


## CHAPTER 35

# Twitter social network and its interaction between the educational community and higher education institutions in Ecuador

 [10.56238/pacfdnsv1-035](https://doi.org/10.56238/pacfdnsv1-035)

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### ABSTRACT

This research work presents an analysis on the interaction of the educational community to the publications made by the institutions of Higher Education in the social network Twitter, five public universities in the country were analyzed, from which 106 data were collected for both retweets and likes in the social network in the years 2017, 2018 and 2019,

where a summary of descriptive statistics was established and the average percentage growth rate (TCPP) was determined. The research design was established as non-experimental, field and with a longitudinal descriptive level, where it was obtained as a result that the Escuela Superior Politécnica del Litoral predominates the interaction with its community through a TCPP of 71, 76% and 116.63% for retweets and likes respectively.

**Keywords:** Interaction, Twitter, Higher Education, Average Percentage Growth Rate.

## 1 INTRODUCTION

Currently, social networks in the educational field have evolved constantly, this is because educational institutions, with more emphasis on universities in the country, see as an alternative to improve their corporate image by making publications of all kinds, in order to generate a significant impact to students, teachers or the general public who are in the interactivity with social networks or in the constant use of technology.

Twitter has one of the ideal characteristics to be used in educational and training processes or in the dissemination of content in a formal manner. Universities in Ecuador use this social network to publish educational content, offer their followers undergraduate and graduate academic offerings, publicize educational management processes, and disseminate important events in internal or external social contexts.

In the research conducted by Gallardo & Lopez (2020), on Twitter as a methodological resource in Higher Education, the interaction of enrolled students (137 students) in the subject of Introduction to Social Pedagogy, it was obtained that in the last 100 tweets of categorized students (teaching line 1 and 2) in teaching line 1 (67 students) was 82 contributions, where there were 17 comments and one retweet, and for teaching line 2 (70 students) was 52 contributions with 6 comments and 37 retweets. [1]

In the educational field, according to the study conducted by Guzmán Duquea & del Moral Pérez (2012), on the use of Twitter in Ibero-American universities, the average number of tweets shared by the institutions with their community was 2031 in December 2011, in addition the average number of tweets per university was 114 and in September of the same year was when the highest number of tweets was 149, it should be noted that the lowest number of tweets was in January with 55.

The interaction of followers with any page of the social network is done through four basic aspects implemented by Twitter, which are comments, retweets, likes and the share function, of which the first three can be counted, as it depends on the number of followers and above all that the user is online or performs a daily review of the publications made of the pages of interest. [3]

## 2 MATERIALS AND METHODS

Regarding the methodology and context of the research, a quantitative approach was used [5], where a descriptive statistical analysis of the interaction of the educational community to the publications made by five universities in the country on the social network Twitter was performed, using as data, the number of retweets and likes for each institution of Higher Education. The method applied is detailed below:

Five universities in the country, accredited in category A by the Consejo de Aseguramiento de la Calidad de la Educación Superior (CACES) and the ranking of universities established by the SCIMAGO INSTITUTIONS RANKINGS, were randomly selected.

1. The official Twitter page of the universities was accessed and a record was made of retweets and likes of randomly selected publications in 2017, 2018 and 2019.
2. Descriptive statistics were determined using Minitab 18 software.
3. Bubble charts were made according to the number of retweets, likes and percentage relative frequency for each Higher Education institution according to the established years, with the application of Minitab 18 software.

$$f_i = \frac{n_i}{n} \cdot 100\% \quad (1)$$

Where:

$f_i$  is the relative percentage frequency.

$n_i$  is the corresponding value of the category.

$n$  is the sum of the values of all categories.

4. The average percentage growth rate was determined by applying the geometric mean.

$$\bar{X}_g = \left( \sqrt[n]{\prod_{i=1}^n X_i} - 1 \right) \cdot 100\% \quad (2)$$

Where:

$X_g$  is the average percentage growth rate.

$X_i$  is the ratio of one year to the previous year.  
 $n$  is the number of proportions in the analysis.

*Note:* The analysis of the comments on each publication was not considered, because in most cases there were no opinions from followers or they were very few.

