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Can Homepage Openness be a Signal of Institutional Quality in Higher Education?

Abstract

This exploratory study analyses a rarely investigated element of online marketing of higher education institutions (HEIs) using a sample of 150 doctoral/research universities (DRU) and 150 liberal arts colleges (LAC) from the USA. Using quantitative analysis, it primarily examines the homepage of the institutions' websites according to various aspects of openness (availability of the homepage in foreign languages and for visually impaired users, presence and type of search options and social media links on the homepage, and the number of news articles published on the website in a given week). Besides the analysis of the whole sample, the types of institutions (i.e., DRUs and LACs) as well as higher or lower ranked institutions according to an HEIs ranking list are also compared using these dimensions. The main findings are that DRU homepages provide more advanced search opportunities, present a higher number and different order of social media links, and publish a greater volume of news than LAC websites. The higher ranked DRUs present the most news, followed by lower ranked DRUs, and then higher ranked LACs; the lowest number of news items were provided by lower ranked LACs. Moreover, in the case of LAC institutions a significant negative correlation was also identified between their rank and the number of news items displayed, while no significant correlation was found in the case of DRUs.

Keywords: higher education marketing, online marketing, website openness, signalling

INTRODUCTION

Nowadays, similar to profit-oriented businesses, HEIs also have to compete for their customers; moreover, due to globalization competitors can come from abroad and not only from the region or country of the institution (Bagley–Portnoi, 2014; Hemsley-Brown–Oplatka, 2006). Thus, to stay competitive, it is essential for HEIs to use marketing tools well-tried in the profit oriented sector. One type of these tools includes various online marketing options that are increasingly important in influencing consumer behaviour of younger generations making up the primary target group of higher education (Popa, 2015). Within the broad range of online marketing tools one of the cornerstones is the use of institutional websites; in many cases this is the communication channel and interface through which prospective students first encounter the HEI (Misley–Vámos, 2017; Schimmel et al., 2010). Therefore, their first impressions of the institution can be based on it (Wilson–Meyer, 2009). The items of information on the website and their struc-

ture and accessibility (i.e., the "openness") largely determines the image of the HEI (Kent–Taylor, 2002; McAllister-Spooner, 2009; Middleton et al., 1998), thus its marketing value is especially high, since it can facilitate or hinder the "purchase" of the product (in this case an educational program) (Misley–Vámos, 2017).

The primary aim of this research is to reveal the relationship between the openness of HEIs' websites (the availability of news and of a search engine on the website, the accessibility of the website – i.e., in foreign languages and for visually-impaired users – and the availability of social media links in our understanding) and institutional quality (approximated by their type – i.e., doctoral/research universities vs liberal arts colleges – and their ranking). Based on signalling theory (Teoh–Hwang, 1991), it is hypothesized that the websites of higher quality HEIs are more open than those of lower quality ones. To answer our research question and to examine our hypothesis a primary research study was conducted in which the openness of websites of 300 US-based HEIs belonging to three quality classes were examined, based on certain openness-signalling factors found primarily on their homepages.

After reviewing the literature, the methodology of the primary research is introduced, followed by our detailed results. As is usual in exploratory studies, the discussion of results puts more emphasis on those measures that provide more options for analysis. Finally, the paper ends with a discussion and conclusion.

1. LITERATURE REVIEW

1.1. THE ROLE OF INSTITUTIONAL WEBSITES IN HIGHER EDUCATION MARKETING

The selection of a higher education institution is a high involvement activity, as the financial, psychological, and social risks of the choice are quite high (Kotler–Fox, 1995; Ramasubramanian et al., 2003). In addition, higher education is a credence good (Darby–Karny, 1973), since it is difficult for the consumer to evaluate the service even after trial (Pham–Lai, 2016; Zeithaml, 1981). In the case of services with these characteristics, information-gathering becomes more critical in the decision making process (Kotler–Fox, 1995), as one can expect a greater information need is required prior to purchase.

Nowadays, the primary tool to fulfil that information need is the Internet (Benjamin–Lee, 2005), which allows fast, convenient, and virtually free gathering of information. Thus, HEIs' webpages are especially important in the information search stage of the consumer decision making process. The webpage is found to be the gateway to other forms of communication between the HEI and prospective students; this has been confirmed by several studies (Schimmel et al., 2010; Wilson–Meyer, 2009).

Numerous papers have already discussed the importance of institutional websites as a marketing tool in higher education marketing. These studies can be classified into three categories (Klassen, 2002): 1) examination of what students expect from HEIs' websites (e.g., McKnight–Paugh, 1999; Mechitov et al., 2001; Ng et al., 2003; Schimmel et al., 2010); 2) practical advice about how HEI websites can be used to increase the number of applications to an institution (e.g., Poock–Lefond, 2001; Schimmel et al., 2010); and 3) analysis of current websites (e.g., Gordon–Berhow, 2009; Kiss–Kun, 2018; Kittle–Ciba, 2001; Klassen–Sitzman, 2000; Lee–You, 2011; Ooi et al., 2010; Will–Callison, 2006; Wilson–Meyer, 2009; Zhang, 2017). The current study aims to broaden the literature in the third field by using a methodology not used before, to the best of the authors' knowledge, on a US sample.

