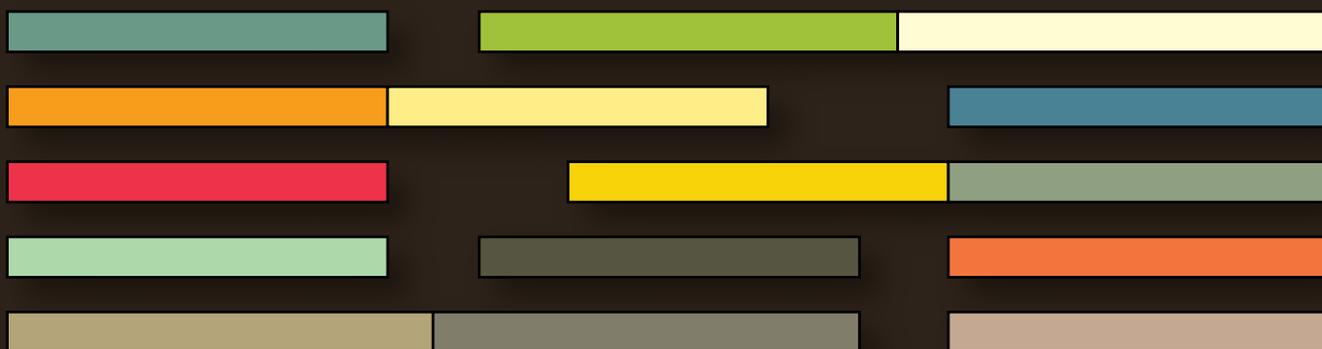


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9TH INTERNATIONAL CONFERENCE  
ON EDUCATION AND NEW LEARNING  
TECHNOLOGIES

BARCELONA (SPAIN)  
3RD - 5TH OF JULY, 2017



## CONFERENCE PROCEEDINGS



**Published by**  
IATED Academy  
iated.org

**EDULEARN17 Proceedings**  
9th International Conference on Education and New Learning Technologies  
July 3rd-5th, 2017 — Barcelona, Spain

**Edited by**  
L. Gómez Chova, A. López Martínez, I. Candel Torres  
IATED Academy

**ISBN: 978-84-697-3777-4**  
**ISSN: 2340-1117**  
**Depósito Legal: V-1538-2017**

Book cover designed by  
J.L. Bernat

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# RECRUITING UNIVERSITY ENTRANTS VIA SOCIAL NETWORKS

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## Abstract

Social media is an important element of today's university communication policy. They deliver information directly to the target audience with no middlemen and guarantee vast reach with moderate financial investments. Meanwhile existing targeting methods of advertisement do not let universities define personal learning needs and interests of potential entrants and provide them with individual recommendations on choosing educational programs. That is the reason why universities create universal communities in social media and promote all the educational programs at the same time in the framework of their recruitment campaigns. This approach does not imply differentiation of the target audience according to their interests and attract their attention to educational programs that meet them.

Current methods of analyzing user's data in social networks make university recruitment campaigns more effective. Our paper covers Tomsk State University experience in applying big data analysis methods for selecting promising entrants from social networks. We are going to share our success in these entrants' involvement and retention in university informational space. The study is based on content analysis and statistical methods, interview and data mining.

The method of automated analysis designed for working with texts from social networks accounts lets us discover entrants' interest in any subject area (history, mathematics, biology, etc.). Analyzing the topics of virtual communities the entrants follow, we clarify the information about their interests and evaluate their motivation to education and entering a university. Comparative data analysis of a significant number of possible entrants (100 - 500 thousand people) provides us with a list of highly-motivated learners interested in some subject (10 - 20 thousand people) and enables us to establish relationships with them. Specially designed communities in social networks for 4 specialties (Humanities, Natural Science, Physics and Mathematics and Economics) provide entrants with a comprehensive information about those programs which meet their interests.

A suggested approach allows to enhance the effectiveness of university marketing communications in social media, relevance of educational programs to users' interests and entrants' satisfaction with the university in the future, educational level of the entrants and their success in studying after entering the university.

Keywords: Innovation, technology, research projects.

