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**Review Article**

# Big Data, Online Reputation and Knowledge Management in Higher Education Online

Consuelo León Llorente<sup>1</sup>, Marta Matias Roca<sup>2</sup>

<sup>1</sup>School of Communication, Istmo University, UNIS, Guatemala

<sup>2</sup>Lakefield Hospitality College, London, England United Kingdom

**Email address:**

cleonllorente@gmail.com (C. L. Llorente), marta.matias@lakefield.org.uk (M. M. Roca)

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**Abstract:** Summary: The progressive digitalization of our society has also transformed the online training. The new platforms offer more features, favour a tailored education and are compatible with the working life of the student. From the servers it is possible to measure the rate of interaction and the student's dropout rates. For this reason, the phenomenon of Big Data requires a rethinking of the concept of reputation based on three ideas: transparency, trust and digital identity of the educational organization. This article analyzes the case of the School of Communication at the Istmo University (UNIS) in Guatemala. The use of Blackboard platform improved learning and interaction in those students. It is confirmed that the e-learning platform known as Blackboard facilitates learning and teacher-student interaction. This tool collects and updates data throughout the process, so that the educational organization can monitor the degree of interaction and student dropout.

**Keywords:** Learning Platforms, Big Data, Corporate Reputation, Digital Identity, Transparency, Visibility

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## 1. Introduction

The Information Age [1] [2] and the "virtual world", called Cyberspace [3], gives a decisive direction to the Knowledge society [4]. Educational organizations can make use of the challenges of transparency, trust and digital identity that the online market [5] in order to establish new standards. Nowadays, learning platforms are capable of measuring the dropout rate and student interaction. From these data, others can be derived, that can be very useful for the institutions because all the information is collected on servers and can be analysed algorithmically. This capability is called also Big Data.

At the same time, the Internet user in the knowledge society processes the network information selectively and critically. Some authors emphasize negative aspects of this superabundance of information known as "infoxication" [6] because the subject has a limited capacity to process them [7]. This situation particularly affects the world of online training.

The emergence of other communication channels and the huge amount of data has changed the nature of their

relationship [8]. This phenomenon occurs when there is confidence in the sources and prestige of the institution providing enrichment that is a result of online participation and diversity of content.

Moreover, digital readers and aggregators have also increased, making access to online content more effective [9]. Therefore, new higher education business models are arising that are more efficient, with a greater ability to segment and innovate, with new tools and software applications that support a high degree of interaction across the Internet.

In this context, the online channel adds a new dimension to the concept of offline reputation, because it creates social feedback that is carried out thanks to the rating of content made through contributions, opinions and interactions of students. The reputation management of a higher education institution online is related to the management of information.

In this information management process, we wanted to focus on three terms attached to the concept of reputation: transparency or visibility, trust and digital identity.

## 2. Transparency

Some authors [10] [11] [12] [13] [14] consider visibility as a decisive factor in corporate reputation. MOOCs -Massive Online Open Courses- are an example of search reputation built in this way.

In the current context, visibility is synonymous with transparency and accessibility of this open source content: Open Access, this has become an essential requirement for the educational world if it wants to keep up a process of continuous transformation.

The online channel provides more visibility than offline. Online, it is more difficult to hide information and it is easier to build it up from a proactive attitude. Anyone can easily access the history of actions and views on a subject matter and check by themselves if what the organisation is saying is true or false. Forums are an example of this reality.

Reputation in online media, in a certain way, becomes more reliable, more grounded in reality and therefore more difficult to be distorted or manipulated [15]. These authors concluded that reputation can be regarded as the most reliable indicator of a service company's capabilities, such as universities, which seek to satisfy students considering and treating them as customers.

One of the ways of achieving a better reputation is by intensifying the interaction on the Internet, not only spreading the institution's information and sharing it in a corporate way on the website home itself, but, in the case of higher education, making learning platforms a paradigm of interaction and self-presentation of the institution.

The Two-way symmetrical communication theory supports this position [16]. Collaborative learning techniques, favoured in the platforms of online higher education training, intensify the interaction between students and also with the network in a maximally collaboratively way, improving the academic reputation of the educational institution.

In contrast, the educational institution that is not sufficiently visible, whose online programmes are not developed; or has less presence on the Internet, will hardly be found, its SEO will be affected and therefore, not being found online (findability), it will not exist (for the users) in the offline world. This is the big problem with some renowned universities. They ignore or are unaware of that most of the 300,000 new jobs that the digital economy will generate in the coming years will be linked to online education and aligned with scientific advances related to knowledge of the brain and its relationship with learning. Future professionals will focus on emerging areas, such as improving school performance, attention to the diversity of students, research and educational consultancy for principals and teachers.

