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Abstract

This study aims to find out how Chinese hospitals have used online videos as marketing and patient education tools. The findings from this study can help Chinese hospital administrators better understand how to best take advantage of the up-to-date online video delivery technology to conduct contemporary marketing and efficiently help their patients. Based on a systematic probability sample of 2385 Chinese hospitals, the authors conducted a content analysis of Chinese hospital websites in early 2013. The study found that 42% of Chinese hospitals had a website, only 21.8% of these websites contained video(s), and 44.3% of the these video websites carried only one video. The videos were mainly used to provide patient education (27.7%) and to promote a hospital (23.1%). Overall, private hospitals used more videos than state-owned hospitals especially for advertising and promotion, but hospital ranking did not exert much influence. The study concludes that Chinese hospitals need to learn how to turn videos into an integral part of their marketing strategy so as to create both conceptually and technologically user-centric websites to serve themselves and, more importantly, to serve their patients.

Keywords: Hospitals, Marketing, Videos, websites, e-health

Introduction

Online video, as a Web 2.0 phenomenon, has attracted online visitors all around the world, including China, for some years. Online videos have been widely used by hospitals in the USA. Huang[1] found that by the end of 2008, 33% of the US hospitals had at least one video on their websites. The videos were mostly used to promote their corporate identities (50%), provide a variety of hospital information (42%), and educate patients regarding medical procedures and disease prevention (42%). Videos are sometimes seen on Chinese hospital websites. For instance, Li and Zhang[2] investigated 42 San Jia hospitals (San Jia refers to a category in a hospital ranking system in China. This category of hospitals is supposed to be the highest rank.) in Beijing and noticed that half of them had videos and that the video content included hospital exteriors, introduction to departments, expert interviews, and healthcare lectures. Nevertheless, empirical research regarding how Chinese hospitals have used online video as a tool to market themselves and to provide patient education has never been seen. This study aims to answer these questions.

China had a population of 1.36 billion as of May 2013 (See Country Meters – China at http://countrymeters.info/en/China/.). It has a huge base of online users. By the end of 2012, the number of Chinese online visitors had reached 564 million, according to a report released by China Internet Network Information Center.[3] China is a big country for online video consumption. By the end of 2011, domestic users of online videos had reached 325 million with an annual increase of 14.6%, according to a new media blue book released by Chinese Academy of Social Sciences.[4] Among the numerous big and small online video-hosting websites, Youku.com has unquestionably become the YouTube in China; it has reached 80% of the Chinese users with a strong loyalty to it since access to YouTube – the biggest video-hosting website in the world – is blocked in China. Youku.com's average number of videos watched every day exceeded 170 million; monthly active users reached 100 million, and a user spent on average 70 minutes on this website every day.[5] With such a public craze for videos, it will be interesting to know how Chinese hospitals have taken

advantage of such free resources to benefit themselves and their patients.

According to the Ministry of Healthcare of China, in 2011, people in China saw doctors around 6.27 billion times in 22 000 hospitals; the per-person healthcare expenditure in public hospitals was 180.2 Yuan, which was roughly equivalent to US$30; Chinese hospitals had 3.7 million beds with 88.5% occupancy rate.[6] With such a large population, such a high demand for healthcare services, and so many hospitals and hospital beds in use, using healthcare videos on hospital websites may better guide users' online traffic, improve healthcare service quality, provide patient-friendly services, empower patients in their healthcare decision-making, and reduce administrative costs.[7–11]

Many hospitals in China, however, do not yet seem to know how to build a website to appropriately serve its users, as a few Chinese scholars have found. Many hospital administrators started as medical experts and are busy with all kinds of hospital businesses; as a result, they do not have time to study information technology and often have no clue as to how to build a hospital website to serve their patients.[12] Wu said that Chinese hospitals had copied what other Chinese hospitals had done or simply built one as an ornament without updating it routinely; some had treated their websites as static brochures.[13] Such hospital-centered approach, Wu said, had hardly considered the users' needs, and such websites could hardly attract traffic. Matthew Dillingham, vice president of MedTouch, a company that designs websites in healthcare areas, fervently evangelized using videos on hospital websites. Dillingham said, 'Many hospitals still do not understand the importance of video … In most cases visitors who come to a hospital's website are not looking for a long, drawn-out explanation of the greatest technologies … What is a better way to do that than video?'[14] He suggested that videos be extensively used because they are much easier and less expensive to develop, create, deploy, and maintain these days.[15] Poulos listed six reasons why hospitals need video content:

1. Videos are social.
2. Videos are engaging.
3. Videos are getting viewed.
4. Video contents are growing.
5. Videos are accessible.
6. Videos will generate better rankings.[16]

Therefore, finding out how Chinese hospitals have used videos in the healthcare context may help them better understand how to best take advantage of the up-to-date online video delivery technology to conduct contemporary marketing and efficiently help their patients.