1.2. OPENNESS OF HIGHER EDUCATION INSTITUTIONS' WEBSITES

Few studies have so far examined websites' openness explicitly and none of them have assessed the websites of HEIs. Yavuz and Welch (2014) examined the factors affecting the openness of local governments' websites. Based on their work, one can define website openness as the extent to which it provides information about the organization's decision making and other processes and enables the audience(s) to contact the organization. The Cyberspace Policy Research Group (CyPRG) characterized governmental website openness similarly, "as a function of two interrelated elements: transparency and interactivity. In this study transparency refers to the extent to which an organization provides explicit information about work and decision processes, procedures, events, activities, and outcomes" (CyPRG, 2011, cited by Yavuz–Welch, 2014, 575). Interactivity is defined as the quality of communication between the organization and visitor taking place on the website, and it indicates the ease with which users are able to access data or people (La Porte et al., 2001).

In summary, research on HEIs' website openness should consider – among others – transparency, i.e., the availability of news and a search engine on the website and the accessibility of the website in foreign languages and for visually-impaired users, and interactivity, i.e., the availability of social media links.

A previous research study on the web presence of American universities (Will–Callison, 2006) found that only 79.9% of analysed homepages offered news and events. In contrast, in a recent study by Lee and Merle (2018), 99% of American universities' websites examined were found to offer news stories.

As online users have become accustomed to convenience, they have begun to expect that websites have a search engine, which helps prospective students and other important HEI site visitors to quickly locate pertinent information (Kittle–Ciba, 2011). Unfortunately, ineffective search functions not only inhibit the acquisition of desired information but also can increase the level of frustration, which may lead to the termination of the connection with the HEI (Poock–Lefond, 2001).

That's why offering advanced search options on the website is very important. A longitudinal research study by Kittle and Ciba (2001) found a steady increase in the proportion of HEI websites with a search engine: from 27.1% in 1997, through 41.2% in 1998 to 57.9% in 1999; however, the types of search engines were not assessed in this study. In a more recent study by Lee and You (2011) it was found that 100% of 11 top ranked American universities offered search engine options.

Translation of webpages into different languages is particularly pertinent in view of the increasing international competition of HEIs, and thus an emphasis is on universities to market to every region of the world without barriers (Chapleo et al., 2011). In a comparative study of American and Taiwanese top ranked universities (Lee–You, 2011), it was found that only 10% of American, and 100% of Taiwanese universities offered foreign language versions of their websites. The low level of American websites available in foreign languages may be attributed to the extensive global use of the English language (Chapleo et al., 2011).

According to Varma et al. (2016) 3.2 million Americans (1% of the total population) had some level of visual impairment in 2015, and it is estimated that 1 million Americans (0.3%) were legally blind. Moreover, the number of people with visual impairment or blindness in the United States is expected to double to more than 8 million by 2050. The number of Americans with disabilities attending college is also steadily increasing (Harper–DeWaters, 2008). It is a necessity, therefore, for HEIs to ensure website accessibility to visually impaired users. In this sense, most American HEIs' websites perform poorly, and accessibility has been worsening: the percentage of websites considered to be accessible to visually impaired users in 1997 was 64.4%, in 2002 it was 15.6% (Hackett–Parmanto, 2005), while in 2007 only 8% of examined sites met the strictest requirements of accessibility (Harper–DeWaters, 2008). A possible explanation for this unfavourable trend is that as webpage designers have included more complex web design components such as images and streaming video, it requires more effort to make the websites accessible for users with disabilities (Hackett–Parmanto, 2005).

A previous research study on HEI websites (McAllister, 2012) found that the majority (67%) of websites of the world's top 100 universities featured an RSS feed; the proportion is even higher in the case of top American universities (84%). A significant share of the websites of the world's top 100 universities also offered social media links (42% YouTube, 39% Facebook, 39% Twitter), similar to American institutions (78%, 75%, and 72%, respectively). A more recent study (Lee–Merle, 2018) found that an RSS feed was available on only 62.4% of US-based universities' websites, and among social media links, Twitter was the most common (89.1%), followed by Facebook (87.6%), YouTube (76.7%), Instagram (28.7%), and Pinterest (16.8%).

1.3. DIFFERENCES IN THE OPENNESS OF HIGHER EDUCATION INSTITUTIONS' WEBSITES BASED ON THEIR QUALITY

Wilson and Meyer (2009) examined US-based HEIs' homepages and found that more services and information were available (indicating a higher level of openness in our understanding) through the websites of doctoral/research institutions than through those of community colleges. According to them this probably results from different levels of institutional resources (both financial and human) rather than intent. Although the differences are understandable, they may still send an unintentional message to prospective students. In contrast, Carlos and Rodrigues (2012) found no difference in website quality of the three types of Portuguese HEIs (university, polytechnic, and concordat), measured using the five dimensions; only one item, i.e., interactivity, showed differences at a level of significance of 10%.

