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## Answering questions concisely: analysis of a Twitter activity in a management course

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### Abstract

This paper summarizes the results of an activity conducted on a management course using the Twitter microblogging service. Students were required to answer a question by sending a tweet and to favor three classmates' tweets on the basis of how well they answer the question. Students were rewarded according to the number of "favorites" received. The students' tweets were compared to the correct answer, and graded accordingly. Findings are: a mismatch between the students' tweets and the correct answer, no correlation between the number of "favorites" received and the marks scored, and a pattern of mutual favoritism among students.

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*Keywords:* Twitter; tweet; grading schema; rewarding schema; R statistical environment; Wordle; favorite; mutual favoritism

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### 1. Introduction

Since its emergence, Twitter has become a tool to enhance learning in academic institutions, despite the fact that it was initially conceived for personal and professional uses. In this research, the two main objectives of using Twitter in class are to encourage participation of students in the activities and to make them write concisely. Today's professors have to face with their lack of motivation and engagement, and their inability to answer questions succinctly.

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It has been shown that participation in class is essential in order to retain information (Barkley, Cross, and Major, 2005; Schulman, 2002; Clarke and Nelson, 2012) and to increase learner motivation (Wishart and Blease, 1999).

Although allowing the access to an electronic device (laptop or smartphone) may cause a loss of attention to the lecture, Junco, Heiberger, and Loken (2011) show that this does not lead to a decrease in learning. Matterson (2010) says that allowing the use of Internet-connected devices in class may distract students' attention and, hence, be counterproductive. A potential remedy, he suggests, is to set clear rules of use and penalties in cases of non-observance.

The benefits of using Twitter in class with regards to student participation have been highlighted by various authors. When Twitter is used in class as an alternative to more traditional methods, student participation increases (Ebner *et al.*, 2010), a sense of community is created (Clarke and Nelson, 2012), and informal connections among the students are generated (Junco, Heiberger, and Loken, 2011).

During a conventional class, student attention drops after twenty or thirty minutes. It is therefore crucial to find activities that encourage the student to stay active, motivated, and engaged, and Twitter can be used as a tool in this respect. Moreover, the use of an application like Twitter may facilitate the participation of those students who are more reluctant to participate orally in class (Ebner, 2009; Ross *et al.*, 2011). Even those students who did not like to perform activities using Twitter have felt a greater sense of participation and obtained better grades (Bridget and Bonnan-White, 2012).

The purpose of the research is threefold: to verify whether there is a match between the students' tweets and the "teacher tweet"; to analyze the extent to which students favor their peers' tweets on the basis of how well they answer the asked questions; and to examine the appropriateness of the grading and rewarding schemas.

## 2. Activity description

The activity was conducted in the 2013-2014 academic year of the IQS School of Management Degree in Business Administration and Management as part of "Entrepreneurship", a fourth-year elective course. It attempted to increase students' motivation and engagement, and strengthen their ability to answer questions concisely. Two challenging tasks for professors in universities today are to maintain the interest of students and to make them answer exam questions succinctly. In the 2013-2014 academic year there were two groups, with 59 and 23 students respectively.

During the course students are asked to prepare at home some teaching cases to be discussed in class. At the beginning of each session, the professor usually organizes a quiz to check whether students have prepared the case. The quiz consists of a question to be answered in short on a sheet of paper. However, sometimes the professor asks the students to use the Twitter microblogging service and send a tweet with the answer. Students are obliged to answer the question in less than 140 characters, since the tweet has to include a hashtag in which the course, the group, and the question are identified. This feature allows students to retrieve all the tweets sent in response to the question. Subsequently, students are asked to read all the tweets and favor up to three of those sent by classmates. They are not allowed to favor more than three tweets or to favor themselves. It is emphasized that students should select the tweets that best answer the question.

During the course, students are ranked according to the number of "favorites" received. At the end of the course, the fifty percent of students with the most "favorites" are rewarded an additional point in their final grade.