Literature review

A thorough search of Chinese literature via CNKI.net and wanfangdata.com.cn, the two most popular databases for searching academic publications in Chinese language, showed that literature regarding this topic was non-existent though it showed 29 hits regarding Chinese hospital websites. However, none of these publications is qualified empirical research; it seems that these authors have not been trained to be researchers. Their publications hardly show or clearly explain appropriate research methods.[2,17] Sampling is mostly limited to only a few hospitals, and often just one hospital;[18,19] as a result, external validity can hardly be derived. There is no literature review in any of these publications. Twenty of the 29 publications (69%) made casual generalizations about the healthcare IT usage situations in China without collecting data to support their claims.[20,21] Twenty-two of the 29 publications (76%) contained no more than three pages;[22,23] that fact suggests that the ideas in these studies may not be fully presented.

Healthcare new media marketing is a new research area and started in late 2000s. Huang[1] conducted a content analysis based on a systematic probability sample of all US hospitals to examine the adoption of videos on their websites in an attempt to find out how they had used this new medium for marketing purposes. The study primarily measured the effects that hospital service quality, hospital size, hospital affiliation, and geographic population had on the diffusion of online videos. The study found that, although the critical mass for using videos on hospital websites had been reached, for the overwhelming majority of the hospitals, including those that were already using videos, there was still a long way to go in learning how to harness the power of video for marketing and to make videos an integral and routine part of their marketing strategy. The research protocol in this 2009 study was adopted in the current study.

In addition, Huang examined six US hospitals with different healthcare characteristics and geographic natures in a case study to find out why and how these hospitals were using e-health videos.[24] The study concludes that developing outstanding e-health videos for the Web is not the prerogative of only financially or technologically privileged hospitals. Developing e-health videos

requires a hospital administration's technological awareness, a strategic plan, and dedication. A good strategy includes knowing what to emphasize on a website, presenting with consistency, and using up-to-date technology. The study also concludes that more patient education videos need to be produced to further develop visitor trust and increase market competitiveness and that return-of-investment measurement for using e-health videos needs to be enhanced.

In 2011, with the Delphi technique, Huang *et al.*[25] investigated both users' healthcare video consumption behavior and their underlying rationales through three rounds of questions among 30 users of varied demographic backgrounds in a purposive sample. The study found that most participants did not watch videos on US hospital websites because of their stereotypical understanding that hospital websites provide no more than clerical information and because of videos' perceived inefficiency in delivering relevant and personalized information. However, most participants expressed their willingness to watch healthcare videos if the presentation were improved. The study concluded that hospitals need to make users aware of the abundant healthcare information in multimedia formats including video on their Websites, present the relevant content, and make such presentations easily digestible.

Public hospitals, owned by the government, and private hospitals co-exist in many countries, such as the USA, Australia, Malaysia, and so on. China is no exception. Many articles have expounded the differences between the two kinds of systems in terms of the use of information technology.[26–28] Overall, private sectors outperform public sectors. For instance, Bales (2010) wrote, 'A private partner can supplement or provide support systems in areas such as information technology, revenue cycle management, purchasing, and payer contracting'. Also, all the found papers from China mentioned above studied hospitals that were categorized as *San Jia*, the top category in terms of quality. Therefore, this study examined the following two hypotheses:

H1: The higher-ranking hospitals tend to carry more videos than lower-ranking hospitals.
H2: Private hospitals carry more videos than public hospitals on their websites.

Based on the existing literature, this study also aimed to answer the following three research questions:

R1: To what extent have Chinese hospitals adopted healthcare videos on their websites?

R2: For what purposes have Chinese hospitals' websites adopted healthcare videos?

R3: Have Chinese hospitals made it convenient for users to watch their videos?

