

A Study of Effects of Open Ceremony on e-learning Account Sustainability

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Abstract. The purpose of this study was to identify whether an open ceremony affects on-line learning platform account keeping behavior. This is a longitudinal non-experimental study. Total 9959 user accounts on a e-learning server since 2009 were reviewed. The server provides on-line learning courses to the publics. There are two types of courses, one with open ceremony for learners in classroom and the other is not. A survival analysis was performed to assess the effectiveness of the ceremony for user account sustainability. It was found that after five years, the survival rate of ceremony group is 0.53 and non-ceremony group is 0.01. Based upon the statistically significant effect, it was concluded that open ceremony had shown effects on user account sustainability.

1 Introduction

E-learning, Open-Courses, & Platforms

In this information age, information system provides a flexible communication solution. It also plays an important way for supporting personal learning by establishing well organized educational environment.

E-learning had become a foundation of life-long learning. No matter when, or where, one can always rely on e-learning to exploring knowledge according one's will. E-learning provides a new concept on learning.

Open-course is another break though on the other side of e-learning. Open-courses are well organized learning activities and freely open to the publics. Based upon the concept of e-learning on the learner side, open-courses on the content side, and internet connected platform, a fully functional education environment is established. A conceptual model is illustrated in Figure 1.

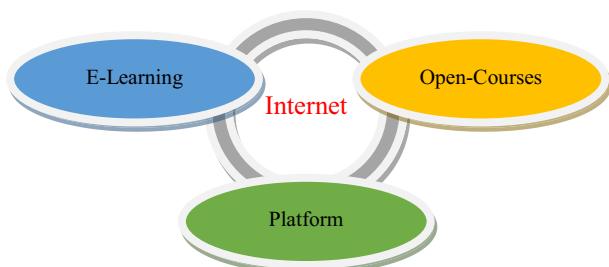


Figure 1. A fully functional education environment

1.1 Problem Statement

For managing an information system, there is always a need to understand user's behavior on system service. In an open learning environment, how an information service provider can keep their users on using service is an important problem.

The purpose of this study was to identify whether an open ceremony affects on-line learning platform account keeping behavior.

2 Literature review

2.1 Massive Open Online Courses

A MOOC is an online educational platform that provides the dissemination of content to large numbers of users who have access to the Internet. The fundamental design of a MOOC affords users the ability to watch videos, access assignments, utilize resources, and connect with fellow users and instructors. Some MOOCs require users to complete tests and quizzes that can be automatically graded, while others rely on peer reviewed feedback from other current users.

Most MOOCs are free but do not provide transferable credit to other institutions. Some institutions do provide users the ability to obtain a "certificate of completion" by completing a final exam or standardized assignments, but this credential is not transferable as college-level credit. Recently, the American Council on Education accredited five MOOCs for which users can earn transferable credit. These courses require that students pay a fee and

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successfully complete assignments and exams before being awarded credit.

Several companies, organizations, and institutions support MOOCs and opensource education to users. As of January 2013, Coursera, Udacity, and edX were the three leading organizations to provide online platforms for MOOCs(Coursera, 2013).

3 Methodology

3.1 Survival / Failure Analysis

Survival/failure analysis is a family of techniques dealing with the time it takes for something to happen: a cure, a failure, an employee leaving, a relapse, a death, and so on.

One interesting feature of the analysis is that survival time (the DV) often is unknown for a number of cases at the conclusion of the study. Some of the cases are still in the study but have not yet failed: some employees have not yet left, some components are still functioning, some patients are still apparently well, or some patients are still living. For other cases, the outcome is simply unknown because they have withdrawn from the study or are for some reason lost to follow-up. Cases whose DV values—survival time— are unknown for whatever reasons are referred to as censored.

The term survival analysis is based on medical applications in which time to relapse or death is studied between groups who have received different medical treatments. Is survival longer for a group receiving ceremony rather than another?

3.2 Life tables

Within the family of survival- analysis techniques, different procedures are used depending on the nature of the data and the kinds of questions that are of greatest interest.