### *Research design*

The research design is non-experimental because the study variable is not controlled or manipulated, i.e., the variable is already established in a real context to be analyzed later. [4]

### *Type of research*

The type of research is field research, this is because the data collection was performed directly where the facts occur considering the study variable and with the help of secondary information sources, this type of research allows a possible revision or modification with respect to the quality of the data obtained. [4]

### *Research Level*

The level of research is longitudinal descriptive due to the fact that the data were collected in the years 2017, 2018 and 2019, i.e. in a time interval.

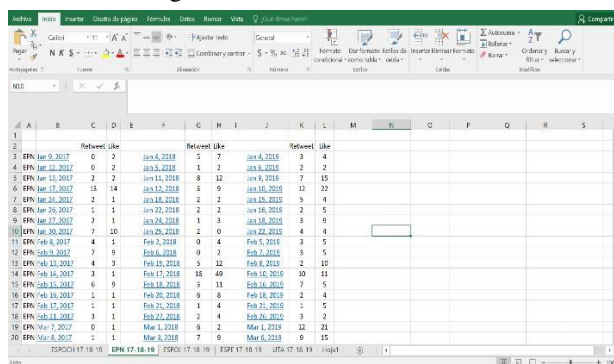
### *Sample*

The Higher Education institutions considered in the research were established under a non-probabilistic purposive sampling, that is, it depends on the researcher's criteria and the interest of selecting a specific sample, in this case the universities analyzed were the Escuela Superior Politécnica de Chimborazo (ESPOCH), Escuela Politécnica Nacional (EPN), Escuela Superior Politécnica del Litoral (ESPOL), Universidad de Fuerzas Armadas (ESPE) and Universidad Técnica de Ambato (UTA), located in Ambato, Escuela Politécnica Nacional (EPN), Escuela Superior Politécnica del Litoral (ESPOL), Universidad de las Fuerzas Armadas (ESPE) and Universidad Técnica de Ambato (UTA), ranked 12, 8, 9, 11 and 4 respectively by the SCIMAGO INSTITUTIONS RANKINGS. [6]

### *Data collection techniques*

The technique used in this research was direct observation, where the publications were analyzed through retweets and likes counted in the tweets originated by the Higher Education institutions selected for the analysis, the review of the publications was random and monthly. The data obtained were placed in an Excel sheet with the exact dates of the selected publications as evidence of the process.

Fig. 1. Record of data collection.



### 3 RESULTS AND DISCUSSION

#### Descriptive statistics

Table 1. Descriptive statistics

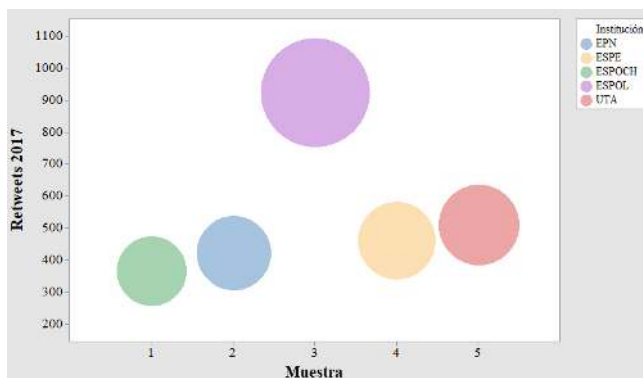
Institution	Followers	Year	n	Sum	Media	Standard Deviation
ESPOCH	13488	2017	Retweet			
			Like	612		
		2018	Retweet	510	5	
			Like	917		
		2019	Retweet	520	5	5
			Like	1345		
EPN	18873	2017	Retweet	420		
			Like	488	5	
		2018	Retweet	337		5
			Like	614		
		2019	Retweet	1067		
			Like	2075		
ENGLISH	61287	2017	Retweet	923		
			Like	938		
		2018	Retweet	1125		
			Like	1886		
		2019	Retweet	2723		
			Like	4402	42	91
ESPE	18585	2017	Retweet	461	5	
			Like	516	5	
		2018	Retweet	285		
			Like	637		
		2019	Retweet			
			Like	1074		
UTA	9347	2017	Retweet	509	5	
			Like	745		
		2018	Retweet	633		
			Like	880		
		2019	Retweet	543		5
			Like	800		

In each established year, 106 tweets (n) were analyzed according to the Higher Education institution, in addition, as the measurement scale was of discrete type (whole numbers), for the arithmetic mean and standard deviation (Std. Dev.) it was rounded to the nearest higher number.