At the end of the course, the tweets are collected and the information is organized in two Excel tables. In the first table all the tweets and their relevant data are shown in order of appearance in the timeline. In the second table only the favored tweets are displayed, and the students who have favored each tweet are indicated. The second table allows us to keep the ranking of students and track "who has favored who."

Before running the activity, the professor writes the "teacher tweet," which is considered to be the correct answer to the question asked. In order to verify whether there is a match between the students' tweets and that of the teacher, a grading schema was designed. A complete match is graded with a mark of 10 and a complete mismatch is graded with a mark of 0. The "teacher tweet" is broken down into keywords and points are given to each keyword in order to objectively grade the tweets between the two endpoints. As an example, the correct answer to a question was: "export ice glasses from the Torne River." The word "export" was given 2 points, the words "ice glasses" were given 7 points, and the words "Torne River" were given 1 point.

The activity consisted of 10 runs along the course. Students were invited to send 10 tweets answering 10 questions.

### 3. Methodology

Tweets are collected accessing the Twitter API using the R statistical programming environment and the TwitteR package for the mentioned environment (RDC Team, 2004). The data collected is managed using Excel. Tweets are also analyzed using the Wordle tool (Feinberg, 2014) to generate a word cloud in which the most frequent words are represented in larger characters.

### 4. Results

Participation in the activity in the 10 runs fluctuated between 56% and 83% of the students attending the session. Average participation was 68%. Participation along the course shows a decline trend (in the first run participation was 83%, falling to 56%, 56%, and 61% in the final three sessions).

For each of the 10 runs and 2 groups, bar charts have been created to graphically represent the frequency of the marks, on a scale of 0 to 10. Only the bar charts for 3 out of 10 runs show a bell-shaped distribution centered on the 5, 6, or 7 marks. In 6 out of 10 bar charts the most frequent marks are 0 (as an example, see figure 1) or 1. The remaining bar chart shows an almost flat distribution.

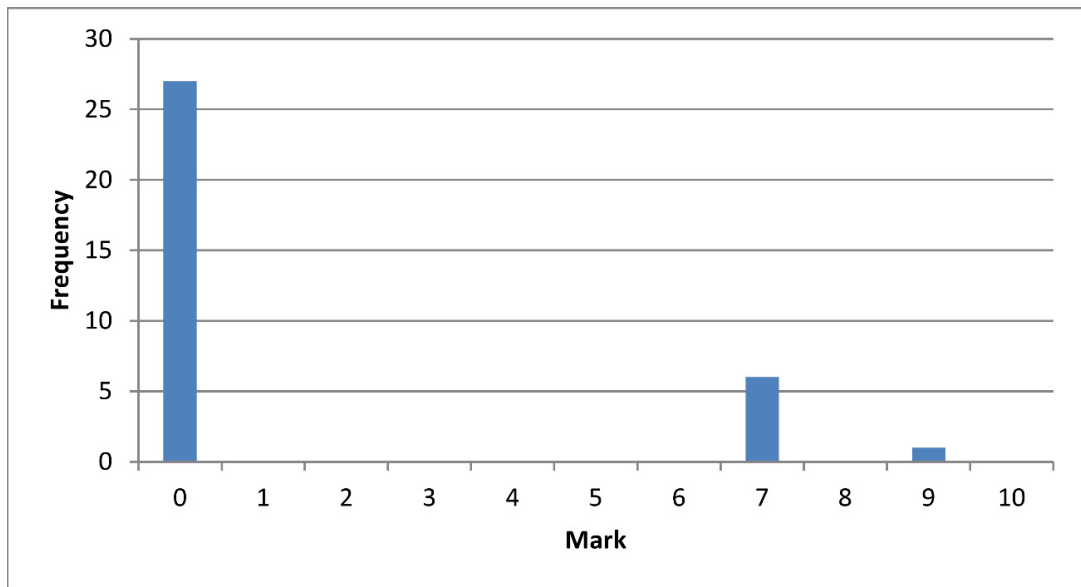


Figure 1. As an example, bar chart for run 1 of group 1.