Methodology

When this study was started, the fact that there was no official list of Chinese hospitals available online presented a big hurdle. It seemed that the Chinese government controlled the dissemination of the hospital information so that only it could gather and distribute in China, as it does to information in many other areas.[29–31] Although there were 22 000 hospitals in 2011, according to the Ministry of Healthcare of China,[4] a public list of the hospitals could not be found. A thorough search via baidu.com found a few possible lists. Eventually, a site titled The Complete List of Chinese Hospitals (See the site at http://yyk.qqyy.com.), developed by a private company, was chosen for sampling because it contained the most hospitals: 19 084. Every eighth of the hospitals was sampled in March 2013. In total, 2385 (12.5%) Chinese hospitals were included in the sample. A content analysis was conducted on the basis of this systematic probability sample. The list contained no information about how many beds each hospital had, but the list did tell whether a hospital was state-owned or privately owned, and where it was in the 11-scale ranking system (In China, *San Jia* hospitals are the highest-ranked hospitals, and 'other hospitals', the lowest rank, refer to those that are not ranked. In both extreme ranks, there are state-owned hospitals and private hospitals though San Jia hospitals are dominantly state-owned hospitals (159 state-owned vs. 51 private) and 'other hospitals' contain dominantly private hospitals (344 private vs. 119 state-owned).). These two variables became the independent variables in this study. The dependent variables included the number of videos used, video content, video promotion on a site, video frame size, and video format.

This study consulted the video content categorization approach in Huang's study[1] but eventually came up with its own categories based on the availability of videos on Chinese hospital websites. These are the categories:

1. *Establishing corporate identity and advertisement*: Promoting the public image of the hospital, such as caring, providing high-quality services, being community-oriented, etc. or advertising the hospital services and personnel.

2. *Patient stories*: Showing patients' stories and testimonials (Almost all patient stories are for promoting the hospital corporate identity in nature. Since there were many such videos, they are singled out.).
3. *Informational*: Providing specific information regarding hospital services, employment opportunities, time and location of hospital operation, procedure preparation, meetings, professional training, local information, etc.
4. *News*: Showing what is new at the hospital and in the neighborhood.
5. *Documentary*: Showing the history of the hospital, doctors' experiences, etc.
6. *Educational*: Showing patients how to deal with different kinds of symptoms, disease, or medical challenges and demonstrating medical facilities or equipment in treatment through dedicated educational videos, lecture videos, or surgical procedure videos. Usually, these videos are not hospital-specific.
7. *Public service announcement*: Promoting a cause or a health habit.
8. *Entertainment*: Entertaining online visitors in the forms of talk show, singing contest, MTV, and drama that are somewhat related to healthcare.

A coding sheet was designed to maximize the coding reliability. Data collecting was conducted by two trained coders in the spring of 2013. The coders methodically went through each site in the sample to search for obvious video players, video links, and video libraries. If videos could not be found on home page or in menu links, the keyword 'video' was used to search videos on the affiliated pages. A site was counted as having videos only if the videos were shown on the site and were not just linked to an external website. Data recording relied on Google Docs' forms so that collaboration between the two coders could be easily carried out and data could be aggregated easily. The average intercoder reliability value using Scott's π was 9.18. Both descriptive and inferential statistical procedures were used in data analysis, which was executed in SPSS 16.

Findings

As of March 2013, 52% of Chinese hospitals were state-owned, and 47.8% were private hospitals. There are 11 categories of hospital ranking in China. Twenty-one percent of Chinese hospitals were ranked as *San Jia*, meaning the best in the top-tier hospitals, 22% *Er Jia*, meaning the best in

the second-tier hospitals, and 46% 'other'. Hospitals in the other seven categories were few and constituted 11%. In the 2385 sampled Chinese hospitals, 1003 (42%) had a website. In total, 219 out of the 1003 Chinese hospitals (21.8%) used at least one video on their websites. As a result, the data in this study were based on these 219 hospitals.

R1: To what extent have Chinese hospitals adopted healthcare videos on their websites?
Although 21.8% of Chinese hospitals used at least one video on their websites, the data in Fig. 1 tells a more precise picture: 44.3% of the Chinese websites carried only one video, and 33.8% had 2–10 videos. The mean of the number of videos used on a site is 9.37, and the median is 3. Because of the high skewness (4.46) of the data, the median, 3, is a more precise prediction of the average number of videos used on Chinese hospital websites.

A correlation test between hospital ranking and the number of videos used shows that hospital ranking did not affect how many videos the hospitals used ($N = 219$, Pearson $R = 0.054$). Therefore, H1 was rejected.

R2: For what purposes have Chinese hospitals websites adopted healthcare videos?
Table 1 shows that the videos on Chinese hospital websites largely did two things: to provide patient education (27.7%) and to promote a hospital (23.1%). The secondary functions of such videos were to advertise either the hospital or its departmental services (17.7%) and to entertain the hospital's online visitors (12.3%). Patient stories certainly pertain to online visitors' needs for information, but they are used more often for promoting a hospital's doctors and services. In Table 1, advertising/promotion, patient stories, hospital and vicinity information, news and documentary videos
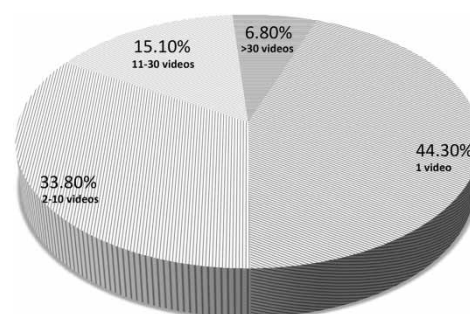

Figure 1. The number of videos Chinese hospital websites carry.