## 1 INTRODUCTION

If university uses social networks for recruiting, there are two tasks that can not be solved in an easy and effective way. The first task is connected with selecting the entrants with great interest in a certain subject and with motivation to study. Common social network tools for target audience segmentation operate with social, demographic and geographic data. These data are not enough to define entrants' needs and interests in education, they could be completed with user profile information: subscriptions to topical groups and pages, timeline posts, connection network, etc. Approaches for analyzing user data and interpreting them to establish effective information influence are being already used in politics and marketing. These approaches are based on linguistic analysis and psychodiagnostics ([1], [2], [3], [4]). The findings are still not being applied at universities to identify educational interests and to recruit entrants. We came up with the hypothesis that potential entrants could be found in social networks for a certain department and a specialty by defining their interests in appropriate subjects. So testing this hypothesis is one of our research objectives.

The second task for universities in recruiting is concerned with the need to influence entrants' choice towards a certain university and specialty under competition at the on-campus, regional, national and global level. Today all the universities are establishing communication with entrants in social networks, but only some universities succeed in it. Poor effectiveness of university marketing communications in social networks is caused by a number of following matters: use of mass communications instead of

personified ones, publication of advertising content without its adaptation to youth culture, use of traditional marketing approaches that do not bring results in network communities, misperception of criteria of entrants' choice in behalf of a university and a specialty and wrong positioning as a result. At the same time research projects on increasing efficiency of entrants' recruiting show direct correlation between successful work of the university in social networks and the number of students attracted in higher education institution ([5],[6]).

Therefore the research is aimed to find out the methods for identificating among social network users upper-form pupils who have interest in a certain science field, for segmentation of audience according to the educational programs, for ranking in terms of interest extent, for recruiting of entrants with the most expressed interest into the relevant departments.

## **2 METHODOLOGY**

As far as we are concerned, the interest of high school students in one or another subject field is connected to the probability of entering a particular university faculty. A user's interests in social networks are presented via the texts published on his/ her profile timeline and participation in groups. Analyzing these texts and groups, to our mind, we are able to define the research areas this user is inclined to. Then we can divide possible entrants according to their interest into three groups (Humanities, Life Science, Physics and Mathematics and Economics) and differentiate users in every group according to the extent of their interest.

We make use of content analysis. We follow D. Riffe et al. in their definition of its essence and aims: [Content analysis is defined as] «systematic and replicable examination of symbols of communication, which have been assigned numeric values according to valid measurement rules and the analysis of relationships involving those values using statistical methods, to describe the communication, draw inferences about its meaning, or infer from the communication to its context, both of production and consumption» ([7]). By counting relevant textual units (in our case, these are separate subject-related words) we plan to discover the interest of a particular user – a potential entrant – towards a particular area of knowledge. In addition to content analysis a statistical method Kruskal–Wallis one-way analysis of variance has been used.

The basic tool for mining data from social networks is Application programming interface (API). It enables getting public data including the fields in a user profile (name, surname, city, country, gender, education, interests, favorite books and so on), content of a user personal page (timeline) and list of favorite groups and pages.

## **3 RESULTS**

We have tested the hypothesis that user's interests may be defined via analyzing the text derived from timeline in social networks on TSU students. University recruitment campaign starts in June, 2017 and finishes in September, that is why cannot check the methods on real entrants up to now. At the current stage of the research we have TSU students profiles that have been selected from those of VKontakte social network, and those texts that had been published on the timeline before they entered the university. We have excluded texts as small as 20 kilobyte and less out of the sample. Overall we have 131 texts which equals 10% of the original sample.

As a result of content analysis of topical communities four vocabulary 400 word markers each have been completed. These vocabulary define what topic a particular text is: humanitarian or non-humanitarian. We have compared the texts from student's timeline with these vocabulary and found a prove that humanitarian topic of the texts on a user's timeline correlates with choosing a humanitarian faculty to study at ([8]). But this hypothesis has not been proved for non-humanitarian students. To improve the method we have designed specific vocabularies for texts on Physics and Mathematics, Economy and Natural Science. The second analysis of texts derived from the social networks profiles demonstrated a highly-precise definition of entrants for Humanities and not so precise definition for other fields, especially Economics. Checking non-Humanities entrants (Physics and Mathematics, Economics and Natural Sciences) profiles manually we paid attention to high frequency of words from the Humanities vocabulary.