A study by Gordon and Berhow (2009) showed that doctoral universities' websites scored higher in providing more information and were easier to use than those of liberal arts colleges; however, they did less well in areas promoting online interactions with prospective students. In the study, a higher level of interactivity of liberal arts colleges was explained by less organizational complexity, as Taylor et al. (2001) found that the size and organizational complexity of an organization tended to work against web-based dialogues, since complex organizations were less likely to respond quickly to environmental pressure. According to the findings of Gordon and Berhow (2009), Tier 3 institutions (in an institutional ranking) excelled in their dialogic feature, which could be explained by their efforts to jump from Tier 3, or their bottom half status on the list. Thus, they worked aggressively to improve their ranking, and the higher level of dialogic features may be an indicator of their overall campaign to be a college "on the move" within the ranking system.

Klassen (2002) and Klassen and Sitzman (2000) examined differences between websites of top- and lower-ranked US universities according to their ability to build relationships with students. Both of these studies found that top-ranked schools have more interactive capabilities and are better at using websites to respond to consumer demand. They argued that the effectiveness of websites as a marketing tool relates to the willingness and ability of schools to not just build but effectively maintain and successfully operate websites. Here, again, possible differences in financial and human resources are implicitly cited by the researchers. So, despite the fact that Internet marketing is a relatively low-cost and a widely available tool and in contrast to the statement made by Lee and You (2011), HEIs do not enjoy similar abilities to use it to their marketing advantage.

On a less abstract level, Lee and Merle (2018) examined the relationship between HEIs' rankings and the inclusion of social media links on their websites. Their findings confirm previous studies in that the availability of an RSS feed, and YouTube, Facebook, and Twitter accounts were significantly positively correlated

with ranking (the Point Biserial correlations were 0.393, 0.222, 0.199, and 0.186, respectively). However, no significant correlations were found in the case of Instagram or Pinterest.

2. MATERIAL AND METHODS

To answer our research question, a primary research study was conducted by reviewing various homepages of US-based HEIs. The use of an American sample is justified by the fact that the American higher education market provides the most HEIs in one national market in the world. However, the findings of the current study may facilitate the understanding of other higher education markets, too, since our research is not only a descriptive one, but aims to reveal relationships between variables, and these relationships are likely to be non-country-specific.

2.1. DATA COLLECTION AND SAMPLE

The population of the current study was HEIs of the USA. One of the most complete lists of these institutions at the time of our research was available on findthebest.com[1], which ranked the two categories (hereinafter: types) of HEIs, namely doctoral/research universities (DRUs) and liberal arts colleges (LACs), based on several factors. Both HEI types were included in our research, from all HEIs (4355 in the academic year 2016/17[2]) we chose institutions for which all required data was provided on the website, since rankings were based on that data. Altogether 826 HEIs fulfilled this criterion. From these 826 HEIs 300 institutions were chosen to make up our sample, 150 DRUs and 150 LACs; 50 of each type from the top, the bottom, and the middle of the ranking.

The majority of the data collection was conducted on 16 and 17 July 2018, by university students[3]. These were the ideal data collectors as they are the people who most closely resemble those wishing to choose an institution to apply to and they can therefore provide valuable information about the perception of HEIs' online marketing activities. The HEI websites selected for examination were assigned to the students as evenly as possible, so each student had to deal with institutions of each type: half were DRUs, and half were LACs, and the first student was assigned to the first HEI in the ranking, the second student to the second ranked, etc. Although two students did not complete their assigned work, which left data incomplete, due to the method used to assign HEI websites to students, as mentioned above, errors resulting from the data collectors' mistakes were evenly distributed in the sample and did not cause any distortions.

[1] The website – after several years of market presence – is not available any more.
[2] https://www.statista.com/statistics/306880/us-higher-education-institutions-by-state/, accessed: 23.10.2018.
[3] Students were paid in proportion to the number of websites they analysed.

2.2. RESEARCH AND DATA ANALYSIS METHODS

The openness of HEI websites was examined by a quantitative analysis. The current study did not aim to provide a complete analysis of HEI websites; in the majority of examinations only homepages were assessed because this element of the website is encountered by all visitors, and only those who already have an interest in the institution will navigate to further content.

During data collection students manually recorded the availability of homepages in foreign languages (noting which languages), for visually impaired users (yes/no), availability of a search engine (no/simple/advanced/calendar/other) and social media links (noting which ones), and the number of news items on the homepage and/or on the "News" or similar sub-site published in the week before the data collection (9–15 July 2018).

Data was analysed by both simple descriptive statistics (e.g., mean, standard deviation, frequencies) and more complex statistical methods (independent samples *t* test, Welch test, Cramer's *V* test, Wilcoxon test, Mann–Whitney *U* test, Spearman and Pearson correlations, ANOVA).