Analysis using the Wordle tool reveals that in most of the runs of the activity: 1) there were a lot of different words in the cloud and, therefore, a significant amount of dispersion in the answers (see figure 2); 2) the most frequent words in the cloud were not the keywords of the “teacher tweet.”



Figure 2. Word cloud made using the Wordle tool for run 8, both groups.

Figure 3 is a graphic representation of all the tweets sent during the course. The X-axis shows, for each tweet, the number of “favorites” received and the Y-axis shows the marks scored.

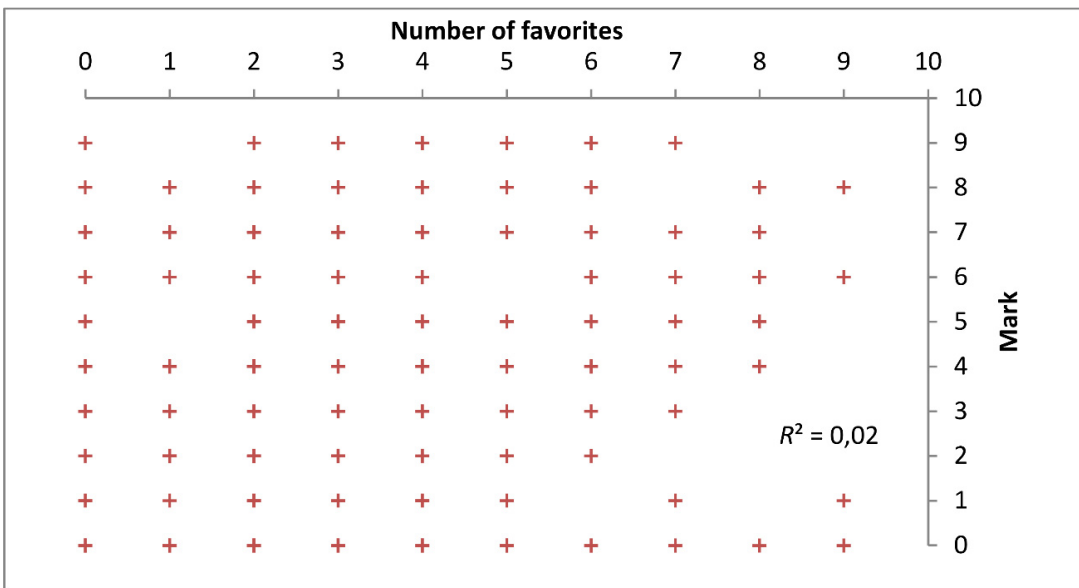


Figure 3. For each tweet, number of “favorites” received and marks scored.

Figure 4 is a graphic representation of the number of “favorites” received and the marks scored by all the students during the course. The X-axis shows, for each student, the sum of the number of “favorites” received and the Y-axis shows the sum of the marks scored.

