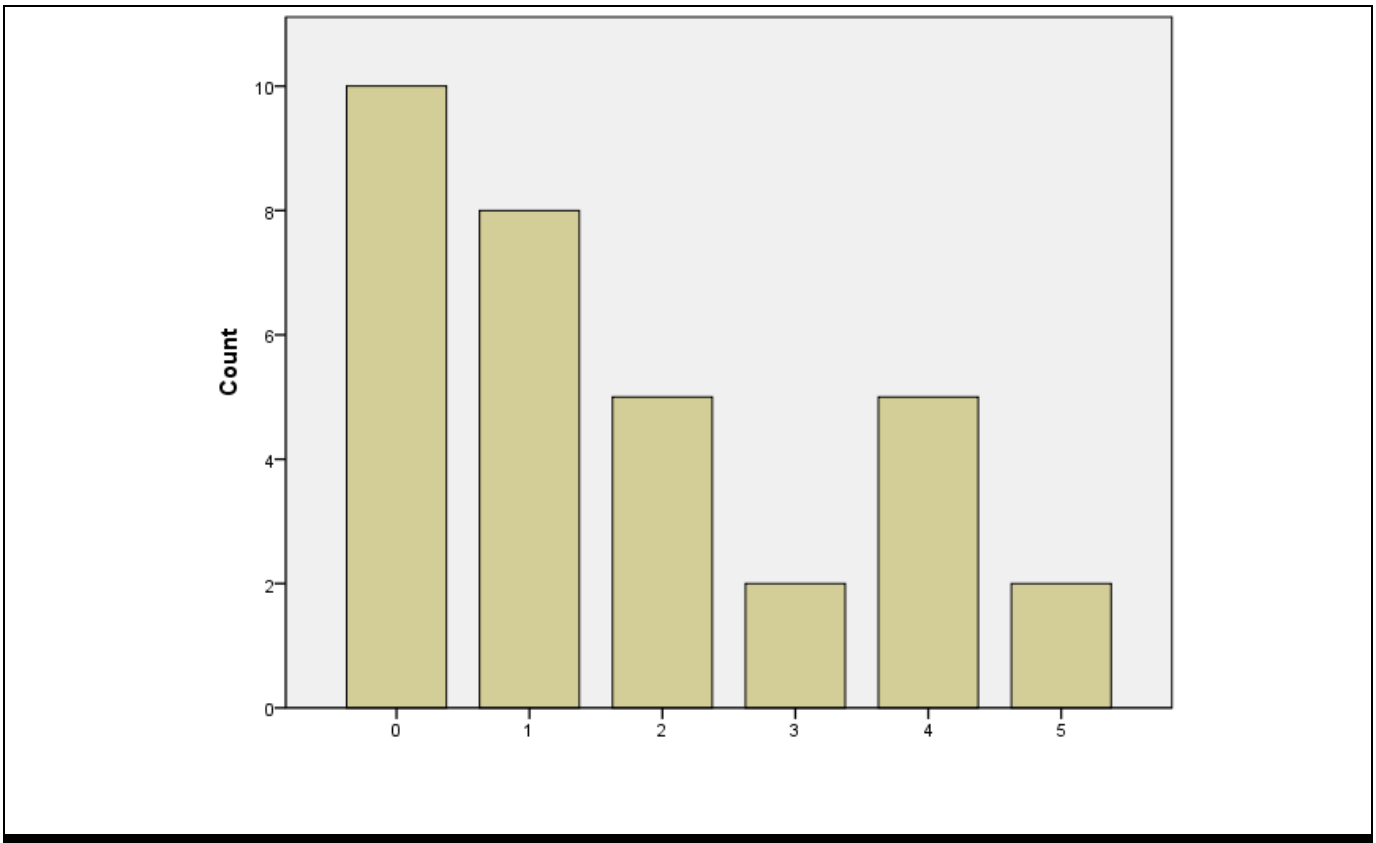

Figure 6. No of MOOCs Preferred as Part of the MBA

Essentially, this suggests that, while 30 percent of the students did not want any further involvement with a MOOC as part of their MBA program, almost 70 percent would have liked to take at least one course this way and over 40 percent would like to take two or more. Perhaps the questions here are more ones of flexibility and saving class times for presumed important interactions. This has potentially significant implications for business schools and MBA programs: students may well be attracted to programs that offer the opportunity to mix-and-match traditional and MOOC delivered classes. In the feedback session and in the focus group, students expressed concern as to the accountability and rigor associated with the MOOCs (in other words "how do we preserve the integrity of a program if people can cheat" and "I agree that I didn't feel there was much accountability and I wasn't crazy about the peer review"), but this is not an insurmountable difficulty. Indeed, as one person from the focus group said: "Integrity of the program as it relates to cheating is really a non-factor". In this context, note that some MOOC providers have already begun to set up arrangements for proctored testing.

