CYBERBULLYING IN E-LEARNING PLATFORM: AN EXPLORATORY STUDY THROUGH TEXT MINING ANALYTICS

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ABSTRACT*:* The adoption and use of Learning Management System (LMS) in Higher Education Institutions (HEIs) have become inevitable for teaching and learning process. It facilitates communications between teachers and students, as well as among students, regardless of physical barriers and time. However, there is also a dark side to the online environment, given more and more adolescents admit they have been the victims or bystanders of cyberbullying. In order to ensure that the online learning environment is safe for everyone, it is critical to assess the extent of the conversation carried out through the platform so as to ensure that no such misconduct is carried out via LMS. Hence, it is the aim of this study to propose a practical solution to combat cyberbullying in an educational platform. This study has demonstrated the potential applications of text mining techniques in educational research. In addition, the result of the study also shows the pattern of when cyberbullying is more likely to occur in E-Learning platform.

KEY WORDS: *Cyberbullying, E-Learning, Text Mining, Exploratory Study*

1. INTRODUCTION

The advancement of technology had changed the way education is carried out in all level of education institution, particularly higher education. Among others is through the adoption and use of Electronic Learning (E-Learning), which primarily aimed to facilitate the learning process by delivering information and instructions to individuals over an intranet or through the internet (Welsh, Wanberg, Brown, & Simmering, 2003). The adoption of E-Learning by higher education institutions is also aimed to provide a conducive collaborative environment for students to communicate and share ideas in an online learning environment (Cheung & Vogel, 2013).

Today, one of the most rampant misconduct in online activity, especially among youth, is cyberbullying (Orel, Campbell, Wozencroft, Leong, & Kimpton, 2017). While there is extensive research on the extent of cyberbullying in social media among university students (Çelik, Atak, & Erguzen, 2012; Orel et al., 2017), little

attention had been given on the possibility of how E-Learning platform may be used to carry out such misconduct. Hence, it is the aim of this paper to shed some lights on the use of data analytics, particularly text mining, in order to understand the nature of cyberbullying in an E-Learning platform of a higher education institution. The subsidiary aim of this study is to propose practical solutions for all stakeholders in combating cyberbullying.

2. E-Learning Use in Higher Education

The advent of the internet and its advancement throughout the years have made possible to develop courseware with many multimedia and interactive elements and deliver it online. The research examining the benefits of E-Learning had been extensive. Among the many advantages associated with E-Learning documented in the literature were: increase learner's convenience, the flexibility of content delivery, and promote student's ability to develop self-learning ability (Concannon, Flynn, & Campbell, 2005; Welsh et al., 2003). In other words, the perspective focused on personalization and learners' rights and responsibilities.

Hrastinski (Hrastinski, 2008) emphasizes the importance of social support communication feature that every E-Learning platform should have in order to sustain the communities. It is expected that such an online environment, just as in traditional education, enables the learners to ask questions and share information and ideas. In addition, through such communication, learners would be able to obtain social support, which is desirable for creating an atmosphere that fosters collaborative learning.

Along with the promising benefits that E-Learning may offer to institutions and learners, there are challenges – or disadvantages as a number of researchers refer to –, that inherent to any technology adoption. Arkorful and Abaidoo (2015) reported the negative impact of E-Learning on socialization skills due to the limited role of instructors as directors in the educational process. They also cautioned the issues of piracy, plagiarism, cheating, and other inappropriate use which may occur in the E-Learning platform.

3. Cyberbullying

Cyberbullying is an emerging problem in higher education institutions, especially as the internet increasingly becomes more accessible and part of daily life in university. It can be defined as the use of communication tools on the internet which intentionally and repeatedly caused harm or disturbance to a specific individual or group of individuals (Ang & Goh, 2010). Such term has been regarded as a generic term to describe a range of behaviours, including internet harassment and online bullying (Tokunaga, 2010) (see Figure 1).

The increasing attention on cyberbullying in higher education is triggered by the high variable prevalence rates for victimizations and perpetrations reported in earlier studies (Ang & Goh, 2010; Çelik et al., 2012; Faucher, Jackson, & Cassidy, 2014). Different to face to face bullying, cyberbullying has a longer "shelf life" of the bullying text or images, which can place the victim in harm's way for longer periods of time (Faucher et al., 2014).
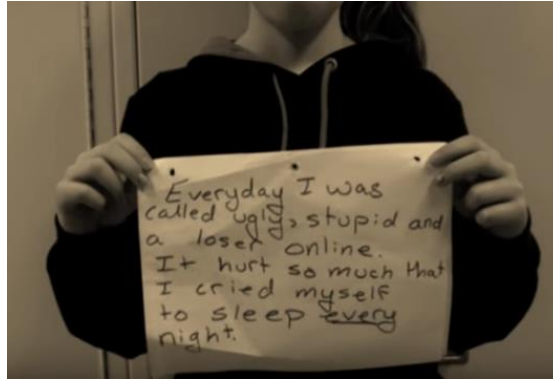
Fig. 1. Cyberbullying Victim's Message Posted Online
(Source: HandsShinetheLights (HandsShinetheLights, 2013))

