

# **Sustainable Design in Video Social Networks.**

Xanat VARGAS MEZA<sup>1</sup>, Toshimasa YAMANAKA<sup>2</sup>.

<sup>1</sup>School of Human Comprehensive Sciences, University of Tsukuba.

<sup>2</sup>Faculty of Art and design, University of Tsukuba.

## **ABSTRACT**

Webometric methods were employed to explore the status of Sustainable Design (with an emphasis on Academia). Findings included a coincidence between the distribution of videos over time and the volume of Google search interest. Most videos on the sample were about architecture, uploaded by university, media and education related channels. The majority of speakers were identified as designers. Network centralities revealed a fragmented network structure and the role of some transnational corporations on the diffusion of academic work related to Sustainable Design. A statistical analysis also suggested differences between University related and non-University related videos. A complex ecology of educational institutions outside the formal academia are uploading videos about Sustainable Design. Nevertheless, despite being well connected, videos related to academic institutions tended to function as document repositories. This has relevant implications on the role of universities in the era of web 3.0, where edutainment and ubiquity are emphasized.

## **1. INTRODUCTION**

Science, Technology, Engineering, Mathematics and Social Sciences have turned their attention towards the Sustainable Development goals to solve the urgent problems of our world, but the participation of design is still underdeveloped. The integration of Sustainability in design education and professional practice has mixed levels of acceptance (Carter, 2013; the Smithsonian Institution, 2013; Tonkinwise, 2013).

One of the challenges for its adoption is the change of focus from “clients” and “design objects”, to “systems” and “relationships”, but such complexity is difficult to understand and visualize. On the other hand, Video Networking Sites (VNS) have had successful results in education (e.g. Juhasz, 2011) and have been widely adopted at the University level, particularly in the case of YouTube. Because YouTube videos have strong correlations with each other, and liking and comments have been increasing over time (Cheng et al., 2013), communities formed around a topic can be detected through this VNS. Therefore, this research will explore the status of Sustainable Design in YouTube.

## 2. METHOD

### 2.1 Data Collection

YouTube Data Tools (Rieder, 2015) was employed to extract the videos data as a graph file. This file is read with Gephi (Bastian et al., 2009) to perform network analyses and create data visualizations. Queries containing the words “eco”, “green”, “sustainable”, “design”, “university”, and “lecture” were employed for this study.

### 2.2 Webometrics and Social Network Analysis

Webometrics is a technique that can visualize VNS communication mainly through quantitative methods. A social network is a set of nodes and ties, where a node represents an entity (a YouTube video) and a tie represents a link (to a recommended video).

## 3. RESULTS AND DISCUSSION

### 3.1 Classification of Videos and YouTube Metrics

From 2,452 videos related to the keywords, 1,819 disclosed location on 75 countries. Figure 1 shows the distribution of videos' uploaded dates, compared with Google's searches on Sustainable Design in a typical year, showing a coincidence.

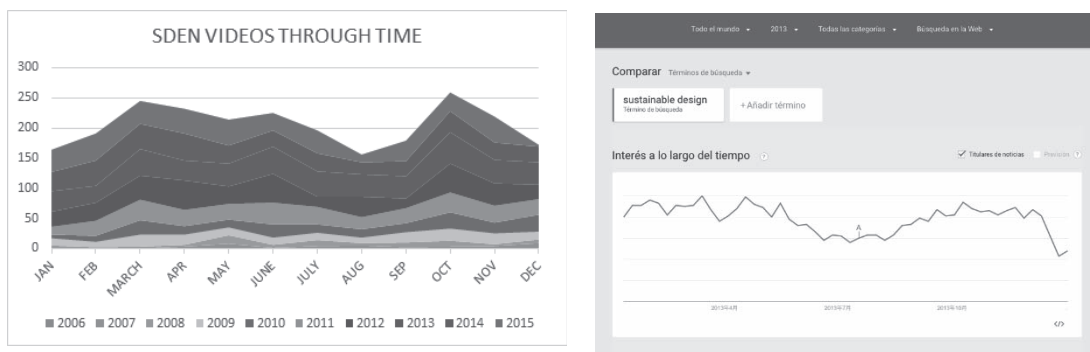


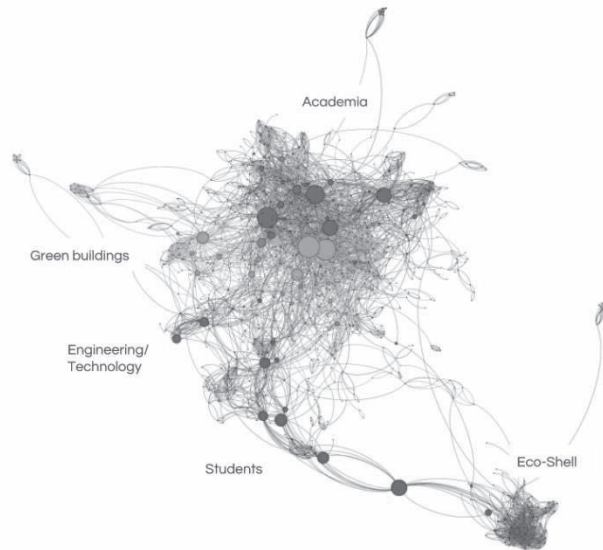
Figure 1: Sustainable Design video uploads, and volume of searches (Google, 2015).

