J. Internet Comput. Serv.
ISSN 1598-0170 (Print) / ISSN 2287-1136 (Online)
http://www.jics.or.kr

Understanding the Entertainment Values in the Online Educational Videos☆

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ABSTRACT

Since the inception of the platform business in educational contents, the prominence of the online educational video has flipped the educational environment. Educational contents have been produced on the internet and allowed learners to access more flexible and student-centered. In fact, the number of people watching the educational content online, such as TED talks and YouTube, has increased during the past decade. The ways of delivering the lecture and the course information in online educational videos are totally different from the traditional lectures. In this paper, we aimed to examine and categorize the online educational videos based on the user's engagement and interest in the course contents. For the study, a negative binomial regression analysis was applied to estimate the effects of the attributes of the traditional lectures by comparatively analyzing the educational videos online. Several values are determined as engaging factors in the online educational videos; hybrid production of education and entertainment, shorter duration, and the number of presenters. From the study, we suggests how to produce engaging educational contents which will appeal the attentions from the users. Moreover, the result of the study may use as a guide to the providers making the productive educational videos.

☞ keyword : Online Educational Videos, Video Engagement, TED, Entercation, Educational Content

1. Introduction

In 2001, the Massachusetts Institute of Technology launched 'the Open Course Ware (OCW)' that provided more than 1,600 course materials on the website **[1]**. Over 3,000 courses were translated and supported from over hundreds institutes, its educational effectiveness was considered to be limited.

In recent years, a vast amount of online course providers started to emerge, as the learning industry in the online education sector has shown an exponential growth. More than 58 million registered users signed up for more than one course on Massive Open Online Courses (MOOCs) by the end of 2016, and in the year 2017, 'edX (edX.org)' have 14 million registered users and 'Coursera (cousera.org)' have reached 30 million users **[2]**.

The unconventional approach of the online course providers delivered course materials at a global mediascape, and the e-learning market is now expected to reach $331 billion (USD) by 2020.

The educational videos providers differ from the past videos such as OCW, as the online education domain in the past has focused primarily on information transmission, while the current structure no longer relies on the primarily outdated methods and instead offers an open and online learning opportunity **[1]**. During the past decade, Technology Entertainment Design (TED) has prevailed as one of the most popular platforms and has viewed over six billion times. The TED phenomenon has been at the forefront of revolutionizing the way we attain knowledge, as the contents delivered on TED would pique the audiences' curiosity within an 18-20 minutes educational module utilizing audio and visual tools to capture the audience's attention **[3]**.

In spite of the technological advancements in creating and providing a vast amount of course materials, online course providers as MOOC has an estimated rate of 85-95% dropout rate **[4]**. Although Noel and Levitz **[5]** emphasize that, the

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[Received 31 July 2018, Reviewed 3 August 2018(R2 20 August 2018), Accepted 26 August 2018]
☆ This work was supported by the Soonchunhyang University Research Fund.

student's success in college directly links to the student's retention rate. Studies identifying and analyzing how to capture successfully capture the student's attrition rate; have stagnated in the online courses, because of the incipient nature of the online education industry. In addition, while the more traditional learning environment has defined in the terms of time, place, and space **[6]**, we wanted to gain a better understanding of what affected the user's attrition rate in the online education environment. Both the delivery method of the online courses and suggestions offered by the online course providers have most certainly acted as a success factor for these materials. Nevertheless, there has been little to no research on these factors for the online education industry.

Our study aims to observe and examine how TED have been a phenomenon for the past decade, for instance TED talks, and to suggest our insight and implications for the online content providers by comprehending what helps dictate the user's decision on selecting an educational videos. Thus, allowing the educational contents providers to increase the user's attrition rate. The educational videos' content type, popular topics, and duration of the lecture, and entertainment factors in the online lectures are crucial components for the online course that influences the user's interest and attrition rate. We therefore discuss and hypothesize the effects they have on the user's retention rate.

