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HARNESSING “MOOCs” – CAN THEY BE PART OF MBA COURSES?

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Abstract:

This paper reports the first academic study of student satisfaction with a MOOC – this one experienced as part of an Information Systems class in an MBA program. A causal model based on the literature was developed and student satisfaction with the learning experience measured, as was the desire of the students to take more courses this way. 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.

Keywords: Online learning, MOOCs, e-learning, course content, college credit

I. INTRODUCTION

“Thirty years from now the big University campuses will be relics. Universities won’t survive. It is as large a change as when we first got the printed book”

- Peter Drucker - 1997

At the time when President Clinton was calling for more money to be pumped into the education system, Peter Drucker was making a worrisome prediction:

“Do you realize that the cost of higher education has risen as fast as the cost of health care? And for the middle-class family, college education for their children is as much of a necessity as is medical care—without it the kids have no future.

“Such totally uncontrollable expenditures, without any visible improvement in either the content or the quality of education, means that the system is rapidly becoming untenable. Higher education is in deep crisis.”

Stanford faculty set up three classes in the fall of 2011 – they were courses in artificial intelligence, databases, and machine learning and opened them to the world – these classes attracted hundreds of thousands of students leading to the launch of Coursera and Udacity. At the same time an MIT and Harvard venture evolved into edX as a non-profit consortium for online education (Cooper and Sahami 2013). Massive Open Online Courses (MOOCs) were born. Both groups have now grown substantially.

This paper reports the results of the first (to the best of the authors’ knowledge) academic study regarding student satisfaction with such classes and the effect of satisfaction on the desire to take classes this way. It is the first study relating to Information Systems and Business School programs – it may well be the first relating to satisfaction with a MOOC in any discipline.

II. BACKGROUND

An increasing emphasis is being placed on learning in today’s globalized world with its knowledge-based economy, driven by competition and sharing of information (Zhang et al. 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. Early forms of distance learning sent printed materials through the mail, subsequently enhanced this with radio and eventually with 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 the day, but in time a more recent technology, the internet, took over, allowing computers and the internet to be used for students to take online courses while 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 100 000 students in his open class. These iterations helped establish the playing field for the development of the current phenomenon of distance learning, MOOCs.

Coursera now claims 62 universities worldwide and over 3 million "courserans" – students who have enrolled in at least one course. edX, the MIT Open Course Ware venture with Harvard and 10 other leading universities from around the world offers large numbers of courses as does Udacity, the other major player.

Against this, 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, "delivering valuable signifiers of completion such as credentials, badges or acceptance into accredited programs" and "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 is 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 (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. They are 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% of presidents thought that online courses were a good investment and 66% said that their school either offers or plans to offer online courses (Foster, 2013).

Many believe that e-learning is not for everyone. Sharma et al (2007) in conducting a study of corporate e-learning suggested that organizations might be able to identify "at-risk" learners who may have difficulty succeeding in e-learning, by measuring the learners' self-regulation (discipline, time management, etc. (Britton and Tesser 1991)). By identifying these learners, organizations may target such learners and encourage them to make use of self-regulation, or in

the context of a MOOC, it is conjectured that some will be more satisfied 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 went on to discuss “help seeking” – the way in which students sought help when confronted with a problem – did they prefer to gain assistance from manuals, references, online resources, etc., or ask classmates and the instructor for assistance?

Computing and internet technologies may also impact the satisfaction of e-learning students 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 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 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 and Moore, 2002). 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, it is converging or competing with campus based classes and it is becoming seen as a significant factor in global trade. Factors influencing this include quality management, faculty development, online course design, and pedagogy (Lee 2004, Chao et al 2010). Lee 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 the student’s 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 standing of the instructor and the institution, and the cost.

The following research questions are proposed against the research model offered in Figure 1:

1. What are the principal factors determining satisfaction with a MOOC?
2. Does satisfaction influence the desire to take more classes this way?