Table 1: Video content on Chinese hospital websites

Video content	Sum	Percentage
Advertising/promotion	364	17.7
Patient stories	175	8.5
Hospital and vicinity information	170	8.3
News	473	23.1
Documentary	39	1.9
Patient education/surgery procedures/lectures	568	27.7
Public service announcements	11	0.5
Entertainment	253	12.3
Total	2052	100

mostly serve the interests of a hospital and constitute 59.5% of the content; patient education/surgery procedures/lectures, public service announcements, and entertainment videos mainly serve the interests of a hospital's online visitors and constitute 40.5% of the content.

In Table 2, a comparison between state-owned hospitals and private hospitals shows that, overall, in terms of the sums of videos, except for documentary videos and patient education videos, private hospitals showed more videos than state-owned hospitals across most categories. Overall, private hospitals also used significantly more videos to promote themselves and to advertise their departmental services ($t = 2.9$, df = 218, $p < 0.05$). H2 was supported. Especially, private hospitals used significantly more advertising and promotional videos than state-owned hospitals ($t = 2.64$, df = 218, $p < 0.05$). The difference in terms of patient stories videos between the two kinds of hospitals is seemingly significant, but the big difference is incidentally caused by the big number of videos used by extremely few private hospitals; because of the huge standard deviation, the significant difference was non-existent.

R3: Have Chinese hospitals made it convenient for users to watch their videos?

Videos attract attention and easily boost online traffic.[32] Today, many famous websites, such as CNN.com, Apple.com, Harvard.edu, WhiteHouse.gov, and StanfordHospital.org, place their videos or video links on their home page to attract online visitors. On Chinese hospital websites, 48.7% of the hospitals promoted at least one video on their home page, 32.3% promoted via a video link on their home page, and 19% showed their videos only on their affiliated pages without hinting that the site had any video(s) at all.

Videos can be shown in context, for instance, in an article related to the video content or the hospital home page if the video is promoting the hospital's corporate identity; or videos can be shown in a separate page that is dedicated to the video when the context, however, is either non-existent or lost. Some hospitals only carry a video linked to an external website; as a result, the branding effort is lost. On Chinese hospital websites, 43% embedded their videos on a content page, 52% showed videos on a separate Web page but within the site, and 5% linked to videos on external sites.

When a website carries a host of videos, it can build a video gallery to make it easy for online visitors to find the videos on the site. In total, 34.6% of the Chinese websites had a video gallery; 66.7% of those websites that had more than three videos had a video gallery though the styles and convenience of such galleries varied drastically.

The implementation of online videos is constrained by the information technology infrastructure of a country. As of the fourth quarter of 2012, the average Internet connection speed in China was 1.8 Mbps and ranked 91 globally, according to Akamai.[33] This kind of speed does not allow high-quality videos. The image quality of an online

Table 2: How state-owned hospitals and private hospitals differ in terms of video content

Content	State-owned hospitals		Private hospitals		*T*-test significance
	Sum	Mean	Sum	Mean	
Advertising/promotion	110	1	254	2.31	0.004*
Patient stories	36	0.33	139	1.26	0.116
Hospital and vicinity information	67	0.61	103	0.94	0.521
News	67	0.61	103	0.94	0.521
Documentary	28	0.25	11	0.10	0.06
Patient education/surgery procedures/lectures	346	3.15	222	2.02	0.211
Public service announcements	4	0.04	7	0.06	0.462
Entertainment	110	1	143	1.3	0.577
Total	768	0.87	982	1.12	

*$P < 0.05$.

video is directly associated with the dimension of the video. The wider a video is, the higher bit rate is needed during the video encoding so as to render the video clearly. On Chinese hospital websites, the average width of a video was 408 px; the minimum width observed was 155 px; the maximum width was 868 px.

On the technical level, Flash videos are not viewable on any Apple hand-held device, such as the iPhone, iPad, or iPod. On Chinese hospital websites, 90% of the videos were Flash videos; 8% used the obsolete Windows Media Video format; 1% used Real or other obsolete video formats, and 1% showed videos in the most-updated HTML5 video format, which allowed viewing on Apple hand-held devices.