VII. CONCLUSION

This study has clear limitations. The data came from one MBA class in one university. The students experienced one MOOC and were only asked about their experiences with that MOOC. To a large extent, the students were homogeneous, at least is terms of their education and experience with technology. They did not select the course of their own volition but were instructed to participate in it, and the sample size was small, which makes statistical results borderline, even for the PLS-based methodology that was adopted for the analysis. Future research needs to address each of these areas and find a way to compare satisfaction derived from such courses with satisfaction in more traditional course delivery environments. In addition, more work is needed on the aspect of "satisfaction" itself. Perhaps satisfaction is not the ideal dependent variable and indeed there may well be an emerging debate on whether course quality might be better assessed as being good enough as opposed to equal to more traditional courses.

The above notwithstanding, the results are statistically significant and indicate a desire by students to take more courses in this way. It certainly seems reasonable for this group of students to be representative of many MBA program students in similar schools. The feedback from the students supplementing the survey data suggested that their main concerns centered around the assessment of student performance associated with the course—in other words, many felt that the bar needed to be raised somewhat. In all, this study's results support MOOCs' significant place in education. Future education could involve blended learning, flipped classrooms, matched learning to students' practices along with the continued existence of hundreds of professors lecturing on the same material in classrooms across the country (or indeed around the world). More research is clearly needed on all of these aspects.

Are MOOCs an impending revolution in higher education or passing fad? MOOCs may well be waking those slumbering and at least partially answering Kirschner's (2012) call for technological innovation in education. MOOCs are undergoing rapid development and expansion against a background of rising tuition costs, government clampdowns on university funding, developments in collaborative technology to a point where a significant portion of the classroom experience can be replicated online to a satisfactory level, and poor graduation and retention rates. The technology continues to develop. It is almost inconceivable that MOOCs will simply go away. Hardly a month passes without some addition to the mix; for example, SAP's University Alliances' announcement of a MOOC for HANA training—surely an attractive proposition for many in industry. We can expect them to evolve though: perhaps we will see them being used to funnel students into university programs, to take the place of foundation or pre-requisite classes, to add on to the traditional class room, or to replace actual program-based classes. As such, one can view MOOCs as a threat, particularly to tier 2 and 3 schools—a "disruptive technology" in information systems parlance. Industry is littered with failed businesses due to an inability to cope with a disruptive technology. This study on a single MOOC as it relates to student satisfaction suggests there is little doubt that MOOCs will force changes to higher education; right now, as educators and university administrators, we need to be managing the direction.

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Editor's Note: The following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the paper on the Web, can gain direct access to these linked references. Readers are warned, however, that:

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AFTER THE REFERENCES

PART A

Please enter the following demographic information: *(check the correct response)*

1. Gender: □ Male □ Female
2. Age group: □ < 21 □ 21 - 31 □ 32 - 40 □ 41 - 50
3. Children: □ No □ Yes, living with me □ Yes, not living with me
4. Job title / f/t student _____
5. Work experience:
   □ < 1 yr □ ≥ 1 but < 4 yrs □ ≥ 4 but < 7 yrs □ ≥ 7
6. Online classes taken before this course.
   □ 0 □ 1 □ 2 – 3 □ ≥ 4
7. How would you rate your ability using computing and internet technology?
   □ minimal □ passable □ strong □ expert

PART B

Thinking about the Coursera course you sat in on, please circle the correct response, using the scale indicated:

	Not at all true of me				**Very true of me**
1. In general, participating in the Coursera course was valuable in itself beyond being required by the professor.	1	2	3	4	5
2. Generally, for me, participating in such courses would be an end in itself rather than a means to an end.	1	2	3	4	5
3. Generally, I would seek help when I have / if I had problems in a Coursera course.	1	2	3	4	5

	Not at all true of me				Very true of me
4. In general, participating in such Coursera courses would be helpful to gain external rewards (such as promotion, approval from others or improved performance).	1	2	3	4	5
5. Generally, participating in the Coursera course would be a means to an end (such as college credit, promotion, approval from others or improved performance).	1	2	3	4	5
6. Overall, I managed my time well to deal with the Coursera course.	1	2	3	4	5
7. Generally, I chose places to work that allow me to avoid distractions when doing Coursera course work.	1	2	3	4	5
8. The most important thing for me regarding a Coursera course would be college credit.	1	2	3	4	5
9. I would want to do well in a Coursera course because it is important to show my ability to my family, friends, employer, or others.	1	2	3	4	5
10. Generally, I selected locations that help me to work without interruptions when doing Coursera course work.	1	2	3	4	5
11. I would try to make use of online help files and materials if I experienced problems in the Coursera course.	1	2	3	4	5
12. Generally, if I had/experienced difficulties in the Coursera course, I would seek help from another person.	1	2	3	4	5