Life tables describe the survival (or failure) times for cases, and often are accompanied by a graphical representation of the survival rate as a function of time, called a survivor function. Survivor functions are frequently plotted side-by-side for two or more groups (e.g., treated and untreated patients) and statistical tests are used to test the differences between groups in survival time.

3.3 Proportions Surviving at Various Time

The primary goal of one type of survival analysis is to describe the proportion of cases surviving at various times, within a single group or separately for different groups. The analysis extends to statistical tests of group differences. The primary goal of the other type of survival analysis is to assess the relationship between survival time and a set of covariates (predictors), with treatment considered one of the covariates, to determine whether treatment differences are present after

statistically controlling for the other covariates. We may ask that what the survival rate at various points in time is.

3.4 Group Differences in Survival

This study also asks that If there are different groups, are their survival rates different? Several tests are available to evaluate group differences. If statistically significant group differences are found, separate life tables and survivor functions are developed for each group.

3.5 Limitations to survival Analysis

One problem with survival analysis is the nature of the outcome variable, time itself. Events must occur before survival or failure time can be analyzed: Components must fail, users must leave, and patients must succumb to the illness. However, the purpose of treatment often is to delay this occurrence or prevent it altogether. The more successful the treatment, then, the less able the researcher is to collect data in a timely fashion.

Survival analysis is subject to the usual cautions about causal inference.

3.6 Fundamental Equations for Survival Analysis

Life tables are built around time intervals; in this study, the intervals are of width 3 months. The survivor function, P, is the cumulative proportion of cases surviving to the beginning of the i + 1st interval, estimated as:

$$P_{i+1} = p_i P_i$$

where:

$$p_i = 1 - q_i$$

$$q_i = \frac{d_i}{r_i}$$

and

where d_i = number responding (dropping out) in the interval and

$$r_i = n_i - \frac{1}{2} c_i$$

where n_i = number entering the interval

c_i = number censored in the interval (lost to follow up for reasons other than dropping out).

The proportion of cases surviving to the (i+1)st interval is the proportion who survived to the start of ith interval times the probability of surviving to the end of the ith interval.

4 Findings

4.1 Descriptive Statistics

In Table 1., the months of account sustainability was listed. The minimum is four months and the maximum is fifty months. The average account sustains 34.9 months. The standard deviations are 15.271 months. The total accounts are 9959.

Table 1. N, Minimum, Maximum, Mean, & Std. Deviation of Account Sustainability (Months)

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
MONTHS	9959	4	50	34.9	15.271
Valid N (listwise)	9959				

In Table 3, the frequency of account status was listed in two types under still using and not using. There are 4052, 40.7%, active accounts and 5907, 59.3%, discontinued accounts.