3. RESULTS

The results will be discussed by variables characterizing the openness of HEI websites. First, findings based on the total sample will be introduced, also covering differences between DRU and LAC institutions where applicable, followed by comparisons of openness according to institutional ranks, where computable.

3.1. FOREIGN LANGUAGES, VISUALLY IMPAIRED USERS, SEARCH ENGINES

In our sample, only two HEI homepages were available in a language other than English. In some cases, however, Google Translator was available through a link on the homepage, but because it is independent from HEI, these options were not regarded as a foreign language availability. In sum, we can conclude that American HEIs' websites are not generally available in foreign languages. Since none of the 300 HEI homepages offered a version for visually impaired users, this variable could not be used for analysis among variables, either.

Among the 300 institutions in our sample only 6 did not offer a search option on their homepage. All these institutions fell into the LAC category. Due to low prevalence, the difference between institutional types could not be examined statistically. When the quality of search engines was taken into account (a search option is seen as more advanced if it offers any kind of extra options, such as a calendar, a multi-attribute search option, etc.) it was found that DRUs possessed more advanced search engines in a notably larger proportion than LACs. Among

150 LACs 9 (6%) offered more advanced search options on the homepage, while among 150 DRUs this figure was more than double, i.e., 20 (13%).

Due to the high level of homogeneity of the sample, correlational analyses between availability (in foreign languages, for visually impaired users, of search engines) and institutional quality (ranking, type) could not be performed.

3.2. PRESENCE OF SOCIAL MEDIA LINKS

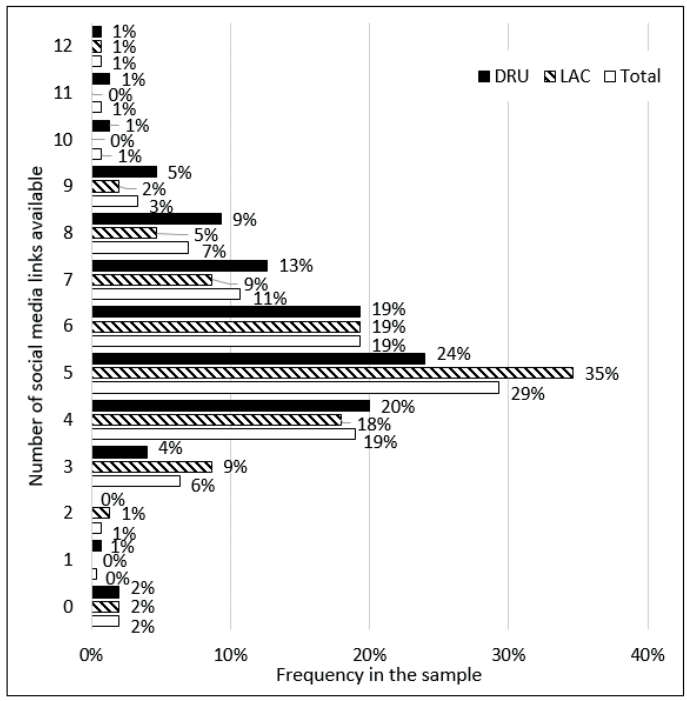
It is important to note that in the current research only those social media links were examined that were available through the website. Besides links to social media on homepages, links on other pages of the websites accessible by 1-2 clicks were also taken into account. The spatial order of the links was calculated as follows: first, links on the homepage, followed by links on other pages (in both cases from left to right, from top to bottom, except when there were obvious columns).

In this research social media is understood as everything HEI websites seemed to treat as social media, if it was not obviously incorrect. The following broadly defined social media links were identified in our sample: Facebook, Twitter, Instagram, YouTube, LinkedIn, Flickr, Snapchat, Pinterest, Google+, RSS feed, Tumblr, iTunes, Vimeo, Foursquare, Spotify, Soundcloud, institutional blogs, Sina Weibo, Futurity, Medium, Metirlink, William Jewell Photo, Alumni UMBC, My Juniata, Mopaw, My ASU, ASU Alert, Last.fm, Bear in Mind podcast, #UNOproud, Escores, Uva-Wise Live Webcast, Issuu, FLC Connects, and Storify.

Our results show that 6 institutions (2%) in the sample did not present any social media links, with three (2%) in each of the two categories, LACs and DRUs. Thus, no significant difference was detected between the two categories of HEIs.

The number of social media links per HEI website is shown in figure 1. The most common number of links per website were 4, 5 or 6, and about 68% (203) of the sample fell into this category. The “average link density” was 5.42 per website (standard deviation: 1.82 links per website).