In section 2, we introduce the key success factors for creating online educational contents that will help raise the viewer's engagement and briefly discuss the changes and history of the online education trends. In Section 3, we posit our hypothesis. In the penultimate section, we present our method, analysis, and results. Finally, we conclude the paper by focusing on our implications and limitations on this study.

2. Literature Reviews

2.1 User's Motivation to Watch the Online Educational Videos

Past studies on the use of computer-based communication technologies have found that the user's capability, social interaction, media richness are part of the individual's reasons for the media use **[7]**. In recent years, the media landscape's trend has shifted, as the users are now able to have greater control over the media consumption. Consequently, the trend has also influenced the way the online educational videos are developed and delivered. With the rapid growth in technologies, utilizing the technologies as an effective tool for developing the educational contents online has become important for MOOCs, as these tools often help lead to the student's best learning outcomes **[8]**.

The rapid development of the online media consumption has fundamentally transformed the mechanisms in the online education industry. As a result, our study aims to define the online education for the online course providers and institutions, specifically, by suggesting how to design a successful online lecture and investigating the critical factors of a popular online lecture. Past studies have attempted to measure the effectiveness of the online education, by measuring the user's participation, cognitive engagement, and technology self-efficacy **[9]**. Another study measured the effectiveness through the technology, instructor characteristics, and student characteristics **[10]**.

Fulfilling the learning outcomes is part of the criteria that shape the online education. In fact, the online education requires similar engagement levels like face-to-face interactions. A study supported that the online delivery demonstrates a certain level of interaction towards the learners **[11]**.

In the past, the accessibility, cost-effectiveness, flexibility, and learning quality were the key determinants of the success of the online lectures **[12]**. However, in recent years the qualities of the online lecture, user's support, and engagement have become critical elements for the online lecture **[13]**. Past studies that investigated the finding key elements for the online education contents have varied. Nevertheless, these studies have drawn attention to the educational purpose the online lecture and how the online lecture can help the student's learning outcomes as a tool.

The educational contents providers allow the users to select a wide range of topics on the online videos. This permits the users to easily access these contents based on the user's preference and interest. Hence, online course providers must constantly produce educational videos that will appeal to a wide range of users. The user's decision to consume and share the contents drive from their interest. For

the user's motivation for watching online lectures, around 45% of the users have stated that they watch online lectures for their own interest **[14]**. In order to assist users to find their interested topic from a huge number of videos, the platform such as YouTube provides several features such as the search engine, front-page highlight, and videos recommendation. Moreover, auto-recommend method positively promoted learner's motivation compare, in specifically using content summarization **[15]**. The online recommendation system uses the user's profiles to make suggestions that highly correlate to the user's preferences. Nevertheless, the suggestions are restricted based on the user's prior experiences **[16]**. Refining the user's preferences and interest only through their prior experiences and suggesting the contents from the vast amount of data may be difficult online lecture providers. Thus, comprehending the other factors that appeal to the users may provide a greater insight for the online lecture providers. Online lecture providers and presenters should also focus on the duration of the video, the number of objects appearing on the screen, auxiliary materials and presenters to gain a deeper understanding on the user's interest and motivations for viewing the online educational videos **[8]**.

2.2 Engaging Online Educational Videos for the User

As mentioned above, the vast amount of educational contents are accessible to the users and this no longer guarantee the success of making engaging online educational videos. One of the fragmentary evidence to support the phenomenon is the 85-95% dropout rate showed among the learners in MOOCs **[4]**.

The user's intention to acquire more information via the online videos may hinder the user's interest, if there is an information overload **[17]**. Ho and Tang **[18]** argued that information overload consists of information quantity, information quality, or information format. Users were less satisfied with the online lecture when faced with an information overload. Renckstorf's social action model demonstrates the uses and gratification theory applying in media use **[19]**. The model categorized the purposes and motivations of media use into three parts; social use, instrumental use, and the intrinsic use of media for entertainment. In the past, the media considered playfulness and entertainment value as the most significant part of the media use. In fact, entertainment values closely relate to the emotion and need that seeks pleasure. Toms **[20]** revealed that a curiosity or play driven interpretation of reading electronic news.