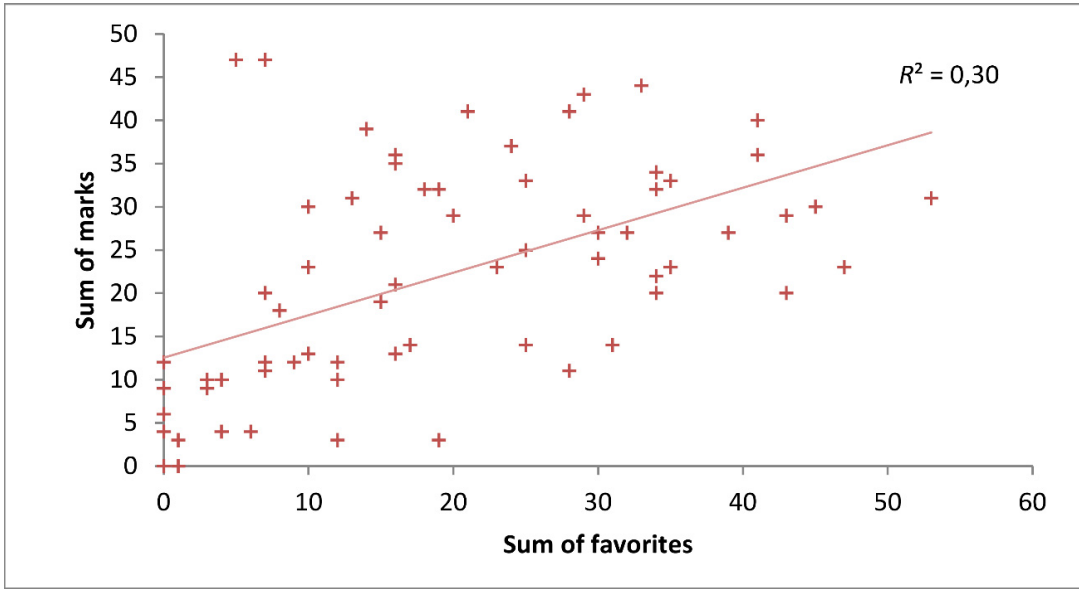


Figure 4. For each student, sum of the number of “favorites” received and sum of the marks scored.

Figure 5 is a graphic representation of the average number of “favorites” received and the average mark scored by all the students during the course. The X-axis shows, for each student, the average number of “favorites” received and the Y-axis shows the average mark scored.

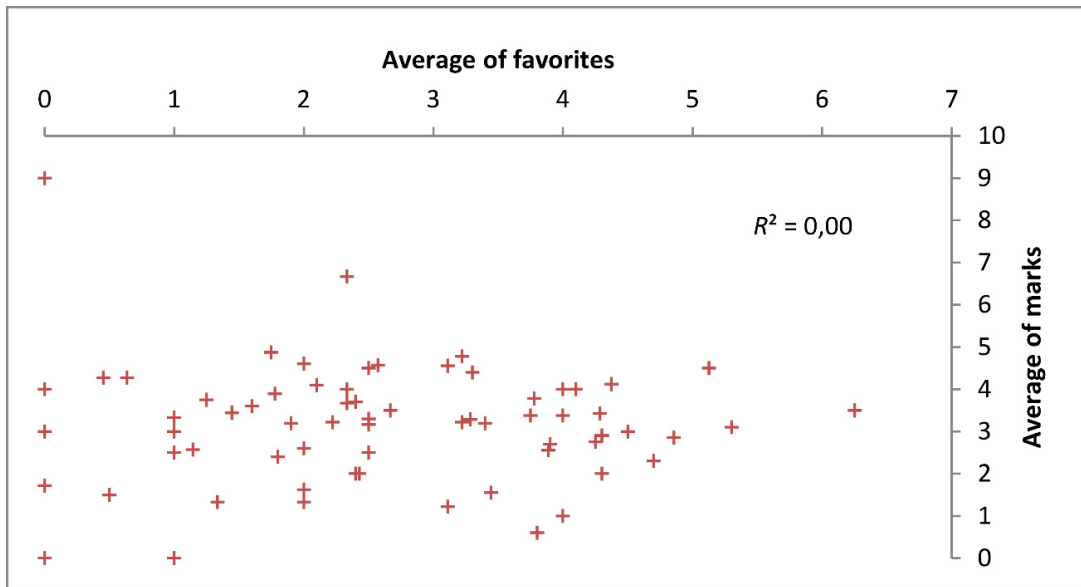


Figure 5. For each student, average number of “favorites” received and average mark scored.

All the figures show a low correlation between the variables.

The second table showing only the favored tweets and indicating the classmates who have favored each tweet has been reordered in order to better analyze students’ “favorites”. The original table showed the students in the first column and the first row in numerical order. “Student 1” in the first column meant “tweets sent by student 1” and

“student 1” in the first row meant “tweets favored by student 1.” The reordered table (see figure 6) shows the students in the first column ordered according to the number of “favorites” received along the course. The order of the students in the first row is the same as in the first column. Figure 6 shows an area of high intensity and a symmetry between both sides of a diagonal (see the left upper quadrant), indicating that a certain pattern of mutual favoritism among students exists.