In Table 1, it can be seen that in all cases the number of likes is higher than retweets, in addition, the Higher Education institution that has the highest number of retweets and likes in all years and that surpasses the other institutions is ESPOL.

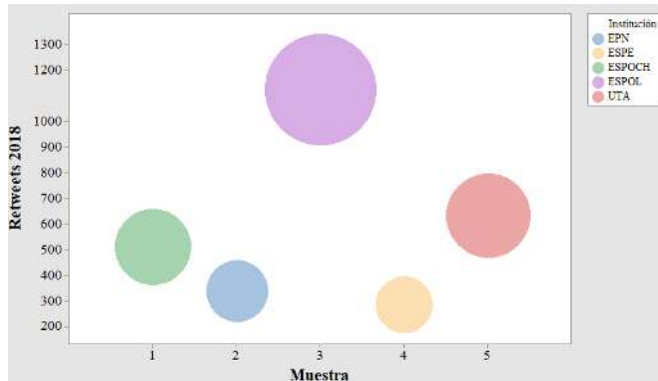
*Bubble charts*

Fig. 2. Bubble plot, retweets and percentage relative frequency, 2017. [7]



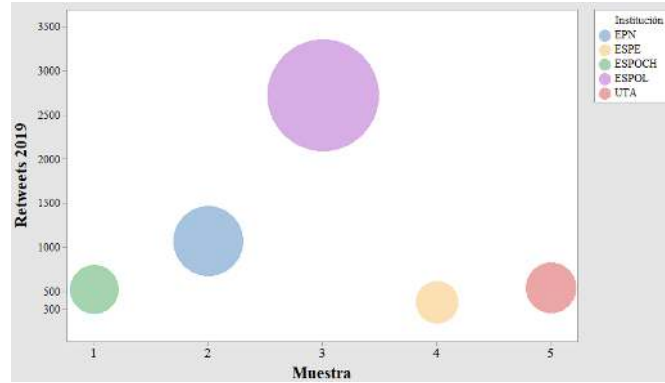
In Figure 2, it can be seen that the number of retweets in 2017 is led by ESPOL (1ro , with 923 retweets), followed by UTA (2do , with 509 retweets), ESPE (3ro , with 461 retweets), EPN (4to , with 420 retweets) and ESPOCH (5to , with 365 retweets).

Fig. 3. Bubble plot, retweets and percent relative frequency, 2018. [7]



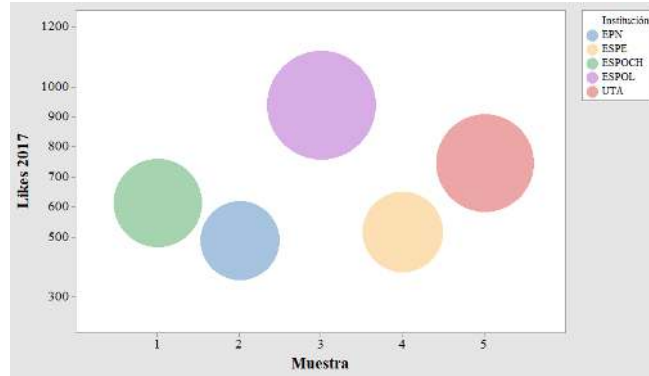
In Figure 3, it can be seen that the number of retweets in 2017 is led by ESPOL (1ro , with 1125 retweets), followed by UTA (2do , with 633 retweets), ESPOCH (3ro , with 510 retweets), EPN (4to , with 337 retweets) and ESPE (5to , with 285 retweets).