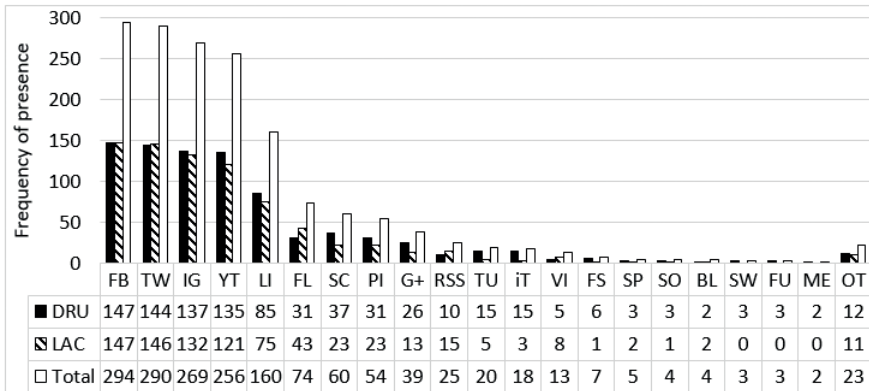
Figure 1 The number of social media links on HEIs' websites by HEI type and in total, n = 300



Source: authors' own calculations based on primary data collection
Note: values are rounded

Figure 2 shows how many times each social media link was present in the sample (links with only one appearance were omitted). Practically, based on the frequency of social media links, three groups could be identified. Facebook, Twitter, Instagram, and YouTube made up the first group, occurring in more than 85% of HEIs in the sample. LinkedIn is one-element group, being present on websites of about half of the sample. The third group contains social media occurring on a maximum of 25% of HEIs examined; all social media not yet mentioned belong to this group.

Figure 2 Frequency of the presence of social media links on HEI websites by type of HEIs and in total, n = 300



	FB	TW	IG	YT	LI	FL	SC	PI	G+	RSS	TU	iT	VI	FS	SP	SO	BL	SW	FU	ME	OT
DRU	147	144	137	135	85	31	37	31	26	10	15	15	5	6	3	3	2	3	3	2	12
LAC	147	146	132	121	75	43	23	23	13	15	5	3	8	1	2	1	2	0	0	0	11
Total	294	290	269	256	160	74	60	54	39	25	20	18	13	7	5	4	4	3	3	2	23

Source: authors' own primary data collection
Notes: the social media types are shown on the horizontal axis (FB=Facebook, TW=Twitter, IG=Instagram, YT=YouTube, LI=LinkedIn, FL=Flickr, SC=Snapchat, PI=Pinterest, G+=Google+, RSS=RSS feed, TU=Tumblr, iT=iTunes, VI=Vimeo, FS=Foursquare, SP=Spotify, SO=Soundcloud, BL=Blog, SW=Sina Weibo, FU=Futurity, ME=Medium, OT=Other)

Statistically significant differences between the media presence frequencies of LACs and DRUs were found only in some cases using the Cramer's *V* test (*V* values in parentheses). The difference was significant at 1% in the case of iTunes (0.17); at the 5% level in the case of YouTube (0.13), Google+ (0.13), and Tumblr (0.13); and at 10% in the case of Snapchat (0.12). In each of these cases DRUs used the given medium more frequently. All other social media showed lower *V* values than 0.10. Thus, we can conclude that DRUs and LACs do not differ in whether they include social media links on their websites, but DRUs use more of them and they use some of them more frequently.

Table 1 provides information about the order of social media links on webpages. The spatial order seems to be important, since while the difference between the frequencies compared to the sample size is minimal, especially in the case of Facebook vs Twitter, and these two versus Instagram and YouTube, the number of first-place appearances of Facebook was 243, while that of Twitter, Instagram, and YouTube was only 30, 12, and 3, respectively.

Table 1 Absolute and relative place rank frequencies, n = 300 (pcs, %)

Social media	Place, from left to right and from top to bottom (reading direction)												
	1	2	3	4	5	6	7	8	9	10	11	12	**Total**
Facebook	**243 (82)**	34 (12)	12 (4)	3 (1)	2 (1)								294 (100)
Twitter	30 (10)	**203 (70)**	32 (11)	14 (5)	6 (2)	4 (1)		1 (0)					290 (100)
Instagram	12 (4)	30 (11)	**115 (43)**	66 (25)	28 (10)	14 (5)	3 (1)	1 (0)					269 (100)
YouTube	3 (1)	11 (4)	82 (32)	**101 (39)**	40 (16)	9 (4)	8 (3)	2 (1)					256 (100)
LinkedIn		4 (3)	24 (15)	34 (21)	**55 (34)**	28 (18)	9 (6)	4 (3)	1 (1)		1 (1)		160 (100)
Flickr	1 (1)	3 (4)	6 (8)	16 (22)	20 (27)	16 (22)	5 (7)	6 (8)		1 (1)			74 (100)
Snapchat	2 (3)		6 (10)	12 (20)	13 (22)	15 (25)	9 (15)	1 (2)	1 (2)			1 (2)	60 (100)
Pinterest			3 (6)	8 (15)	13 (24)	14 (26)	10 (19)	3 (6)	3 (6)				54 (100)
Google+		5 (13)	5 (13)	3 (8)	8 (21)	9 (23)	7 (18)	1 (3)			1 (3)		39 (100)
RSS feed		1 (4)		2 (8)	8 (32)	6 (24)	2 (8)	3 (12)	2 (8)	1 (4)			25 (100)
Tumblr	2 (10)	1 (5)	1 (5)	2 (10)	5 (25)	2 (10)	3 (15)	1 (5)	1 (5)	2 (10)			20 (100)
iTunes			1 (6)	2 (11)	4 (22)		2 (11)	6 (33)	2 (11)		1 (6)		18 (100)
Vimeo			1 (6)	2 (11)	4 (22)		2 (11)	6 (33)	2 (11)		1 (6)		18 (100)
Foursquare			1 (14)		1 (14)	1 (14)	2 (29)		2 (29)				7 (100)
Spotify				1 (20)				3 (60)				1 (20)	5 (100)
Soundcloud					1 (25)	1 (25)			1 (25)	1 (25)			4 (100)
blogs				1 (25)	2 (50)	1 (25)							4 (100)
Sina Weibo					1 (33)				2 (67)				3 (100)
Futurity					2 (67)		1 (33)						3 (100)
Medium					1 (50)						1 (50)		2 (100)
Other	1 (4)		1 (4)	2 (8)	4 (15)	7 (27)	7 (27)	2 (8)	1 (4)	1 (4)		0	26 (100)
Total	294	292	291	272	215	128	69	37	16	6	4	2	1626