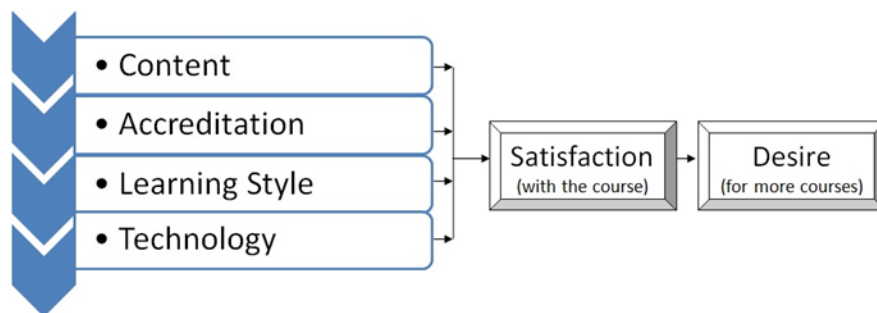


Figure 1 Research Model

III THE RESEARCH ENVIRONMENT

The data collected for this study was obtained in a particular environment which a) has an impact on the findings, and b) affects the generalizability of the results. This notwithstanding, the authors

believe that the study and the results will be particularly useful to Business Schools and Information Systems departments where the use of such technology is being considered; it may well have wider implications for university administrations.

The respondents to the survey were drawn from an Information Systems Management class taught as part of an MBA program at a Tier 2 school in the South-East United States. As part of the class, the students were asked 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 2 weeks' coverage; in this case the students were asked to participate in the MOOC for 4 weeks (up to and including a mid-term paper) in lieu of attending the normal face-to-face class sessions. 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 relating 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 at 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.

The instructor for the MBA class (one of the authors of this paper) also enrolled in the MOOC and participated in all the scheduled activities.

The assignment work referred to above was not available at the time of preparation of this paper; however a feedback session at the conclusion of the required portion of the MOOC was held and provided a forum for considerable discussion. In addition the results of the analysis were referred back to a small focus group of students for further response and comment. Comments from both groups have been included in the discussion section of this paper to flesh out the statistical findings.

Respondent Demographics

The class consisted of 34 students – 33 completed the survey, 32 responses were usable. Of the 32, 62% were male, 84% aged under 31, 3% had children living at home, 28% had less than 1 year of work experience, 37% had 1 or less online classes prior to this and most rated their computing and internet technologies as “strong” on a 4 point scale – minimal, passable, sound, expert. In summary then, this can be considered a fairly standard MBA class – reasonably evenly split male/female, a mixture of recent graduates with limited experience and those with considerable time in the work place, most with at least some prior online experience and all confident in their abilities to use computing and internet technologies.

Another aspect relating to these respondents is that the university where they are enrolled in the MBA program also offers an online based MBA – therefore having made the choice to enroll in the regular MBA, these students might be expected to prefer the face-to-face classroom environment to that of an online one.

Background Analysis

Some preliminary analysis taken from the survey responses is appropriate at this point.

The principal construct measuring satisfaction with the MOOC experience was expressed as follows: “Please rate your overall satisfaction with the Coursera course” and evaluated on a 5 point scale, ranging from “very dissatisfied” to “very satisfied”. The responses are shown in Figure 2 below. It can be seen that the majority of the students were satisfied, however there was a small group (around 20%) who expressed dissatisfaction (as it happened, a vocal minority in the feedback session).