Previous research (Akbulut & Eristi, 2011; Willard, 2005) have classified cyberbullying into several types of online misconduct, which described as follows:

• *Harassment*   :   repeated aggressive and offensive messages
• *Flaming*   :   rude messages
• *Denigration*   :   sending fake or false statements or information about someone
• *Masquerade*   :   the bully pretends to be someone who they are not
• *Outing*   :   sharing others' private information
• *Trickery*   :   tricking someone to sharing secrets or solicit information
• *Exclusion*   :   intentionally leaving someone out of an online group
• *Cyberstalking*   :   threats of harm or intimidation

The victims of cyberbullying are often harmed psychologically rather than physically (Arıcak, 2009), reported feelings of anxiety, depressions and suicidal ideation (Carol M. Walker & Koehn, 2011). Unfortunately, many educators and parents often unaware of when and where it is happening.

Cyberbullying has also been identified to disrupt all aspects in the learners' lives which may have interfere with the academic development of learners (Akbulut & Eristi, 2011; Çelik et al., 2012). Studies have urged society to no longer regard such instances as a trivial nature of growing up (Betts & Spenser, 2017; Willard, 2005). Unfortunately, many education institutions are lacking of codes of conduct, policies and restrictions to prevent and address cyberbullying (Eskey, 2014). The lack of awareness on the severe impact of such misconduct and gray area of interpretation of when the behavior violates criminal or civil law, have contributed to the upsurge of cyberbullying in education institutions (Eskey, 2014). Hence, it is imperative for both parents and educator to start considering the severity of psychological harm they may cause to the victims.

4. METHODOLOGY

In order to achieve the objective posited in this study, a series of individual conversation records posted in English and Malay language between students were collected from an E-Learning platform's database (see Figure 2) of a Higher Education Instituions. Any messages recorded as broadcast, or personal communications with lecturer or instructor, are not included in the dataset.
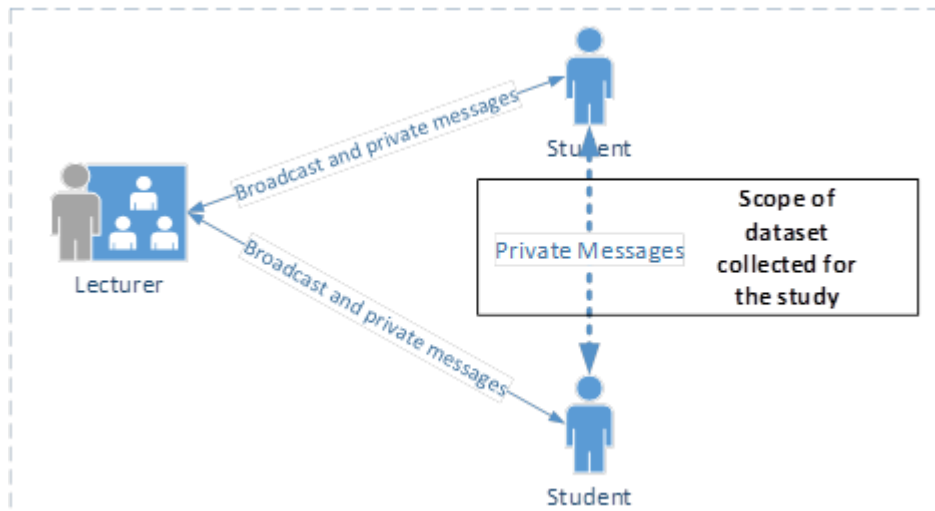
Figure 2. Scope of Dataset Collected for the Study