PART C

Thinking about the Coursera course, please circle the correct response, using the scale indicated:

	Not confident at all				Very confident
13. Overall, I feel confident working on a computer.	1	2	3	4	5
14. I had all the technology and technology skills I needed to adequately cope with this course.	1	2	3	4	5
15. I had no problems with the technology.	1	2	3	4	5
16. I had lots of technical problems.	1	2	3	4	5
17. For someone like me, technology has now reached a point where it can be an acceptable alternative to the face-to-face classroom.	1	2	3	4	5

PART D

Thinking about the Coursera course, please circle the correct response, using the scale indicated:

How well did you….	Not well at all				Very well

How well did you….	Not well at all				Very well
18. …manage your learning in the Coursera course overall?	1	2	3	4	5
19. …handle your learning in the Coursera course overall?	1	2	3	4	5
20. …effectively participate and control your own learning in the Coursera course overall?	1	2	3	4	5
21. …finish your course work by deadlines within the course?	1	2	3	4	5
22. …work on Coursera course work when there were other interesting things to do?	1	2	3	4	5
23. …use appropriate resources to get information for Coursera course work?	1	2	3	4	5
24. …plan your Coursera course work?	1	2	3	4	5
25. …organize your Coursera course work?	1	2	3	4	5
26. …motivate yourself to do Coursera course work?	1	2	3	4	5
27. This way of learning suits my learning style.	1	2	3	4	5

PART E

Thinking about the Coursera course, please circle the correct response, using the scale indicated:

	Strongly disagree				Strongly agree
28. The course material was interesting.	1	2	3	4	5
29. I like to learn this way.	1	2	3	4	5
30. The course material will be valuable to me.	1	2	3	4	5
31. The workload was too light for an MBA class.	1	2	3	4	5
32. It was worthwhile.	1	2	3	4	5
33. It was well presented.	1	2	3	4	5
34. It was easily understood.	1	2	3	4	5
35. It was too basic for a MBA class.	1	2	3	4	5
36. This was a good add-on for the class.	1	2	3	4	5
37. It was terrific to take a class from “the man who wrote the book on this topic”.	1	2	3	4	5
38. The standing of the professor was an important thing when thinking about course quality.	1	2	3	4	5
39. The standing of the institution (University of Maryland) was an important thing when thinking about course quality.	1	2	3	4	5
40. It is great these courses are available for free.	1	2	3	4	5
41. The fact that it is free diminishes the quality.	1	2	3	4	5

	Strongly disagree				Strongly agree
42. GSU should recognise courses like this for credit.	1	2	3	4	5
43. If I had paid a small fee for this class, I would be more likely to complete it.	1	2	3	4	5
44. I would take more of these classes if I could get credit.	1	2	3	4	5
45. This might be interesting but it is not of college standard.	1	2	3	4	5
46. Overall I enjoyed this course.	1	2	3	4	5
47. I learnt a lot from this course.	1	2	3	4	5
48. It was a great idea to include this in our MBA IS class.	1	2	3	4	5
49. I would like to take more classes like this.	1	2	3	4	5
50. A big plus for me with classes like this I can take them at a time to suit myself.	1	2	3	4	5
51. I would only take these classes if I could get college credit for them.	1	2	3	4	5
52. I believe I will be able to use the skills/ knowledge I have gained from the Coursera course.	1	2	3	4	5
53. I believe I have learnt a lot from the Coursera course.	1	2	3	4	5
54. I see the Coursera course we took as pretty much a waste of time.	1	2	3	4	5
55. Such classes should be an integral part of our MBA classes.	1	2	3	4	5
56. I would prefer to undertake the same course as a traditional face-to-face course (instead of a Coursera course).	1	2	3	4	5
57. I like fellow students and the professor to be around me rather than online.	1	2	3	4	5
58. I can see Coursera-like classes playing a major part in future education.	1	2	3	4	5

PART F

Thinking about the Coursera course, please circle the correct response, using the scale indicated:

	Very dissatisfied				Very satisfied
59. Please rate your overall satisfaction with the Coursera course.	1	2	3	4	5

60. If I have 10 classes in my MBA program, I would like to take _____ this way.

For the following question, please circle the correct response using <u>each of the scales</u> indicated. Each scale indicates your response to the blank space in the question.

61. Overall, I am quite _____ with the Coursera course.

Frustrated				Contented
1	2	3	4	5

Displeased				**Pleased**
1	2	3	4	5
Disappointed				**Delighted**
1	2	3	4	5

Would you like to make any other comments about your Coursera experience (positive, negative, or both)?

Thank you for completing the survey!

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