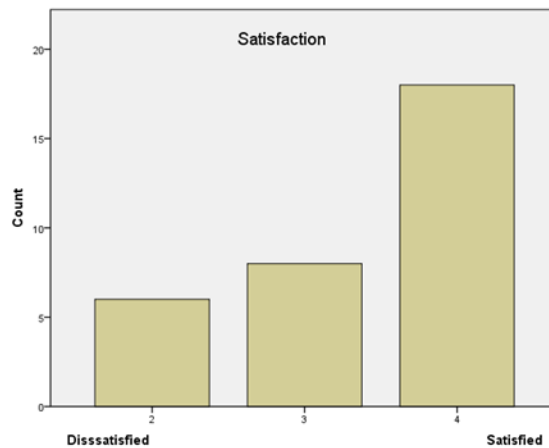


Figure 2 Overall satisfaction with the MOOC

In relation to the demographics of the respondents as outlined above, due to the small sample sizes and the non-normal distributions, a series of non-parametric tests were conducted to determine if there was any difference in the means for “satisfaction” as reported in Figure 2 above for each of these groups. None of the demographic groupings had means with a significant difference using the Independent Samples Mann-Whitney U test. The results are in Table 2. The two closest to being significant, Gender and Technology 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

Regarding the issue of a potential preference for face-to-face classes, the responses to two measurement items are shown in Figures 3 and 4 below. These demonstrate the expected preference for the more traditional environment.

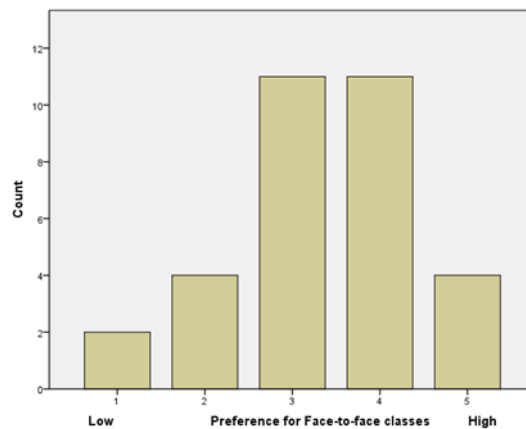


Figure 3 Prefer Traditional Classes

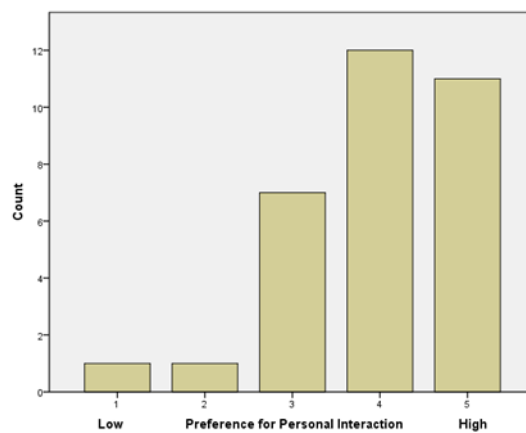


Figure 4 Prefer Personal Interaction

IV RESEARCH METHODOLOGY

A survey tool, reflecting the measurement constructs outlined above, was developed from a published validated instrument (Sharma et al 2007) and adapted for this study by an academic extensively published in online learning and experienced in scale development. The survey was reviewed by other scholars and tested for ambiguity and length prior to its administration to the MBA class of 33. The data was entered into Excel and reviewed for outliers and normality. One survey was rejected as unusable (N now = 32) and in the light of the non-normal nature of the data (and the relatively small sample size), the non-parametric tests as outlined above and the analysis below were conducted using SPSS.

The survey instrument consisted principally of a series of statements with the respondents asked to rate them on a five point scale, typically from “strongly disagree” to “strongly agree”. In developing the scales the authors used a number of techniques to provide some mitigation of potential common method bias. Some questions were negatively worded, others required the respondent 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 the principal measure of satisfaction was assessed, in addition to the Likert scale item, by having the respondents chose a point on a line between two extremes, e.g. “I was DisappointedDelighted” (Podsakoff and Todor, 2003). Correlations between the Likert scale measure (F59) and the three measures where the respondents chose a spot on a line are given in Table 3 below. Another concern re common method bias relates to self-reporting however self-reports are clearly appropriate for job satisfaction and many other private events (Chan 2009) therefore it is considered 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)				

V ANALYSIS

Stepwise linear regression revealed some support for the research model. The dependent variable “Satisfaction” was strongly predicted by the factors of Content, Materials (both related to the *Quality* of the course material), obtaining some form of *College Credit* for the course taken, a fit with *Learning Style* - the need to seek help, and wanting an physical interaction with the professor and fellow students.