Table 2. Life table of account sustainability

First-order Controls	Interval Start Time	Number Entering Interval	Number Withdrawing during Interval	Number Exposed to Risk	Number of Terminal Events	Proportion Terminating	Proportion Surviving	Cumulative Proportion Surviving at End of Interval	Std. Error of Cumulative Proportion Surviving at End of Interval	Probability Density	Std. Error of Probability Density	Hazard Rate	Std. Error of Hazard Rate
CEREMONY	NON_CEREMONY	0	2402	2402.000	0	.00	1.00	1.00	.00	.000	.000	.00	.00
		3	2402	2402.000	30	.01	.99	.99	.00	.004	.001	.00	.00
		6	2372	2372.000	169	.07	.93	.92	.01	.023	.002	.02	.00
		9	2203	2203.000	8	.00	1.00	.91	.01	.001	.000	.00	.00
		12	2195	2195.000	1072	.49	.51	.47	.01	.149	.003	.22	.01
		15	1123	1123.000	20	.02	.98	.46	.01	.003	.001	.01	.00
		18	1103	1103.000	25	.02	.98	.45	.01	.003	.001	.01	.00
		21	1078	1078.000	23	.02	.98	.44	.01	.003	.001	.01	.00
		24	1055	1055.000	437	.41	.59	.26	.01	.061	.003	.17	.01
		27	618	618.000	18	.03	.97	.25	.01	.002	.001	.01	.00
		30	600	600.000	20	.03	.97	.24	.01	.003	.001	.01	.00
		33	580	580.000	16	.03	.97	.23	.01	.002	.001	.01	.00
		36	564	564.000	408	.72	.28	.06	.01	.057	.003	.38	.02
		39	156	156.000	123	.79	.21	.01	.00	.017	.001	.43	.03
		42	33	33.000	0	.00	1.00	.01	.00	.000	.000	.00	.00
		45	33	33.000	0	.00	1.00	.01	.00	.000	.000	.00	.00
		48	33	16.500	0	.00	1.00	.01	.00	.000	.000	.00	.00
CEREMONY		0	7557	7557.000	0	.00	1.00	1.00	.00	.000	.000	.00	.00
		3	7557	7557.000	21	.00	1.00	1.00	.00	.001	.000	.00	.00
		6	7536	7536.000	112	.01	.99	.98	.00	.005	.000	.00	.00
		9	7424	7424.000	5	.00	1.00	.98	.00	.000	.000	.00	.00
		12	7419	7419.000	715	.10	.90	.89	.00	.032	.001	.03	.00
		15	6704	6704.000	14	.00	1.00	.89	.00	.001	.000	.00	.00
		18	6690	6690.000	16	.00	1.00	.88	.00	.001	.000	.00	.00
		21	6674	6674.000	16	.00	1.00	.88	.00	.001	.000	.00	.00
		24	6658	6658.000	880	.13	.87	.76	.00	.039	.001	.05	.00
		27	5778	5778.000	12	.00	1.00	.76	.00	.001	.000	.00	.00
		30	5766	5766.000	13	.00	1.00	.76	.00	.001	.000	.00	.00
		33	5753	5753.000	11	.00	1.00	.76	.00	.000	.000	.00	.00
		36	5742	5742.000	1527	.27	.73	.56	.01	.067	.002	.10	.00
		39	4215	4215.000	107	.03	.97	.54	.01	.005	.000	.01	.00
		42	4108	4108.000	43	.01	.99	.54	.01	.002	.000	.00	.00
		45	4065	4065.000	18	.00	1.00	.54	.01	.001	.000	.00	.00
		48	4047	4019.000	2037.500	.01	.99	.53	.01	.002	.000	.00	.00

Table 3. Frequency, & Percent of accounts status

N USING		Valid		Per-Cumulative	
		Frequency	Percent	cent	Percent
Valid	STILL USING	4052	40.7	40.7	40.7
NOT US-	ING	5907	59.3	59.3	100.0
Total		9959	100.0	100.0	100.0

In Table 3, the frequency information of ceremony was illustrated. Those accounts with ceremony experience are 7559, 75.9%. Those who without ceremony experience are 2402, 24.1%.

Table 4. Frequency, & Percent of Ceremonial Experience

CEREMONY		Valid		Per-Cumulative	
		Frequency	Percent	cent	Percent
Val-	NON_CEREMON	2402	24.1	24.1	24.1
id	Y	7557	75.9	75.9	100.0
Total		9959	100.0	100.0	100.0

4.2 Life table of account sustainability

In Table 4., the intervals are width three months. The first-order controls are non-ceremony and ceremony. Items listed in Table 4. are number entering interval, number withdrawing during interval, number exposed to risk, number of terminal events, proportion terminating, proportion surviving, cumulative proportion surviving at

end of interval, std. error of cumulative proportion surviving at end of interval, probability density, std. error of probability density, hazard rate, and std. error of hazard rate.

For the group without ceremony experience, there are 2,402 accounts in the beginning. In the first 15 months, the number drop less than half of the original, the number for the fifteenth months is 1,123.

For the group with ceremony experience, there are 7,557 accounts in the beginning. Till the end of the fiftieth month, the value is still higher than half of the beginning. The value is 4,047.