Therefore, the user's motivation may be the means for developing the value of an online lecture, which may also develop the entertaining component of the lecture videos.

In 1973, Robert Heyman coined the term "edutainment" that implies interactive education and entertainment services, which consists of a playful communication with educational aims **[22]**. Edutainment is a tool utilized to help promote the user's learning outcomes, memory development, attention, motivation, and development of cognitive process. In fact, edutainment is the concepts that help designing and deliver the educational content in a form of entertainment. There has been an attempt to define the relationship between entertainment and education, and other studies have introduced "entercation" to gain a better understanding of the current online education environment and to better appeal the users **[23]**. The characteristics of entercation primarily focus on the education aspect, while also focusing on attracting the users by offering entertaining factors towards the content. Incorporating intrinsic motivations that evoke the audiences such as emotion, entertainment is a critical part of increasing the user's interest towards consuming the online educational videos **[24]**.

3. Hypothesis

3.1 Finding User Interest in the Online Educational Videos

Content-based video indexing was developed and incorporated in the video management system to create topical categories **[25]**. Due to the huge volume of video data, content providers implemented video recommendation features, which assist the users in selecting a video based on the user's profile **[15]**. Often times, the algorithms and aggregated viewing patterns help reduce the daunting task of exploring and discovering new and interesting videos for the

users **[26]**. However, content creators are often times forced to create videos based on the popular topics suggested by the algorithms.

Despite the importance of the content-based filtering recommendations based on the user profile or past behavior, there is very little understanding of how the recommendation sources affect the user's behavior **[27]**. Maximizing the user's satisfaction level based on the user's profile and feedback is vital for a recommendation system **[16]**. While this may be true, we argue that a truly successful recommendation system should not be able to refine the user's preferences solely based on their past behavior. Furthermore, other studies have found that prior knowledge has little correlations to the learning outcomes **[25]**. Based on the users' usage pattern, YouTube is able to detect a trend in a large number of upload, but since the system avoids recommending commonly viewed videos it does not guarantee an effective video suggestion system **[28]**. Also for the conditions of a cold user, the collaborative filtering is less effective **[10]**.

Hypothesis 1: Popular topics recommended by TED will have a negative relationship to the user's interest for viewing the online lectures.

Much research indicates that the learners are able to determine the time and pace of the educational videos when engaging in the learning experience **[8]**. As such, the flexibility in time and space of the educational videos allows the users to gain access to the materials during commuting hours and at school **[29]**. Other studies have indicated that the instructors' timely response will affect the user's overall satisfaction towards the course **[30]**. TED's duration of the lecture has been a vital part of their success **[3]**, which the users watch during a commute or break. Another study states that shorter videos are much more engaging in the online learning environment **[8]**. Therefore, we suggest that a precedent factor for the user's attrition rate is the duration of the lecture.

Hypothesis 2: There is a positive correlation between the shorter duration of the lecture and the user's interest for viewing online educational videos.

Previous research shows that a heterogeneous group with a shared understanding can perform better perform than a homogeneous group for shared understanding **[31]**. For the policy makers, expert panels that consist of highly specialized individuals with in-depth knowledge in a particular domain can help the different stakeholder groups comprehend the scientific evidence on public policy from a different perspective **[17]**.

Hypothesis 3: The more lecturers appearance will have a positive relationship to the user's interest for viewing online lectures.

3.2 Entertainment Factors in the Educational Videos

Hannafin and Cole **[31]** have shown that the attitude of the student affects the learning interests. Piccoli et al. **[6]** stress how delivering the best suited matter and content type in the virtual environment is imperative for the virtual learning environment. Cheng **[32]** states how emotions are not part of the learning achievement activities or outcomes, but are an underpinning part of the learning and teaching process. By integrating an emotion-based experience, the users can explore a more personalized experience. Furthermore, past studies on viral campaigns have found that viewers who felt an emotional experience with the content will have a higher tendency to promote the content through social sharing **[31]**. The quality of the online educational content is a vital component for the users in the online learning environment, which influences the learning level of the users in a significant way **[6]**.