Discussion and conclusions

Many lessons can be learned from the above findings. First, a byproduct and surprise finding of this study is that only 42% of the Chinese hospitals had a website. Today, almost any serious business has a website and an appropriate Web presence, and many articles, from various perspectives, have cogently explained why.[34,35] Dana Fox, a Web designer, graphic artist, and blogger from Canada, states vividly in this regard:

> Think of it this way: Your website is your business card. It is your brochure, your flyer, your billboard. It is the very first impression somebody gets to see of your company, which is also why it is important to have a website that is nicely designed. A poorly designed website is just as bad as having no website at all. It is like you showed up for an important business meeting with potential customers in your pajamas.[36]

Almost all the percentage calculations in this study have been done in relation to the Chinese hospitals that had at least one video. If the data were extrapolated to all the 1,003 hospitals that had a Web site no matter whether they had a video or to all the 2,385 hospitals in the sample no matter whether the hospitals had a Web presence, there would be a much gloomier picture. For instance, in total, 219 out of the 1003 Chinese hospitals (21.8%) used at least one video on their websites. If this percentage were extrapolated to the total sample, the percentage would go down to only 9%. In short, many Chinese hospitals have much to do in catching up with the information technology that has developed in the Twenty-first century.

Second, China has one of the largest video consumption markets in the world, and the data from Youku.com show that Chinese people love videos. Chinese hospitals, however, have yet to learn how to harness the power of video as a marketing tool. The fact that 78.1% of the Chinese hospitals had fewer than 10 videos and that, even worse, 44.3% had only one video indicates that many Chinese hospitals may not be aware of the power of video and have not used video as a routine marketing tool. This finding supports the charges by Wu[13] and Qi[12] that many hospital administrators have no clue as to how to serve their online visitors and that clueless copying among hospitals is rampant in China. Many Chinese hospital administrators need to understand that Web is not static, that the two most prominent features of the contemporary Web are multimedia and massive, customized, and almost instant interactivity,[37–39] and that the Web should not be treated as 'brochure-ware'.[40] Taking advantage of videos for commercial success and for helping patients has been proved effective by many hospitals in the USA,[1] and, perhaps, many Chinese hospitals can at least experiment on such a practice as well.

Third, there are things that have been done well and things that can be improved on Chinese hospital websites.

- For those hospitals that do have videos, they have a reasonable combination of videos that market themselves (59.5%) and videos that provide patient education (40.5%). This mixture shows the hospitals' wishes to survive financially in the competitive market and their extra online efforts to care for their patients.
- It is nice to see that one-third of Chinese hospitals used a video gallery to make it easier for their online visitors to find and use their videos though most of the designs of such galleries may need a professional touch to better coordinate video content and the textual content and to more logically contextualize the gallery in the whole website.
- Making videos for a website takes money, time, and effort, but videos can attract attention. A natural course of action is to promote them on the home page of a website. In this regard, the majority of the Chinese hospitals (81%) did promote their videos on their home pages either with a video(s) or with an image/text link to a video(s); however, those 19% that did not promote their videos on their home pages may be wasting their resources.

- Embedding a video in a content page can contextualize the video; 43% of the Chinese hospitals did so and more hospitals can follow suit.
- The average 408 px video width is still reasonable for the average Chinese Internet connection speed, but since most hospitals serve their local populations, depending on the local average Internet connection speed, the size probably can be much bigger. Youku.com, for instance, is using scalable video sizing depending on the size of a Web browser; the biggest width has already reached 860 px.[28]
- To be inclusive, for the convenience of those who use Apple hand-held devices and for the sake of sustaining the long-term technological viability, a big lesson Chinese hospitals need to learn is to shift the Flash video format to the HTML5 video format soon. Since HTML5 video complies with the Web standard, it is gradually becoming the standard online video delivery approach, and Flash video is fading into history. As Anderson wrote, 'While there are still some roadblocks to this particular future, the overall path is quite clear, and HTML5 is going to make up a big part of the video landscape'.[41]

In short, Chinese hospitals need to learn how to turn videos into an integral part of their marketing strategies so as to create both conceptually and technologically user-centric websites to serve themselves and, more importantly, to serve their patients.

This study had its limitations. It explored a pattern of video usage on Chinese hospital websites, but a case study needs to be done on those hospitals that have done an exceptional job in this regard. Video is one of the marketing approaches on a hospital website. It is desirable to study how it is combined with other approaches, such as interactive e-health tools and social media, to accomplish a hospital's marketing goals. A study on how Chinese users use such videos can also be a follow-up study.

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Disclaimer statements

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