Given the focus of this study is to examine the content of the message, hence, no personal information was retrieved in the dataset. The userID captured in the dataset is a system-generated number which is different from the personal identification number of the individual. Other attributes retrieved in the dataset were full messages and time created (see Figure 3). The dataset used the messages collected between 3rd September 2017 and 17th July 2018, with the total number of 3498 messages were retrieved as the sample for text mining. The messages were saved into spreadsheets for analysis.
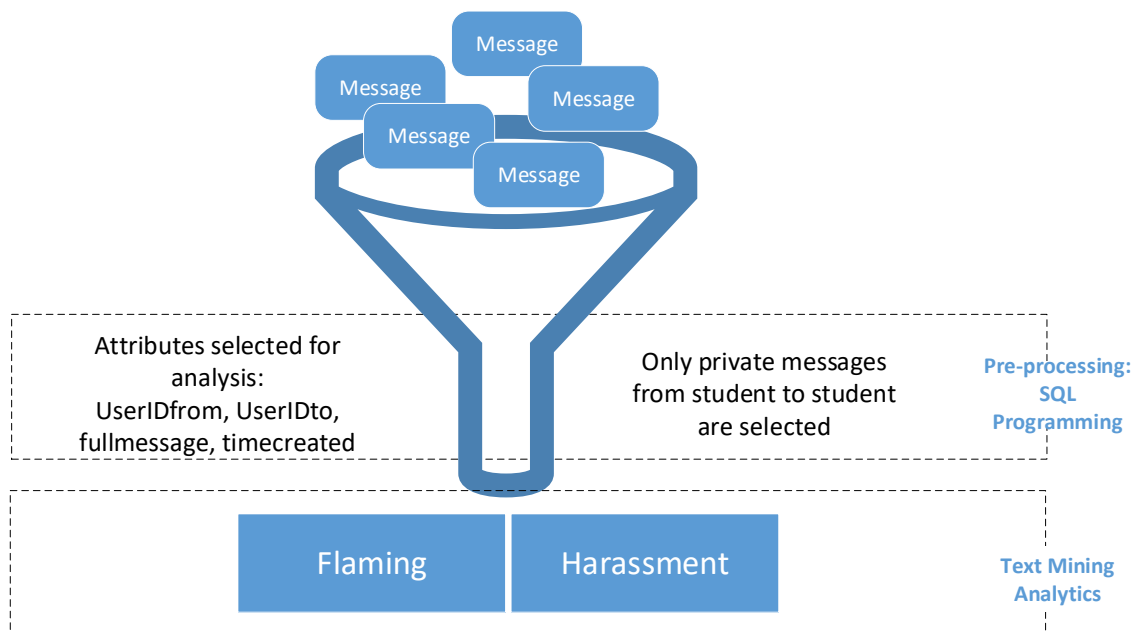

Figure 3. The Adopted Methods of Data Analytics and Selected Attributes

The text mining process in this study was carried out in multiple stages. The messages collected was sent to the pre-processing stage, in which raw data was transformed into a usable format. It was then followed by text mining techniques to gain insights about the contents and context of the messages in the dataset. A

renowned tool in textual data analysis and mining, ATLASti, was used to facilitate the mining and analysis using common linguistic methods such as extracting, grouping, indexing and so on. The result of the analysis enables the researchers to explore and extract key concepts, generate categories, and rapidly gain insights from interesting patterns, connections, and unusual information in the textual data.

5. RESULTS AND DISCUSSIONS

The aim of this study is exploring the use of text mining to understand the nature of cyberbullying in an E-Learning platform of a higher education institution.

In order to address such aim, an analysis was conducted to identify the average of the frequency private messaging among students on every hour. As illustrated in Figure 4, the highest average number of private messages among students were recorded at 2 PM, where students often resume their classes from the lunch break.

It is also interesting to note on the relatively high number of the traffic of private messaging between 9 PM to 1 AM, hence supports the findings of the previous study who found that more and more young people lose sleep over online activity (Christakis, Moreno, Jelenchick, Myaing, & Zhou, 2011).
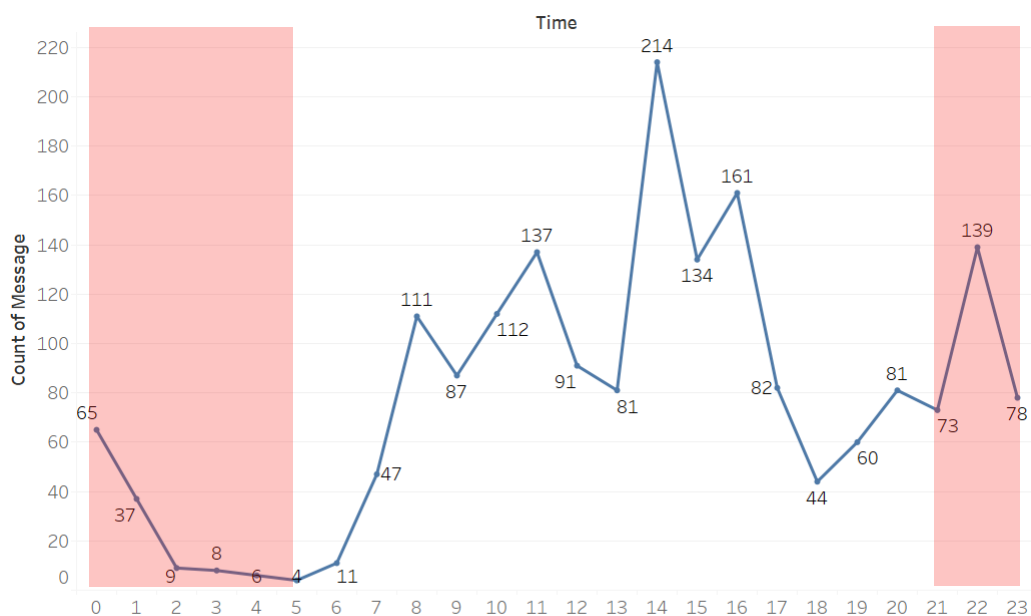
The trend of count of Message for Time Hour. The data is filtered on Time Year, which keeps Null, 2018 and 2019. The view is filtered on Time Hour, which excludes Null.