Vensteenkiste et al. **[33]** states lectures designed to enhance the student's motivation are a precedent factor for the learning outcomes of learners. Also the study defined motivation as intrinsic, extrinsic, and motivational styles that can help predict and provide insight into the individual's engagement and enthusiasm **[34]**. Motivated students are prone to successfully complete homework assignments, but unmotivated students are less persistent about their learning activities and outcomes. Moreover, the unmotivated students are more likely to drop out in comparison to the motivated students

Hypothesis 4: Educational contents designed to enhance the user's motivation will have a positive relationship to the user's interest viewing the online educational videos.

Often times with information overload, users are unable to locate the information that they need, because of the overwhelming amount of information **[35]**. In addition, users may fail to use relevant information. Garrison et al. **[36]** point out that implementing cognitive presence that involves the students to construct meaning on the learning content will enhance the student's satisfaction with the higher education students. Yet, other studies have shown that the anxiety and emotional fear of negative outcomes will significantly affect the learning satisfaction in the online learning environment **[6]**. Despite the individual's motivation to attain new knowledge in the online environment, lectures that incorporate numerous new knowledge may hinder the individual's retention rate and motivations.

The online lecture providers have numerous video formats ranging from handwritten tutorials, audio voice-over, and PowerPoint presentations. Studies have found that the format of the online lecture is an integral part of the online lecture, as graphics, illustrations, and photographic images that helps persuade the audiences to obtain and adhere to the speaker **[37]**. Other studies have found that 'TypeRighting', the combination of two formats 'Khan-style (tablet drawing)' and 'PowerPoint slides', is preferred by the students **[8]**

Hypothesis 5: An overload of information within the online lecture will have a negative relationship to the user's interest for the viewing the online educational videos.

Users have used online lectures to acquire new knowledge for their future career possibilities and current jobs **[38].** Other studies have emphasized the relevant trends of immersive traits of game-based learning **[39]** The online lecture provider attracts a diverse group of users, as such understanding, the user's purpose for taking an online lecture will help create engaging lectures **[40]**. Moreover, teachers who highlight the relevance and value of the information will increase the student's interest **[41]**.

Incorporating entertainment factors in a lecture helps improve the learner's attrition rate not because of the informative and persuasive content, but because it offers a compelling story. The interaction between the student and lecturer helps improve the learning outcome, as the students are able to have stronger emotional appeal towards the lecture **[6][30]**. The emotional appeals allow the audience to sympathize with the teacher, which improves the audience interest towards the lecture. Other studies have also indicated how the user's attitude plays a vital role towards the user's learning outcome in the online learning environment **[34]**. In a classroom environment, the students found the course instructor to be more engaging and help improve the overall experience when using the presentation graphics and visual presentation media **[42]**. Students also connected to the subject and story when they were encouraged to think more deeply about the idea or the personalized experiences **[43]**.

Hypothesis 6: The inclusion of entertainment components to the online lectures will have a positive relationship to the user's interest for viewing the online educational videos.

4. Method, Analysis and Results

For the hypothesis test, this study crawled the TED website (www.TED.com) which consists of 1,891 talks during the duration of 9 years from the year 2006 to 2014. We employed the screen-scraping method to retrieve the data fields as a variable such as the title, speaker's name and association, description of the lecture, tags pertaining to the lecture, ratings, and number of views. We used both the Python library and Beautiful Soup library.