To improve the methods of tests classification we have performed a statistical analysis of the most significant lexical units out of the topical vocabularies using Kruskal — Wallis multivariate analysis. As a result, a set of statistically significant words have been defined. We consider these words to be

markers when classifying the texts from users' timeline according to the subject fields. This led to a significant decrease of lexical units in vocabularies (from 400 to 10 -15), and increase in the precision of Physics and Mathematics and Natural Sciences entrants. We used linear regression (67% precision) as a classifier.

The method of linguistic analysis of the wall content in relation to an entrant's educational interests should go along with the analysis of thematic communities this entrant participates. Entering a community and subscribing to a page in social networks may characterize an entrant's interests. If we choose topics that are relevant to education and cognition out of the entrant's interest spectrum, we might achieve a higher precision of the entrants' classification according to their subject fields.

The study covers the analysis of the thematic content of the communities of 18,000 entrants of the only one town (Tomsk). We have downloaded and generalized the entrants profile data that is connected to the communities, they participate in. Out of the overall number of the communities we have chosen 959 that have been mentioned in the profiles of 10 or more users. The topics of the communities have been defined through the expert assessment. Their analysis has been performed manually. As a result, we have made up a classifier of communities and defined a share of every rubric in the total number of communities ([8]).

The classifier test applied to 992 TSU students showed that 66% of them are followed to communities and pages the topic of which may be connected with a certain subject field: 324 Humanities students, 199 Physics and Mathematics students, and 139 - Natural Science students. 88% Humanities students do not have any following to Natural Science or Physics and Mathematics communities, 6% of them have much more following to Humanities content than any other. Therefore, precision of defining people interested in the Humanities with the help of the classifier is 94%. Only 6% of all Humanities students have been mistakenly defined as non-Humanities ones. Out of all Physics and Mathematics students only 17% are subscribed to the content of the corresponding theme, 1% are followed to mixed content pages where such topics as Physics and Mathematics prevail, and 82% are followed to Humanities topics. Only 4% of Natural Sciences have any subscriptions related to their study (Table 1).

**Table 1.** Testing the topics of students subscriptions with the classifier.

	Following up content		
	Pure & Relevant	Mix & Relevant	Not relevant
Humanities	88%	6%	6%
Physics	17%	1%	82%
Natural Science	4%	0%	96%

Inaccurate definition of interests in physics, mathematics and natural sciences could be explained with limited selection of communities to draw up the classifier. From 959 analysed communities 231 ones conform to humanities, 22 – to physics and mathematics and only one – to natural science. To enlarge the qualifier the communities' sample was increased to 50 000 by expanding the investigated group of potential entrants of the whole Siberian region (126 000 people). 1091 communities were connected with school subjects, 73% of them – with humanitarian sciences, 18% – with physics and mathematics, 9% – with natural sciences. The new qualifier has not been tested by the TSU students yet, but we suppose that identification of students' educational interests will be more accurate. Now the hypothesis that it is possible to detect interest in subjects through topical communities is confirmed only for humanities.

At the current phase of our research only people feeling interest in Humanities can be precisely identified by using the methods of text analysis in user profiles as well as in groups and on pages that they are follow up. These methods applied to profiles of potential entrants of 2017 allow to determine relative frequency of mentioning linguistic markers in profile wall texts and absolute quantity values of following for content related to the Humanities. We suppose these data allow to rank all users according to extent of interest and to narrow target audience during engaging entrants in social networks. We will be able to estimate outcomes of this approach after enrolment campaign in August, 2017. The following results are expected: expansion of entrants' geography, increase of enrolment competition for the educational programs in Humanities, expanding share of first-year students who

have learned about the university in social networks, reduction of expels from the university and improvement of academic performance in the first year of study.

One of the important tasks of the project on development and support of university recruiting campaigns in social networks is to search for the effective methods of influencing entrants choosing their future university.

One of the factors to solve this task is that recruiting companies should exactly perceive the criteria of entrants' choice among higher education institutions and post the information in social networks according to these criteria. We carried out the analysis of advertising campaigns of some Russian universities and defined key subjects that they use in social networks for engaging entrants. These data were checked and enriched with the questioning of 286 entrants from different cities in Siberian region (Table 2).

