Sentiment Analysis to Evaluate Teaching Performance

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ABSTRACT

The aim of this work is to review a specific learning analytics method - sentiment analysis - in the field of Higher Education, showing how it is employed to monitor student satisfaction on different platforms, and to propose an architecture of Sentiment Analysis for Higher Education purposes, which trace and unify what emerges from the literature review. First, a literature review is carried out, which proves the widespread and increasing interest of the communities, of both scholars and practitioners, in the use of sentiment analysis in the field of Higher Education. The analysis, focused on three different e-learning domains, identifies weaknesses and gaps, and in particular the lack of a unifying approach which is able to deal with the different domains. Secondly, a prototype architecture – LADEL (Learning Analytics Dashboard for E-Learning) - is introduced, which is able to deal with the different e-learning domains. Some preliminary experiments are carried out, highlighting some limitations and open issues, as stimulus to continue the development of the platform.

KEYWORDS

Bounded Rationality, E-Learning, Emotion Analysis, Learning Analytics, MOOCs, Satisficing, Sentiment Analysis, Zone of Proximal Development

1. MOTIVATION AND BACKGROUND

(Hazelkorn, 2013) claims that university rankings mechanisms in use are subject to several drawbacks such as, for example, measurement accuracy, measuring the university as a whole institution, and the way data is being collected for measuring specific indicators at universities. For instance, only the average quality of a university is measured, while individual subjects are not considered in the computation. And different compilers have adopted different methods to produce these rankings (Berbegal-Mirabent & Ribeiro-Soriano, 2015). Moreover, indicators such as university reputation have a higher influence value than some others (Olcay & Bulu, 2016), especially on social media (Bunzel, 2007; Kietzmann, Hermkens, McCarthy & Silvestre, 2011). In this sense it appears unsurprising that Higher Education institutions turned to social media strategies to target and attract new students (Constantinides & Zinck Stagno, 2012). Furthermore, relevant educational factors such as quality of teaching or the quality of student experience are taken into account but only marginally (Hazelkorn, 2013), even if students use social media daily and, as such, they are well acquainted with their use (Westerman, Daniel & Bowman, 2016; Siamagka & Christodoulides, 2016). Not surprisingly, therefore, there haven’t been new attempts of constructing rankings mechanisms that

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seek to incorporate student satisfaction (Vidal, 2016) and content analysis of news media coverage (Friedrichsmeier & Marcinkowski, 2016). For instance, some findings indicated that instructors, from any discipline or culture, could deliver courses through social media platforms thanks to different features provided by social media tools, that encourage, for their part, students’ participation (Kilis, Gülbaşar, & Rapp, 2016). Other inquiries show how numbers of instructors are turning to social networking sites to communicate with students, since instructor credibility seems to increase when students are engaged with his social posting with respect to the only scholar posting activity of the teacher (Johnson, 2011).

A chief role in this context is played by MOOCs (Massive Open Online Courses). According to Class Central¹, the popular search engine for online courses, MOOCs doubled on 2015. Always in 2015, the number of students enrolled in MOOCs was equal to the total number of students enrolled in the three previous years, when the first MOOC was launched at Stanford, and the total number of courses is 4,200. According to data provided by Class Central, the number of students that, on 2015, have been enrolled at least in one course achieved 35 million. For instance, coursera.org, that is the world’s leading provider of MOOCs, alone, in 2015, increased its subscribers up to 17 million, increasing its subscribers of 7 million in one year. FutureLearn became the third largest MOOC provider in the world, just behind coursera and edX, approaching about 3 million users. The competition among MOOCs allows new ways to convey traditional content, but on a grand scale, just as FutureLearn did launching the world’s largest single session of a MOOC, with 440,000 students enrolled for one session of the Understanding IELTS², which, traditionally, was taught by the British Council. Indeed, MOOCs changed other traditional high educational habits, such as, for instance, the way courses’ certificates are issued, in other words not anymore on the basis of the individual courses attended but earned by completing a given sequence of courses. As it is easily imaginable, this novelty changes also the way other MOOCs and traditional High Educational institutions should set up their own programs, that, for example, could be more oriented towards the labour market requests/needs (Nirmala, Roopa & Kumar, 2015). Whereas this could be more difficult to do for traditional universities programs, that are constrained by ministerial regulations which, in turn, require precise time slots to make changes and be approved, such user and/or labour oriented settings are adoptable by new programs (e.g. at Master or Ph.D. level) and conveyed either through brick and mortar channels or through MOOCs. The numbers, as those cited above for the case of the IELTS program, demonstrate, successfully, the plausibility of a such an approach. And the revenues gained by coursera and udacity, after adopting these new credentials policies, bode well in this respect.

There are many decisions and policies that can be drawn looking at emerging analytics strategies. For instance, Acevedo & Marín (2015) show how Learning Analytics functionalities, such as the employing of hidden patterns in educational data, can be integrated in a Decision Support System (Power, Sharda, & Burstein, 2015; Moja, Friz, Capobussi, Kwag, Banzi, Ruggiero & Kunnamo, 2016; Chou, Tien, Lin & Chiu, 2016) to produce a Learning Decision Support System, such as, for instance, those developed for healthcare learning (Cook, Sorensen, Nishimura, Ommen & Lloyd, 2015; Chou, Tien, Lin, & Chiu, 2016), helping faculty or department administrators to improve their decision. Cacatian, et al. (2015) employ the learning analytics, tested on edX datasets, as a tool to improve teaching methods, providing visual representations of teaching methods used and their relation to students’ performance, showing relationships, where they exist, between the learning analytics and the student behavior as well as her/his performance in the course.

This work has a twofold aim. First, reviewing a specific learning analytics method (Siemens & Long, 2011; Baker & Inventado, 2014; Merceron, Blikstein & Siemens, 2016), that is sentiment analysis (Shum & Ferguson, 2012; Siemens, 2013), in Higher Education, showing how it is employed to monitor student satisfaction on different platforms: learning diaries, Twitter and MOOCs. Second,
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