This research designed operational definition and measurement as follow. 'User interest', the dependent variable, represents the attention to the online lecture while viewing. In this study 'total number of view counts of the lecture' that retrieved at the end of December 2014. Second, 'content topic' refers to the user's interested topic of the online lecture. The major user groups on TED selectively view the content based on their interest topic. TED offers a wide area of topics. In addition, among the topic area, TED selects six popular topics, which consists of "Technology", "Entertainment", "Design", "Business", "Science", and

"Global Issues." The study conducted these six selected topics as correspond to a binary rating of '1', while '0' marked on the other topics. As shown in Table 1, TED categorized the popular topic approximately 77 percent.

(Table 1) Popular Topics Frequency in TED Talks

Category	Frequency	%
Popular topics suggested by TED	1,454	76.890
Excluded topics from TED	437	23.110

'Duration of the lectures' refers to the measure the length of lecture video as the unit of minute, and 'the number of lecturer' represents the number of presenters appearing during a single lecture. Moreover, 'purpose of the educational videos' implies the unique style and the format of education information given to the user. This research classified the lectures into three different categories, which are the 'motivational lectures', 'informative lectures', and 'entertaining lectures.'

The terminology of the inspiring and motivational contents was based on the user's recognition for inspiring, courageous, or persuasive values. Lectures that emphasized an entertainment component highlighted elements such as fascination, beauty, and fun. These elements have contributed to alter an emotional response from the users. On the other hand, the lecture that delivers educational message emphasized the informative and ingenious part. Three categories were used for a binary rating to the extent of the controlled variables. Year dummy was applied to control unobservable changes in time series, duration of lecture and the number of lecturer were added as controlled variables to verify hypothesis 4 and 6.

Negative binomial regression was used for the research method. In the study, dependent variables were considered as count variables which did not rely on normal distribution and explains the over-dispersion (Mean: 1,439,730, SD: 2,079,947, Variance: 4.33e+12). The equation of the model is as follows, and STATA 12.0 was deployed for the analysis.

Table 2 summarizes the selected application lists for each class and the number of applications in each class depicts the correlation between the variables, and the results from Table 3. Table 4 shows the effect that the 'Topic and format characteristics of the online lecture' and 'purpose of the lecture content' has on the total number of views.

(Table 2) Correlation Table

Var	1	2	3	4	5	6	7
1	1						
2	0.042	1					
3	0.021	-0.052	1				
4	-0.064	0.040	-0.014	1			
5	0.073	-0.042	0.008	0.021	1		
6	-0.110	-0.013	-0.009	0.182	-0.139	1	
7	0.021	0.079	-0.020	-0.010	-0.609	-0.369	1

Note: 1 Total View, 2: Duration of Lecture, 3 No. of Lectures 4 Category, 6 Entertain Motives, 6 Informative Motives, 7 Inspiring Motives

The effect that the lecture contents and individual's interest has on the total number of views in Table 3. Based on our studies, we measured that the popular topics suggested by TED had a coefficient of -0.126 and standard error of 0.047, which suggests that the popular topics could hinder the users' interest. Furthermore, the relationship that longer duration of the online lecture, greater reduction of user interest was confirmed (coefficient of -0.000 and standard error of 0.000). It indicates that considering the duration of the online lecture producing is required in the online environment. Meanwhile, we could not find a statistical significance the number of lecturers had on the user's interest.

(Table 3) Results of Hypothesis Testing(H1-H3)

Variables	Coef.	S.E.
Constant	14.937***	0.133
Year Dummy	(Inclusion)	
Popular Topics	-0.126**	0.047
Duration of Lecture	-0.193***	0.054
Number of Lecturer	0.046*	0.027
Wald $\chi 2$(df)	140.630**(11)	

Note: *p<.05, **p<.01, ***p<.001

Table 4 depicts how the purpose of the lecture content can influence the audience's interest. The coefficient is 0.180 and the standard error is 0.056 for the lectures designed with the intention to entertain the audience. However, the informative lectures scored a coefficient of -0.298 and standard error of 0.046. This illustrates that the informative lectures can hinder the user's retention rate, while the

entertaining lectures can capture the viewer's attention. Unfortunately, we were not able to find the significance level for the motivational lectures.