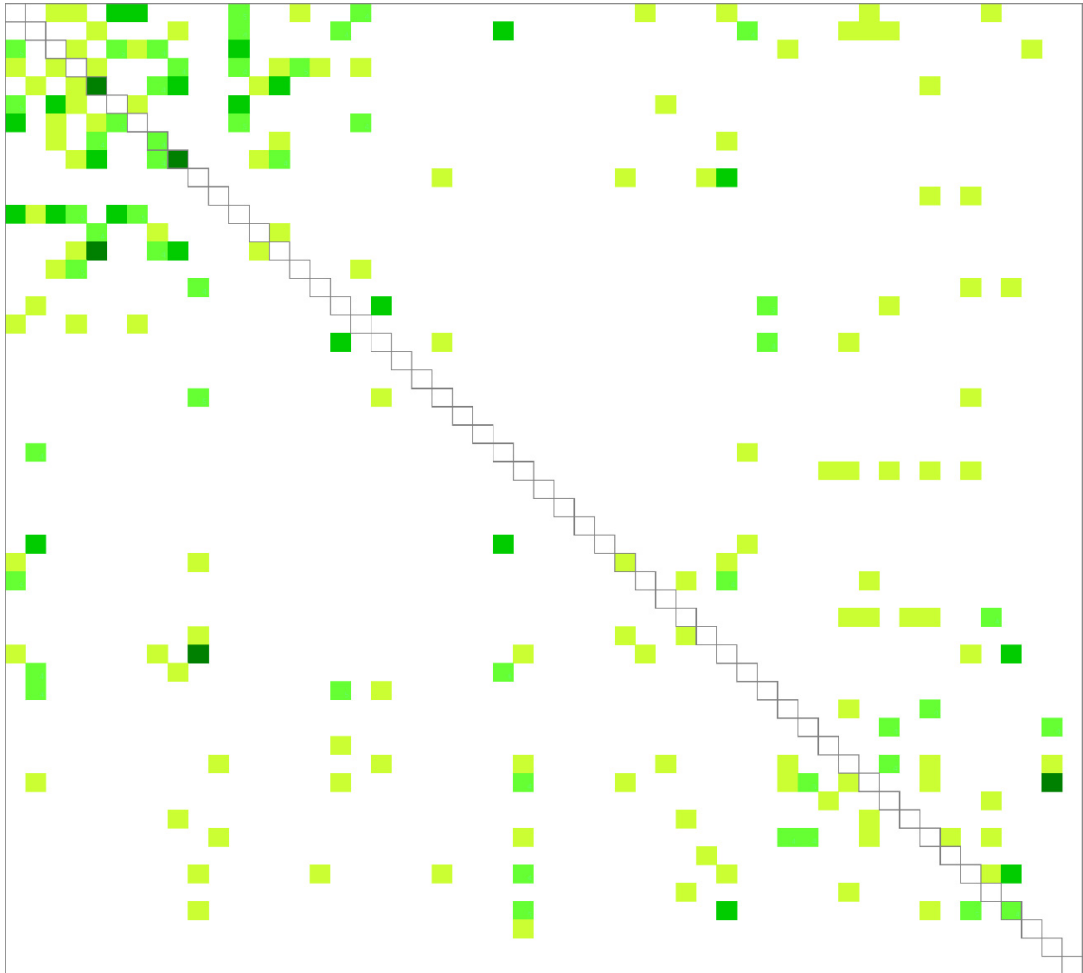


Figure 6. Students in the first column are ordered according to the number of “favorites” received along the course. The order of the students in the first row is the same as in the first column.

## 5. Discussion

Participation in the Twitter activity (percent of students attending the class who sent a tweet) is not too high (average participation of 68%), with a peak of 83% and a trough of 56%. The fact that on average 32% of the attending students did not participate in the activity challenges the contention that, when Twitter is used in class as an alternative to more traditional methods, students participate more (Ebner *et al.*, 2010). Students participate more in the Twitter activity, compared with usual participation in open discussions in class, probably because Twitter facilitates the participation of those students who are more reluctant to orally participate in class (Ebner, 2009; Ross *et al.*, 2011). However, if students had been requested to answer the same questions on a sheet of paper, participation would probably had reached 100% of the attending students. For some students, the Twitter activity is perceived as a

non-serious activity, and there is a perception that the professor has little ability to control who answers and who does not.