Source: authors' own calculations based on primary data collection
Note: rounded proportions of relative place ranks in % are in brackets

The Wilcoxon test was used to examine differences in the spatial order of social media links on the website. We found that in the case of six link pairs, the order of links is not accidental: at the 1% level of significance: Facebook vs Twitter (Z = -11.67, N = 290), Twitter vs Instagram (Z = -9.35, N = 266), Instagram vs YouTube (Z = -3.55, N = 238), and YouTube vs LinkedIn (Z = -4.63, N = 146); and at the 5% level of significance: Pinterest vs Google+ (Z = -2.09, N = 16), and Google+ vs RSS feed (Z = -11.67, N = 7). We can conclude that in the case of the HEIs in our sample a typical order of placement of social media links exists.

When comparing the spatial order of social media links on websites of DRUs versus those of LACs, only one pair showed a significant difference in the Cramer's V test: Instagram was displayed ahead of YouTube on DRUs' websites to a significantly greater degree than on LACs' websites (V = 0.16, $p < 0.05$), although Instagram was found to be ahead of YouTube more frequently in both of the two types. All other social media pairs showed lower V values than 0.121.

In accordance with our research question, we also examined whether social media link types present on the websites and their order imply a rank of the HEI and vice versa. Four rankings were used in the current research: a DRU ranking, a LAC ranking, a mixed ranking containing DRUs and LACs independent of their type, and a LAC&DRU ranking, where the individual rankings of DRUs and LACs are integrated (i.e., there are two first, two second, etc. ranked institutions).

First, we examined whether there is a relationship between the appearance of social media links on the HEI website and the HEI rank by using the Mann–Whitney U test (table 2). Facebook and Twitter were omitted from this examination, since they were present on almost all websites; beside this, social media links appearing on less than 20 websites were also omitted in order to conduct the analyses.

Table 2 shows that typically there is no relationship between the HEIs' ranks indicating institutional quality and the appearance of social media types. The only exceptions are Flickr and YouTube: higher ranked LACs and DRUs (in rankings by type and in the LAC&DRU ranking) tend to present a Flickr link on their websites more often than lower ranked institutions; and higher ranked DRUs tend to present a YouTube link more often than lower ranked ones, both at the 10% level of significance. Thus, in the case of HEIs, although some social media (i.e., Flickr, YouTube) links' appearance on the institutional websites may be a rather weak signal of institutional quality, in the majority of cases this role could not be identified.

Table 2 Relationship between the presence of social media links and institutional ranks (Mann–Whitney *U* test), n = 300

		Mixed			LAC			DRU			LAC&DRU		
		0	1	*U*	0	1	*U*	0	1	*U*	0	1	*U*
Instagram	MR	114.54	110.01	2255.00	151.32	149.85	4113.00	152.76	150.24	4099.50	147.95	150.79	4090.50
	N	24	196		31	268		31	269		31	269	
YouTube	MR	119.73	109.04	2573.00	169.67	146.61	4744.50	171.52	146.89	4707.00*	164.23	148.14	5028.00
	N	30	190		44	255		44	256		44	256	
LinkedIn	MR	107.28	112.99	5643.00	153.42	146.99	10651.50	155.84	145.83	10452.50	155.04	146.53	10564.00
	N	96	124		140	159		140	160		140	160	
Flickr	MR	113.92	100.95	4144.00	155.38	133.63	7113.50*	155.69	134.66	7190.00*	155.49	135.26	7234.00*
	N	162	58		225	74		226	74		226	74	
Snapchat	MR	107.09	123.78	3340.00	148.50	155.98	6811.00	148.70	157.69	6768.50	148.29	159.33	6670.00
	N	175	45		239	60		240	60		240	60	
Pinteres	MR	109.13	116.49	3424.00	150.58	147.36	6472.50	150.99	148.28	6522.00	150.75	149.35	6580.00
	N	179	41		245	54		246	54		246	54	
Google+	MR	110.29	111.80	2811.00	150.58	146.04	4808.50	151.81	141.76	4748.50	151.59	143.19	4804.50
	N	190	30		261	38		261	39		261	39	
RSS	MR	111.51	100.45	1799.00	151.51	133.46	3011.50	151.95	134.54	3038.50	152.19	131.90	2972.50
	N	200	20		274	25		275	25		275	25	
Tumblr	MR	111.06	103.38	1518.00	151.46	129.65	2383.00	151.87	131.38	2417.50	151.41	137.80	2546.00
	N	204	16		279	20		280	20		280	20	