(Table 4) Results of Hypothesis Testing(H4-H6)

Variables	Coef.	S.E.
Constant	14.844***	0.154
Year Dummy	(Inclusion)	
Duration of Lecture	-0.262***	0.034
Number of Lecturer	0.062*	0.027
Motivational Lecture	-0.001	0.062
Informative Lecture	-0.298***	0.046
Entertaining Lecture	0.180**	0.056
Wald $\chi 2$(df)	226.557***(13)	

Note: *p<.05, **p<.01, ***p<.001

5. Conclusion

The purpose of this study was to understand the environment of the online educational videos, while investigating the user's perspective in the online education. For the research, we observed the success factors exhibited by the popular educational videos on TED, and determined the key factors for making the popular online lecture.

The summary of the result are as follows. First, the popular lecture topics recommended from the service system had a negative impact on the user's preference, which reflects how the user's interests may vary. Thus, there is a need for educational videos providers to have a deeper understanding of the users when creating and producing new online lectures that will appeal their users.

Secondly, the videos with shorter durations were successful at maintaining a high retention rate. As mentioned above, the users will watch the online lectures during their commute. Often times the users will consume the educational videos via the wireless based devices, which allows the users to consume the content that is accessible and personalized to the user's demand. As such, the shorter duration of the online lecture was much more effective.

Thirdly, it is confirmed in the study that the view count increased as the multiple presenters whom considered as the professional to the topics appeared on the online educational videos. This indicates that the appearance of the multiple lecture give the credit of professionalism and trustworthiness to the content, and it demonstrates the users prefer the knowledge rooted from collective intelligence. In other words, it can be perceived as a kind of social support.

Fourth, educational contents created with the purpose to deliver heavy academic workloads have hindered to the views, as these lectures demonstrated lower views in comparison to the other lectures. On the other hand, online lectures that introduced academic knowledge reinforced with entertaining factors had a higher view count. This study was able to find that online lectures that embedded with entertainment factors can provoke an emotional response from the audience that will help them sympathize and relate to the speaker. This helps improves the audience's interest and enhances their engagement towards the lectures. We found that it was difficult for the online lectures to engage the user's attention without the stimulating triggers initiated from the entertaining factors. Moreover, the study found that reducing the cognitive load from the online lectures helped contribute to the learner's performance in the online educational videos.

Meanwhile, the correlation between the online lectures and the motivational factors were not significant, as we were not able to find a significant influence from the online lectures with motivational factors.

The key implications of our findings in the online education are providing empirical evidence for the entercation's prospects. The success of the online lectures does not rely on how the knowledge transferred to the users. Instead, it heavily relies on the user experience (UX) aspects of the online lectures that engage the audiences by provoking an emotional response that attracts the user's interest and engagement. Indeed, the importance of entercation for early childhood educational content has been emphasized. However, there has been little to no study that performed an empirical study to confirm that utilizing the entertainment factors in the online lectures was the factor that successfully captured the user's interest. The result of this study suggests that online lecture providers should consider the UX aspect from a practical perspective. Educational contents providers should reevaluate the notion of entercation when creating online lectures that will stimulate and engage the user's interest and preferences.

Furthermore, content providers should focus on combining a degree of entertainment to promote the student's interest and engagement.

Through the results, the study empirically demonstrated the determinants of engaging online educational video. This academic findings may contribute to the business where producing the educational contents online. From the results, content providers can strategically approach its content production such as managing the duration of the video, casting a moderate number of professionals as presenters. Moreover, the influence of the entercation factors may enhance the diversity of the content and the quality of the educational videos.

Although the study defined the influence of entercation perceived by users in theoretical and practical approach in identifying key factors of designing successful online lecture, the study has limitation that collected the data only from TED service for the consideration, and targeted only in a certain period. This leaves the possibility of partial sampling error and coverage error in the analysis. Furthermore, it has limitations of ruling out the context characteristics such as online video usage environment, media usage condition. Thus, complementation on the analysis and the consideration on the control variables should be developed in future work.

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