## 3. Teacher-Student and Trust in the Online Training

The second factor that builds reputation, apart from transparency and visibility is trust. It is considered as a belief, feeling or an expectation that somebody gets through an

exchange of experiences or the intentionality from somebody [17]. Confidence can be affected by variables such as uncertainty, vulnerability and dependency. Confidence is built by little actions that require some commitments between them. If the established actions are reciprocal, trust increases, if not, it decreases.

If a student has lost trust, they will look for information in alternative sources, not the provided official or traditional source, but others, such as forums or informal exchange websites.

Former students who have had direct experiences with these institutions have a high level of trust, as opposed to those who haven't had any direct contact with the institutions. For this reason, there is a strong relationship between reputation, trust and educative behaviour.

Academic honesty has a direct impact on the student's confidence and this directly impacts their behaviour and educative response.

## 4. Digital Identity

With the arrival of the Internet (WEB 2.0), there is an abundance of personal data circulating on the web. This promotes the creation of new personal identities that may or may not coincide with the analogue identity. The Internet has offered a wide range of new tools for content creation changing the traditional conditions in identity management [18]. It is therefore very important to have a clear communication strategy and interaction with the student. Educational organisations are building their identity. This can be seen as "complex social construction that is both personal and social, and consists in part of: who we think we are, how we want others to perceive us and how they actually perceive us" [19]. According to these authors, the most important in online media is the image shown to others. From this definition we can see that actually building digital identity can become part of and enrich the offline identity.

This scenario raises new needs in the way each institution can and must manage their identity. On the one hand it is necessary to control this massive flow of information and consequent exposure of personal and corporate data, which requires an increasing digital literacy to be able to manage it [20].

For businesses, educational institutions and individuals, the parameters that we have to contemplate in building this digital identity are very similar. However, the fact of belonging to a "network society" [21] does not mean that we have to convey the corporate message through all channels it offers, but quite the opposite: it is rather to know the means or tools, to choose between them and from there, build a digital identity that conforms with the culture and does not ignore the basic laws of reputation on the Internet: transparency and consistency.

First it is necessary to clearly identify the institution that should be able to define, maintain and project onto the rest of the people and the scientific community, an institution should itself be able to define and communicate its educational structures of production and dissemination of knowledge [22].

Secondly, the user or student must know how the digital identity is constructed, assuming the responsibility to take part in its construction. Finally, the degree of security of the applications that are used in the management and interaction produced in the online education platform and social networks can influence aspects related to privacy [23].

In addition, a digital identity that is well maintained throughout the process of educational interaction, which is articulated and is consistent with the analogue identity, leads to a more active life therefore also a stronger corporate identity.

Nowadays it is very easy to find, albeit in a fragmentary way, not only data but also activities of any organization on the internet. The digital identity is formed by putting together these fragments and the educational institution must be at all times leading the control of its brand. The fact that we can measure the reputation in a quantitative way through scores or rankings thanks to the intervention of the students themselves and their responses or assessments, helps the institution to make decisions for continuous improvement.

## 5. Student as Subscribers

Having reached this point, it is easy to conclude that students are the stakeholders, the agents of the change in the educational environment and that also they act not only as revenue generators, but as producers of messages and subscribers. The danger would be to reduce the concept of corporate reputation to a negative comment at a particular time. The university has to stop and analyse or investigate data over an extended period of time, using the various tools of the social web, online media, blogs, news sites, specialized websites, in order to reach consistent conclusions about the quality of their programmes. In fact, authors like Roberto Carreras [24] argue that online reputation is not made only from recommendations of former students and reviews or comments online, but rather resides in the ability of the university or educational institution to monitor and manage their presence online, responding with agility in forums, on their suggestion box and on social networks.

Informal interaction also known as WOM -Word of Mouth- is very difficult to measure because it is apparently intangible. However, thanks to a new form of communication called eWom or electronic WOM - positive or negative messages that reflect an individual's online opinion about a product or company and that may be available for many people - they could be measured because the feedback is stored on the network and you can track and measure it [25].