Figure 4. Average Number of Private Messages Sent via E-Learning Platform in 24 Hours and the Critical Window for Cyberbullying

During the text mining analysis using linguistic assessments of the instances in the sample dataset, a series of conversation containing inappropriate words was filtered, and then followed by assessment of the context by the researchers. It was found that a total of 49 messages (or equal to 1.4 percent of all messages) were categorized as flaming and/or harassment. Figure 5 also shows the trendline of the frequency on flaming and harassment messages occurrence in 24 hours. As can be seen, many of these offensive messages were posted late at night, however different to conventional belief, it has smaller number as compared to the remaining

time of the day. The highest number of cyberbullying messages were posted during the day, and shows that internet enable the perpetrators to act yet furtively away from the watchful eye of the educator.
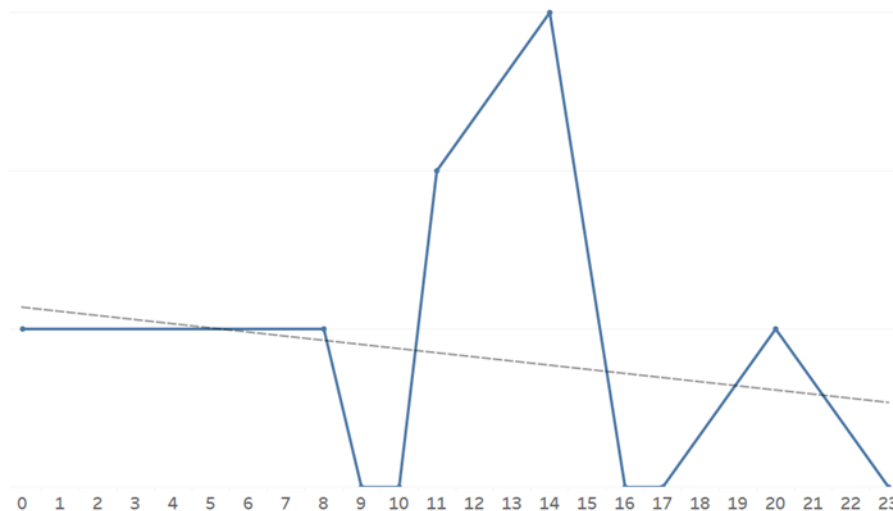

Figure 5. Trendline of Flaming and Harassment Messages Occurrence in 24 Hours

The above results highlight a number of practical solutions which may be undertaken by relevant stakeholders. For the University as the owner and provider of the E-Learning platform, it is imperative to formulate relevant strategy and policies to prevent and/or tackle any issues pertaining to cyberbullying. Such strategy would also include relevant efforts to promote the awareness of cyberbullying and its impact to the individual, and institution in general. Other strategy may include an automated regular analysis of private messages contents through the use of data analytics, so as to allow all stakeholders to be informed of any alarming pattern of communications among students, during and after hours.

6. CONCLUSION

This exploratory study examines the extent use of data analytics, particularly text mining, to assess the nature and cyberbullying carried out in the E-Learning platform. The findings of this study enable all stakeholders in higher education institutions to understand how E-Learning may be used by perpetrators to furtively bully others via internet, during the day or after hours in an online educational facility.

A number of practical solutions are proposed in this study, among others the imperative effort to promote the awareness of cyberbullying and its negative impacts – psychologically – to the victims. Further research is needed to expand the understanding of cyberbullying at the university level through a longer historical dataset, and additional demographical information such as age and gender.

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