Source: authors' own calculations based on primary data collection
Notes: MR = mean rank, 0 = no link on the website, 1 = link is present on the website,
* significant at 10%.

We also examined the quality signalling potential of displaying social media links in the reverse order compared to the order in which they are usually presented (see table 1). For instance, Facebook is usually ahead of Twitter, thus it is interesting to check whether placing Facebook behind Twitter is related to the ranks of HEIs. Deviation from the regular order may be a signal, if it is related to higher quality, or it may be a simple coincidence; moreover, it may also indicate that the HEI is not aware of the typical order, and thus it may signal lower quality. Cases with too low frequencies to be analysed were omitted. Based on our results, the "Twitter ahead, Facebook behind" order was significantly related to higher ranks in the mixed ranking (where DRU and LAC are ranked as part of the same population) but not in any other rankings. No unusual order of any other link-pairs was found to be related to the HEI ranks in any of the rankings (Table 3).

Table 3 Unusual order of social media link-pairs vs HEI rankings (Mann–Whitney U test), n = 300

		Ranking sample												Number of media		
		Mixed			LAC			DRU			LAC & DRU					
		1	0	*U*	1	0	*U*	1	0	*U*	1	0	*U*	1	0	*U*
Twitter > Facebook	MR	112.05	75.96	1673.00***	146.84	133.55	4522.00	147.51	132.95	4498.00	147.08	135.65	4606.00	147.80	131.10	4424.00
	N	187	27		249	40		250	40		250	40		250	40	
Instagram > Twitter	MR	97.81	98.91	2643.00	131.65	139.27	4828.50	132.16	139.77	4852.00	131.92	140.85	4801.00	134.55	128.60	4916.00
	N	162	33		218	47		219	47		219	47		219	47	
YouTube > Instagram	MR	86.49	92.93	3455.00	118.39	119.95	6608.00	118.00	121.83	6525.50	117.43	122.73	6442.50	114.95	126.59	6083.00
	N	108	69		144	93		145	93		145	93		145	93	
LinkedIn > YouTube	MR	59.47	53.55	1294.00	74.16	70.72	2240.50	74.55	71.42	2274.50	74.67	71.18	2263.00	75.04	70.46	2227.50
	N	76	38		96	49		97	49		97	49		97	49	
Flickr > LinkedIn	MR	21.60	17.17	138.00	26.14	22.72	246.50	26.02	22.85	249.50	25.68	23.22	258.00	22.72	26.43	243.00
	N	20	18		25	23		25	23		25	23		25	23	

Source: authors' own calculations based on primary data collection

Notes: N = number of social media links available on the website, MR = mean rank, 0 = the social media link-pair is in typical order, 1 = the social media link-pair is in an unusual order, *** significant at 1% level. In the first column greater means higher rank (e.g., Twitter > Facebook means that Twitter was ranked higher than Facebook).

3.3. NUMBER OF NEWS ITEMS ON THE WEBSITE

When examining the news on their websites, only HEIs providing at least one news item were taken into account. Beside this, two of our data collectors did not complete the recording of news assigned to them. Among the remaining 215 HEIs 55 did not publish any news in the examined week; therefore, the sample size in these examinations was only 160.

The average number of news items published on HEIs' websites was 5.069 (standard deviation = 6.312); it was 3.000 (N_{LAC} = 72, standard deviation = 3.021) and 6.761 (N_{DRU} = 88, standard deviation = 7.676) in the sub-samples of LACs and DRUs, respectively. The difference between the two types is significant (t = -4.215, p < 0.001), thus we can conclude that DRUs provide more news items on their websites on average than LACs.

The within-institution-type ranks of HEIs (LAC&DRU) and the number of news items published in the week examined showed a very weak but significant linear correlation (r = -0.173; p = 0.029; N = 160); the Spearman rank correlation, however, was not significant (p = 0.110; N = 160). In the sub-sample of LACs (N_{LAC} = 72) a somewhat stronger linear correlation (considered weak and not uncorrelated with confidence) (r = -0.239; p = 0.043) and a significant weak-moderate rank correlation (ρ = -0.394; p = 0.001) were found. In the sub-sample of DRUs (N_{DRU} = 88) neither the Pearson correlation (p = 0.104), nor the Spearman rank correlation (p = 0.918) were significant.