Fig. 4. Bubble plot, retweets and percent relative frequency, 2019. [7]



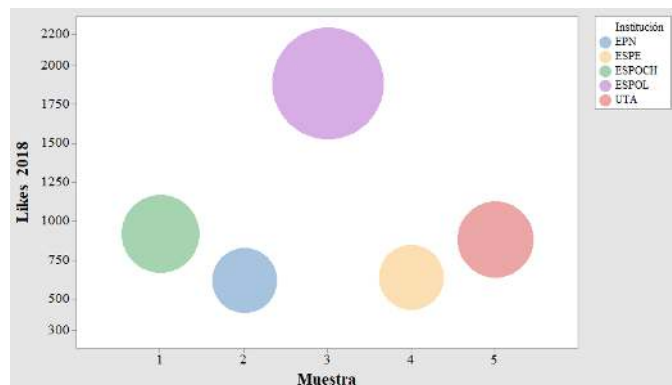
In Figure 4, it can be seen that the number of retweets in 2017 is led by ESPOL (1ro , with 2723 retweets), followed by EPN (2do , with 1067 retweets), UTA (3ro , with 543 retweets), ESPOCH (4to , with 520 retweets) and ESPE (5to , with 375 retweets).

Fig. 5. Bubble plot, likes and percentage relative frequency, 2017. [7]



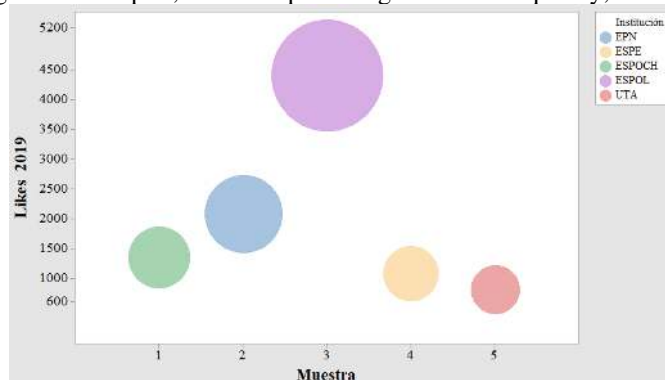
In Figure 5, it can be seen that the number of likes in 2017 is led by ESPOL (1ro , with 938 likes), followed by UTA (2do , with 745 likes), ESPOCH (3ro , with 612 likes), ESPE (4to , with 516 likes) and EPN (5to , with 488 likes).

Fig. 6. Bubble plot, likes and percentage relative frequency, 2018. [7]



In Figure 6, it can be seen that the number of likes in 2017 is led by ESPOL (1ro , with 1886 likes), followed by ESPOCH (2do , with 917 likes), UTA (3ro , with 880 likes), ESPE (4to , with 637 likes) and EPN (5to , with 614 likes).

Fig. 7. Bubble plot, likes and percentage relative frequency, 2019. [7]



In Figure 7, it can be seen that the number of likes in 2017 is led by ESPOL (1ro , with 4402 likes), followed by EPN (2do , with 2075 likes), ESPOCH (3ro , with 1345 likes), ESPE (4to , with 1074 likes) and UTA (5to , with 800 likes).

*Average percentage growth rate (APGR)*

Table 2. TCPP values

	ESPOCH	EPN	ENGLISH	ESPE	UTA
Retweets	19,36	59,39	71,76	-9,81	3,29
Likes	48,25	106,20	116,63	44,27	3,63

In Table 2, we can observe the growth rate in both retweets and likes in the established time interval (2017, 2018 and 2019) according to the selected Higher Education institution, where it can be noted that ESPOCH has a considerable TCPP, EPN and ESPOL the TCPP exceeds 100% in likes, ESPE has a decrease in retweets (due to the negative sign) and UTA the TCPP is small and there is no significant variation in retweets and likes.

**4 FINAL CONSIDERATIONS**

The use of the social network Twitter has had a growth in the interaction of the educational community to publications made by public universities in the country, where the ESPOL leads both in retweets and likes, it is presumed that it can infer the number of followers (3, 4 or 5 times higher than other institutions), As well as other factors such as the region where the university is located (ESPOL located on the coast), this leads to this type of research can be deepened, considering internal or external factors, in addition to involving statistical inference to raise and contrast possible hypotheses.

It was determined that the social network Twitter is used with greater emphasis in ESPOL to publish educational content, in order to inform the educational community of the efforts made by the authorities of the institution, it is also important to highlight the management of ICTs by the universities selected in the study, all are improving in a continuous improvement in the educational process and incorporating virtuality in their teaching- learning process.

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