Those institutions that offer low quality programs are penalized with a negative word of mouth. Moreover, students who perceive that the institution has a good reputation will be more motivated to give positive messages WOM than those who perceive a bad reputation. This idea is supported by Sundaram, Mitra and Webster (1998) [26] who found different reasons that led a subject to generate the WOM: "altruism, product involvement, self enhancement and to help the company". The educational environment, by its own nature, is

the ideal context to generate this culture. Mee-Shew Cheung (2007) [27] added new motivational factors: "altruism motivation, motivation retaliate, compensation motivation and negotiation motivation". In fact, this information generated between users or students can be more influential than ordinary advertising itself. This impact also grows rapidly with digital media [28] [29].

## 6. The Case of Faculty of Communication at the Universidad Del Istmo

The Universidad del Istmo (UNIS) launched in Guatemala in 1996, grew out of the Women 's Institute of Advanced Studies (IFES) to become a college approved as such by the Council of Private Higher Education in September 1997 (CEPS). In 1998 the Faculty of Economics was started along with the Business Administration and Architecture and Design Faculties; in 2001 the Faculty of Law was launched; in 2004 the Faculty of Communication and in 2005 the Faculties of Education and Engineering. The University has been conceived as a link bridge, "isthmus" that combines scientific research, professional practice and civil society. This line is important, because if it is used with technology it can open the door to global and international faculty members

For this reason, the School of Communication uses the Blackboard platform. This is one of the tools used by university professors all over the world. It is built and designed to present a unique educational experience in the best possible way. Blackboard is a leader in the field of e-learning solutions in response to the needs of 72% of the 200 largest universities in the world. According to the report Edutechnica.com 2015, Blackboard, Moodle and Canvas are the three most popular systems of higher education [30]. Blackboard system has recently announced an experimental improvement called "Ultra", which promises a number of improvements in editing and multimedia services. This platform is especially interesting as a tool update for data and data collection, and stands out for its analytical functions, from which the institution can gain a clearer idea of the evolution of the subject as well as the reasons for abandoning or, in its case, students' retention [31].

The demographic decline, changes in lifestyles and geographical mobility which people and their families are affected by throughout their life cycle, forces universities to design programs that can be studied online not only at postgraduate but also at degree level. According to a study by The Learning House (Online College Students: Comprehensive Data on Demands and Preferences) the range of students between 18 and 24 who are in this type of education has grown from 25% to 34%, The decline of the current job market, and full time job offers, and the high rates of short term contracts favors continuous formation and a series of learning habits that the previous generation does not have. Moreover, regarding completion of studies, the rates of attendance and online studies are increasingly more similar according to WICHE of Educational Technologies (WCET).

In the case of Audio-visual Communication Degree and Journalism Degree, in which one of the author of this article taught the subject of Sociology of Communication during the 2013-2014 year, this situation was evident: 20% of the students were older than the age corresponding to the year in which they were. The reason is that this degree was being taken as a follow on for a previous one while they were finding a stable job.

These young people, future professionals of public opinion, were also facing daily, extreme situations in their own country of Guatemala, which is one of the poorest in the world. Their professional activity makes them into agents of development, promoting the strengthening of civic values and helping the most vulnerable in the population.

A total of twelve students of Audio-visual Communication and Journalism attended 9 classes weekly. The initial dynamics consisted of lectures followed by videoconference, animated power point tutorials with audio and participation in forums. The subject was growing in intensity and interaction thanks to the intervention of professionals and international experts in certain areas and conflicts. The learning methodology on conducting online news, was done in real time, being corrected by the rest of students with their teacher's feedback and finally in the oral presentation of students through the platform being valued by other students of the International University of Catalonia and their own professor.

One factor to measure the success of an online platform is to determine the completion or dropout rates of a subject [32]. In the case of the students of the faculty of Communication at the Universidad of Istmo this rate was 5% because there was an evaluation system that included the attendance and participation as recommended and also was compulsory for the final evaluation.

Another key factor to be measured in any program is the information obtained for the institution from the student's own learning. In the last decade, almost all higher education institutions have built learning management platforms (LMS, Learning Management Systems) as part of their virtual campus.

Although the objective of these platforms is to improve performance and effectiveness in the teaching process given by the teacher, it is also considered a great support in the development and better utilization of the subjects by the student. It can also provide a lot of useful information for the institution as it can trace when the students use its resources. The log files from web servers can store various data on user activity, for example, the time students spent doing a certain task - in the case of these students, each spent an average of 35 minutes for each task how they make use of time during the interactions that the student has carried out -which was 95% thanks to the interaction catalysed by the forums- the number of times the student is connected to the platform to carry out the assigned tasks, an average of twice per week including the day of weekly class. In summary, this information is highly relevant to the institution and teacher in its final evaluation.