The bar charts created to graphically represent the frequency of the marks, as well as the word clouds, reveal a mismatch between the students' tweets and the "teacher tweet." Students did not answer the questions in the way expected by the professor. The mismatch can be attributed in part to the grading schema itself. Students' tweets score marks on the basis of some keywords in the answer previously set by the professor, and the student's answer could be right despite using words different from the pre-determined selection.

Figures 3, 4, and 5 show a low correlation between the number of "favorites" and the marks, a result that confirms that students did not favor their classmates' tweets on the basis of how well they answer the asked questions. Figure 4 shows a higher correlation because the variables are the sum of the number of "favorites" received and the sum of marks scored, and the result is distorted by participation in the activity. That is, someone who has participated in all the runs but with a modest number of "favorites" and marks may score higher than someone who has participated in less runs but with a larger number of "favorites" and marks. Figure 3 shows that for each mark (Y-axis, from 0 to 9), the tweets have received a full range of number of "favorites" (X-axis, from 0 to 9). Figure 5 shows two extreme cases: a student does not receive any "favorite" despite scoring an average mark of 9. Another student receives 6 "favorites" per tweet despite only scoring an average mark of 3. Meanwhile, two students who receive 4 "favorites" per tweet score average marks of 0 and 1. The decision to favor the classmates' tweets is not linked to quality, and any tweet may receive any number of "favorites" irrespective of quality. Figures 3 and 5 are conclusive: there is no correlation between the number of "favorites" and the marks, and students do not favor their classmates' tweets on the basis of how well they answer the asked questions, even though this was the criteria set by the professor.

Figure 6 shows that a certain pattern of mutual favoritism among students exists, thus providing evidence, albeit weak, that the use of Twitter in class can create a sense of community (Clarke and Nelson, 2012) and can generate informal connections among the students (Junco, Heiberger, and Loken, 2011). The students who have practiced mutual favoritism (see left upper quadrant of figure 6) are members of informal groups. The professor assigns activities to be done both in and out of class in groups of four or five students, and the students in question usually do them in the same informal groups.

On the other hand, analysis of the tweets collected reveals that some students self-favored, and some other students favored more than three tweets per run, probably incentivized by the grading schema in place. For future replications of the activity, such behavior should be penalized by excluding students from the activity.

The results of this analysis suggest that certain changes are necessary in future use of the activity. The schema used to grade the students' tweets, based on keywords, should be redefined. In the current system, an answer could be correct but could score a low mark because the student has not written the exact words pre-determined by the professor. A modification of the schema, introducing some sort of flexibility in the evaluation, would increase the marks scored by the students. Bar charts show now a gap between the students' tweets and the "teacher tweet" which is larger than the discrepancy that one could perceive by comparing the students' tweets with the "teacher tweet" one by one.

The rewarding schema in place should be also changed because it incentivizes non-desirable behavior. The activity of favoring the classmates' tweets was conceived to reward the students who best answer the asked questions. However, as one might have expected from the outset and as the results demonstrate, students did not favor their classmates' tweets on the basis of how well they answer the questions. The rewarding schema should encourage participation in the activity, while also incentivizing high-quality tweets and rewarding them on the basis of their similarity with the "teacher tweet."

## 6. Conclusions

A first finding of the research is a mismatch between the students' tweets and the "teacher tweet." Students did not answer the questions in the way expected by the professor. A second finding is the absence of correlation between the number of "favorites" and the marks, indicating that students did not favor their classmates' tweets based on the quality of their responses to the questions. A third finding is the existence of a pattern of mutual

favoritism among students. Together, the second and third findings allow us to conclude that, due to the rewarding schema in place, students favored the classmates' tweets not on the basis of how well they answer the asked questions, but rather to gain mutual benefit.

Some changes should be implemented in future uses of the activity, in particular regarding the schema by which students' tweets are graded and the methods used to incentivize participation.

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