As keywords were in English, the lists contained videos mostly from US (862), unclear locations (632), and UK (241). 1,310 videos were related to architecture, 321 to industrial design, 95 to graphic design, 355 to a mixed area (including engineering and fashion design), and 371 to a general area (theory, and architecture, industrial and graphic design combined). This suggests that the standardization of methods and rules in architecture and industrial design have aided the diffusion of sustainability in such disciplines. Top video uploaders were universities (30%), media channels (16%) and education related channels (15%). As for top speakers, 23% were identified as designers, 21% as professors and 13% as students. 1,378 videos were related to universities. The average number of views per video was 11,593.14, likes was 54.76, dislikes 2.04, and comments 9.10.

### 3.2 Social Network's Metrics and Structure

The network, consisting of 2,452 nodes and 5,422 ties, is fragmented. This is shown in the low clustering coefficient (0.132), degree (2.211), and density (0.001), and also in the high number of connected components (956).

Figure 2 shows videos with at least one tie to another video (a total of 1,398). The nodes' size reflects betweenness centrality. While academia related groups are closely interconnected, videos uploaded by and/or featuring students connected the network with Shell Eco Marathon related videos. Companies like Shell (oil) and Autodesk (software) were also present among top videos in terms of YouTube metrics.



*Figure 2: Videos network.*

A Mann-Whitney test showed the following differences: 1) Number of views, dislikes and comments had higher ranks in the group unrelated to University, while likes did not show significant differences. This can be interpreted as more interaction with videos that are not related to Universities. 2) Eigenvector centrality was the only network metric with a significantly higher rank in the University related group. Thus, in terms of connectivity and access to information, Sustainable Design videos in YouTube might be similar regardless of being related to Academia or not. 3) Architecture videos from the group unrelated to Universities had a significantly higher rank, while Industrial Design videos related to Academia had a significantly higher rank. This might reflect a divergence of focus between Universities and other interest groups. Nevertheless, the general Sustainable Design area and the Mixed area did not show significant differences among the two groups, which point to convergence on these areas. 4) Finally, some countries (e.g. Australia, UK, and the US) showed a significantly higher rank on videos related to University, while other countries with many videos (Canada with 99, India with 44 and Netherlands with 49) did not show significant differences among the two groups. This suggests that, on regards to the diffusion of Sustainable Design in YouTube, Universities in Australia, UK and the US are more active than other interest groups, while Canada, India and Netherlands have more diverse stakeholders involved.

#### 4. CONCLUSIONS

The role of educational institutions outside academia has aided the diffusion of sustainability among the design community in YouTube. Despite the enthusiasm with which Universities have embraced the medium, the top most disliked videos contained theory and their speakers were mostly professors. As Academic videos provoked low interaction, they are functioning more as document repositories. In contrast, the active role of students in social media might be fostering the union between industry and academia. Nevertheless, a semantic and sentiment analysis on the video's comments might provide a more comprehensive picture on the sustainable design praxis.

#### ACKNOWLEDGEMENTS

The authors wish to thank Alejandra Vilaplana, Deepak Vijay, Emika Okumura, Mohamed Gharbi, Nikos Fragkiadakis, Priyanka Ram, Rodrigo Queiroz, Ruttikorn Vuttikorn, Saeid Gholami and Zaiga Kompa. The authors declare no conflict of interest.

#### REFERENCES

- Bastian M., Heymann S., Jacomy M. (2009). *Gephi: an open source software for exploring and manipulating networks*. International AAAI Conference on Weblogs and Social Media.
- Carter, C. M. (2013). *Sustainable Consumption & Sustainable Design: moving sustainability theory towards design practice*. Available at: <http://repositories.lib.utexas.edu/handle/2152/22338>
- Cheng, X., Liu, J., & Dale, C. (2013). *Understanding the characteristics of internet short video sharing: A YouTube-based measurement study*. Multimedia, IEEE Transactions on, 15(5), 1184-1194.
- Juhasz, A. (2011), *Learning from YouTube*, MIT Press (BK). Available at: <http://vectors.usc.edu/projects/learningfromyoutube/>
- Rieder, B. (2015). YouTube Data Tools. *Computer software*. Vers. 1.0. N.p.,
- Smithsonian Institution (2013). *Design and Social Impact. Social Impact Design Summit*, New York, February 27, 2012.
- Tonkinwise, C. (2013). *Against Becoming Unsustainable by Human-Centered Design*. A review of Tony Fry's *Becoming Human by Design*. Available at: <https://cmu.academia.edu/cameron-tonkinwise>

*Address: Professor Toshimasa YAMANAKA, Faculty of Art and Design, University of Tsukuba  
1-1-1 Tennodai, Tsukuba, Ibaraki, 305-8574, JAPAN  
E-mail: tyam@geijutsu.tsukuba.ac.jp, kt\_designbox@yahoo.com*