4.3 Group Comparison

In Table 5, the median survival time of non-ceremonial experience are 14.78 months and the median survival time of ceremonial experience are 48 months.

Table 5. Median survival time

Median Survival Time	
First-order Controls	Med Time
CEREMONY	NON_CEREMONY 14.78
	CEREMONY 48.00

In Table 6, the significant level is lesser than .05, the groups are significantly different by the log-rank test.

Table 6. Comparisons for factor ceremony status

Overall Comparisons ^a		
Wilcoxon (Gehan) Statistic	df	Sig.
2860.997		.000

a. Comparisons are exact.

Table 7. N, Mean, Std. Deviation of Account Sustainability for both non-ceremony & ceremony groups

Descriptives		95% Confidence Interval for Mean							
MONTHS		N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
NON CEREMONY	2402	20.53	11.140	.227	20.08	20.97	4	50	
CEREMONY	7557	39.47	13.465	.155	39.17	39.78	4	50	
Total	9959	34.90	15.271	.153	34.60	35.20	4	50	

Table 8. One-way ANOVA for Comparing Account Sustainability of Groups

ANOVA		
MONTHS		
Sum of Squares	df	
Between Groups	654339.151	1
Within Groups	1667845.036	9957
Total	2322184.188	9958
	F	
	.3906.391	
	.000	

In Table 8, the result of comparing was significant. There exists significant difference between groups.

Figure 1, the survival function for cumulating survival rate by months was drawn. The dotted line was drawn according the ceremonial experience group.

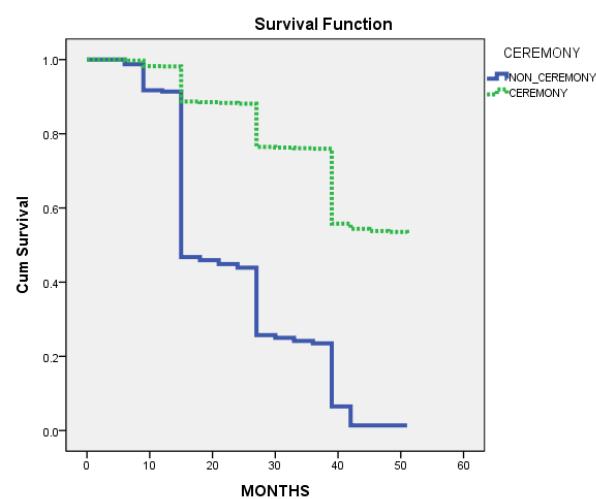


Figure 2. Survival Function

The solid line is for the non-ceremonial experience group.

In Table 7, the mean account sustainability was listed. The value of non-ceremony group is 20.53 months. The value of ceremony group is 39.47 months.

5 Conclusions

The purpose of this study was to identify whether an open ceremony affects on-line learning platform account keeping behavior. This is a longitudinal non-experimental study. Total 9959 user accounts on a e-learning server since 2009 were reviewed. The server provides on-line learning courses to the publics.

There are two types of courses, one with open ceremony for learners in classroom and the other is not. The mean value of non-ceremony group is 20.53 months. The mean value of ceremony group is 39.47 months. Based upon one-way ANOVA test, there is significant difference between ceremony group and non-ceremony.

In the other words, the mean value of ceremony group is significantly higher than the mean value of non-ceremony group.

A survival analysis was performed to assess the effectiveness of the ceremony for user account sustainability. It was found that after five years, the survival rate of ceremony group is 0.53 and non-ceremony group is 0.01. Based upon the statistically significant effect, it was concluded that open ceremony had shown effects on user account sustainability.

This study was conducted from two view points. The first one is seeing accounts sustainability as a whole. The

second one is based upon the time line. From both viewpoints, the conclusion is the same as “ceremony had shown significant effects on account sustainability.”

Reference

1. COURSERA. 2013. Coursera website [Online]. Available: <https://www.coursera.org> [Accessed June 8 2015].