Unlike traditional teaching methods, which require direct

observation or a video recording, this data can be easily obtained from the records of servers and is not intrusive: they include analysis of the data hosted on the LMS [33], the identifying patterns [34] and the assessment of student activity within the platform for identifying learning styles [35] among others. They also allow for the visualization of learning in learning curves, which represent improvements in learning a skill or ability of the student versus the number of opportunities to train this skill or ability [36].

Another major advantage of a learning management platform is that it virtually facilitates interactions between students in the forums as well as the teacher. These interactions are an important source of information and evaluation. In addition, they help to discover patterns of student behavior and organization, modelling informal interactions as a social network [37]. This is another development point for the future in order to form responsible and ethical behavior in the online media. Truthfulness, respect for privacy and the protection of vulnerable sources are some of the issues that are of most concern in academic journalism forums. Using techniques of social network analysis, it is possible to discover characteristics of local and global users on the network. For example, the discovery of which students occupy the central positions, to what extent interactions with other students facilitate learning, or what is the degree of cohesion within a course.

Moreover, it is very interesting to focus on the generated content. The interactions of students usually take place in the form of written text, which is stored on servers for further analysis. This text can be analysed algorithmically using techniques of natural language processing and integrating the results within their own platforms or educational environments. There are numerous works focused on making personalized e-learning tools by incorporating recommendations, corrective actions or automatic resolution of questions by analyzing the contents generated by the student [38]. In addition, you can identify student questions intelligently [39]. These same techniques can also be used to assess students beyond multiple choice answers. In general, you can perform these assessments when it comes to short answers with simple grammatical constructions [40]. Finally, another interesting application of natural language processing refers to the classification of texts in general, and analysis of the feelings or attitude of the individual student. This "sentiment analysis" is the detection and classification of texts in response to a kind of attitude, positive or negative in its simplest form, towards the subject of the text [41]. This may be interesting in order to evaluate not only the responses of students' knowledge, but shared comments in discussion forums. In particular, it is about to analyse the positive or negative attitudes about some aspect or all the matter and in regard to certain tools or tests.

Looking to the future work of the student is not only important to stress the professionalizing nature of academic studies but also its focus on character formation and decision-making [42]. William Symonds from the Global Pathways Institute claims that this issue is a central reality because many of our students lack the necessary information

to make decisions. The result is that they waste time "wandering through the system" closer to the underemployment epidemic (National Career Development Association conference).

In this sense, the growth of online education has changed the way of providing individual training. The highly customized nature of the process and the incorporation of various professionals (developer, multimedia designer, coach, editor) make these programmes very popular and easily assessable. The design of some tools like UDOIT (Universal Design Online Content Inspection Tool) and another one created by University of Illinois Quality Online Courses Initiative) show that the trend is the self-declaration of academic institutions that seek to identify the best "leaders" and educators in their programmes [43].

All aspects are the subject of future research because of their complexity and interest, and will be utilised not only for the academy but throughout the process of continuous improvement of the institution and academic training of students [44] [45].

## 7. Conclusions

The demographic decline, geographic mobility and employment contraction have favoured all over the world an increase of the online training in students between 18 and 24 years old. Strong competition among educational institutions, in the context of a global market, makes it even more necessary to build reputation in an environment of tremendous wealth of information generated by the new reality of Big Data.

In the analysed case, 12 Audio-visual communication and 9 Journalist students from the University of Istmo (Guatemala), it is confirmed that the E-learning platform known as Blackboard optimally facilitates learning and teacher-student interaction. This tool collects and updates data throughout the process, so that the educational organization can monitor the degree of interaction and student dropout. Along with this, this interaction is the way that the reputation is constructed from a triple perspective: transparency, trust and digital identity.

Transparency is usually achieved by intensifying the presence on the internet through MOOC and through open contents called Open Access. These new services rise from the student perspective who are also referred to as customers. In the case of the University of Istmo the correct forum management and consultations made transparency easy for the institution because the students did not have to resort to external sources of learning.

Moreover, trust, which was closely linked to transparency, is also directly related to academic honesty and resulted in a pro-active student behaviour and low dropout rate in this case: 5%.

Finally, the right construction of the online digital identity favoured the offline university prestige. These students become stakeholders, agents of change in the educational environment through the emission of certain messages and opinions that became extra recommendations for future students. The non-formal interaction known as WoM (Word of

Mouth) became an intangible of enormous importance in building a good reputation.

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