The mixed ranking (when institution type is not considered) showed linear and rank correlational relationships with the number of news items only at the 10% level of significance (r = -0.163; p = 0.070; ρ = -0.176, p = 0.051; N = 160). On the LAC-only subsample, both correlations were significant and weak (r = -0.280; p = 0.035; ρ = -0.391, p = 0.003; N_{LAC} = 57). The DRU subsample presented no significant linear (p = 0.274) or rank (p = 0.772) correlations between the mixed rank and the frequency of news articles (N_{DRU} = 67). Thus, we can conclude that the higher a LAC's rank, the more news items are published on its website.

If institution type (DRU vs LAC) is combined with ranking within type (below and above the median) in a two-dimensional matrix, then examination of the four groups determined by the two dimensions (DRUs in the first half of the ranking, DRUs in the second half of the ranking, LACs in the first half of the ranking, LACs in the second half of the ranking) may provide useful findings regarding the relationship between institutional quality and the number of news items published on HEIs' websites. The group means and statistics of the ANOVA of the four categories are presented in table 4.

Table 4 The average number of news items published on the website by HEI categories formed by type and by rank, n = 153

Category	*N*	Mean	Standard deviation	*F*	*p*
DRUs in the first half of the ranking	44	7.705	10.140	6.342	<0.001
DRUs in the second half of the ranking	44	5.818	3.817		
LACs in the first half of the ranking	36	3.833	3.317		
LACs in the second half of the ranking	36	2.167	2.467		

Source: author's own calculation based on primary data collection

Based on table 4, we can state that significant differences exist in the number of news items on websites by institutional type and rank. As was previously shown, DRUs displayed significantly more news items than LACs (independent of their ranks), and higher-ranked institutions also published more news items than their lower ranked counterparts (independent of their types). If the two variables are combined, according to our results the most news items were published by DRUs in the first half of the ranking, followed by DRUs in the second half, then LACs in the first half of the ranking. The fewest news items were displayed by LACs in the second half of the ranking.

4. DISCUSSION AND CONCLUSIONS

The main objective of this study was to explore whether the openness (the amount of information presented) of HEIs' websites could serve as a signal of quality. Our sample consisted of 300 HEIs from the USA. The American higher education market was chosen because it features the highest number of institutions in the world in one country and the available rankings.

To measure homepage openness – based on the literature and on the limitations of the available data – we have used the following quantitative variables: availability of the website in foreign languages, availability of the website for visually impaired visitors, providing any – and any advanced – search tools, the presence, number, and order of HEIs' social media links on the website, and the number of news items presented on the website.

Similar to previous research studies by Wilson and Meyer (2009) and Gordon and Berhow (2009) our study found statistically significant differences between the two types of HEIs:

- DRUs more frequently offered advanced search opportunities;
- DRUs tended to provide significantly more social media links on their websites;
- some social media was used more frequently by DRUs: iTunes, YouTube, Google+, Tumblr;
- DRUs provide more news on their websites on average than LACs.

We have found connections between a given HEI's rank and its information providing behaviour:

- integrated ranks of HEIs (LAC&DRU) and the number of news items published on the websites showed a significant, weak linear correlation;
- in the sub-sample of LACs both linear and rank-correlations were significant, but weak and weak-moderate, respectively;
- most news items were published by DRUs in the first half of the ranking, followed by DRUs in the second half, then LACs in the first half of the ranking, and finally, LACs in the second half.

Based on the above-mentioned findings, our paper has fulfilled its primary objective and provided quantitative evidence of the hypothesized connections between the openness of HEIs' websites and the institutions' two quality measurements: their type (DRU or LAC) and their rank. This result supports the signalling hypothesis in online marketing communication of higher education institutions. Although not all examined openness variables could be analysed by HEI type/rank or were found to have a significant relationship with the selected measures of institutional qualities, this does not represent a serious weakness in the signalling hypothesis. The only message of such a finding is that not every component of marketing communication has (yet) been confirmed to play a role of a signal.

The three most important limitations of our investigation are its spatial focus on the USA, the use of one time cross sectional data, and the use of only one quality ranking (in spite of the fact that both the country and the ranking were chosen to provide the largest available target population). As a consequence, our conclusions are not automatically transferable to other regions with different higher education markets, time periods, or customer segments with largely distinct concepts of quality. However, due to the fact that the largest higher education market in the world and a ranking list that covered the largest number of HEIs on that market were chosen, one would not expect great surprises or at least not too frequently.

A natural and interesting direction for further research – beyond extending the current examination to new target populations, and/or introducing new kinds of quantitative data, and/or repeating the data collection multiple times to enable a time series analysis –, is qualitative data analysis. Openness could be measured not only by the amount of information presented on the websites but also by the topic or content and the tonality of the data shared.

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