In other words the results of the analysis indicate that there is strong support for satisfaction with a MOOC being primarily related to the content of the course – in particular to the quality of the offerings and course material. There is also support for satisfaction being related to the possibility of the course being accepted for college credit. Perhaps learning style plays a small part too. To support these remarks the SPSS output is given in the tables 4 and 5 below.

Table 4 Model Summary

Model	R	R Square	Adjusted R ²	Std. Error of the Estimate
1	.870 ^a	.757	.748	.408
2	.892 ^b	.796	.780	.381
3	.920 ^c	.846	.829	.337
4	.935 ^d	.875	.855	.310
5	.932 ^e	.870	.854	.310
6	.944 ^f	.891	.874	.289
7	.954 ^g	.910	.891	.269

Predictors: (Constant), E54, E34, E44, B3, E57

Table 5 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.533	1	14.533	87.200	.000
	Residual	4.667	28	.167		
	Total	19.200	29			
2	Regression	15.274	2	7.637	52.521	.000
	Residual	3.926	27	.145		
	Total	19.200	29			
3	Regression	16.248	3	5.416	47.707	.000
	Residual	2.952	26	.114		
	Total	19.200	29			
4	Regression	16.801	4	4.200	43.777	.000
	Residual	2.399	25	.096		
	Total	19.200	29			
5	Regression	16.695	3	5.565	57.756	.000
	Residual	2.505	26	.096		
	Total	19.200	29			
6	Regression	17.106	4	4.277	51.063	.000
	Residual	2.094	25	.084		
	Total	19.200	29			
7	Regression	17.470	5	3.494	48.464	.000
	Residual	1.730	24	.072		
	Total	19.200	29			

In addition Satisfaction is a clear indicator of the desire to take more MOOC offerings as part of a regular college program. See tables 6 and 7.

Table 6 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.614 ^a	.377	.357	.863

a. Predictors: (Constant), F59

Table 7 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.542	1	13.542	18.190	.000
	Residual	22.333	30	.744		
	Total	35.875	31			

While the above provides some support for the model, it was also noted that a significant number of students would like to take at least some classes via the MOOC mode in their face-to-face MBA program, see Figure 5:

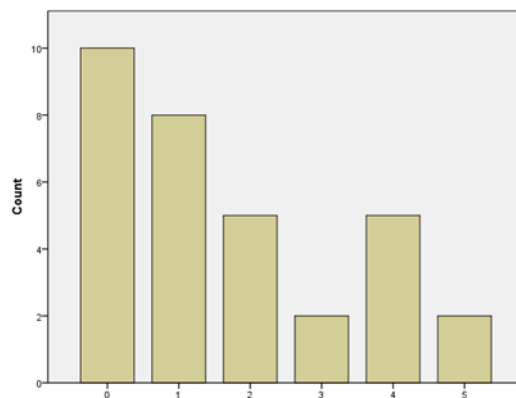


Figure 5 No. of MOOCs preferred as part of the MBA

VI CONCLUSION

The authors believe that this study is a useful indication of one possible direction for the MOOC offerings to take. Clearly, the study has substantial limitations – a small sample (further work using structural equation modeling might provide a more meaningful and reliable analysis)

coming from one class's exposure to one MOOC, and in one university. Also only a few of the students completed the whole of the MOOC.

Nevertheless, the above findings do indicate that at least for some of the students, perhaps a majority of MBA students, the incorporation of this material into face-to-face classes would be an appropriate resource, enabling the fulfillment of course objectives while potentially giving students some flexibility in class timing and attendance and freeing up some professorial time.

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