Information needs of entrants were compared with actual content of the TSU page in a social network and it showed divergence of supply and demand. The check list with key subjects for entrants received as a questioning result can be used during crafting the content plan for official university pages in social networks. Relative popularity values of subjects by target audience can be transferred to absolute values in the number of posts. The statistics of popular subjects and quantitative values of posts that are proportional to the statistics by planning 60 posts per month (two a day) is presented in table 2.

**Table 2.** Results of the questioning performed among university entrants in Siberian region (April, 2017)

Required information for choosing a university	Share of the respondents who considered this information choosing a university	Number of posts a month
Information about the department	90%	8
Lifehacks for university entrants	75%	7
Students stories. A sight from the inside. How the learning process is organised? Reviews	70%	6
Information about instructors	47%	4
Photos of the university and its dormitories	47%	4
News about entertaining events	45%	4
Official news	37%	2
Information about vacant places to study for free	35%	3
News about research results	29%	3
Infrastructure	28%	3
Passing threshold, enrolment competition	27%	3
Employability	17%	2
Future profession+specialty	17%	2
Ranking and the status of the higher educational institutions	15%	1
Tuition fee	13%	1
Quality of the education	10%	1
Traineeships abroad	6%	1
Specialty	6%	1
Location	5%	1
Required documents and the algorithm of filing them	3%	1
Scholarship programs	3%	1
Opportunities for entering volunteer organizations on the university basis	2%	1
Licence and accreditation	2%	1
Information about creative entrance exams	1%	1
Conditions for being offered with a place in the dormitory for the period of taking exams	1%	1
Doors Open Day	1%	1
Information about possible future salary after graduation from the department	1%	1

The next factor influencing recruiting success is connected with adaptation of advertising campaigns under cultural features of young generation and under style specifics of social network content. To inform the target audience universities mainly use explicit advertising text content. At the same time entrants' information needs are related to various representation formats (text, photo, video, audio, surveys, references, discussions) and to various genres (advertising, useful and fun information). Therefore, it is very important to meet these expectations when planning the content of pages/communities for entrants. The tentative plan of 60 posts for a month considering the variety of genres and formats is presented in table 3.

**Table 3.** Plan of posts for entrants community.

		Genres			
		Advertising	Useful	Fun	Total
Formats	Text	8	6	6	20
	Photo	4	4	4	12
	Video	2	2	2	6
	Audio	2	2	2	6
	Survey	2	1	1	4
	Reference	4	4	4	12
	Total	22	19	19	

So three options – high-demand subjects (Table 2), formats, and genres (Table 3) – are to be considered during scheduling the posts.

The next factor of successful recruiting is individualization of communications with entrants when inviting them to visit the landing page. In social media marketing the automated targeted advertising is common that is marked with the low conversion level caused by direct advertising influence and depersonalized handling. Personal invitations are more effective, while communication is established between two subjects, name of the targeted person is mentioned and the netiquette rules are observed. This approach demands more manual actions and seems to be more expensive. At TSU the mailout of personal invitations is partially automated, students are actively involved in the process as volunteers, at the same time financial expenses are almost excluded.

## 4 CONCLUSIONS

The performed analysis of data about students received in social networks allows to find out correlation between the content of texts from user profiles and the list of following. It partially confirms a hypothesis that it is possible to define educational interests according to the user data in social networks. The data analysis methods used in the research confirm a hypothesis only for students in Humanities. Further in the research we attempt to find the reasons of lack of similar correlations for students in Physics and Mathematics and Natural Science. At the following stage we will continue testing analysis methods of entrants' data in social networks and will compare them to results of the TSU enrolment campaign in 2017 to evaluate accuracy and efficiency of identification tools of talented youth. A logical further step for identifying potential entrants in social networks is their informing and recruiting. The recruiting principles presented in the paper will be checked within the next TSU enrolment campaign. We expect the offered approach allows university to reduce marketing costs as well as to expand geographical coverage, to increase the number of entrants, to enhance enrolment competition.

All things considered, the presented recruiting method can be implemented for promotion of other educational products, for example, massive open online courses or postgraduate educational programs.

## ACKNOWLEDGEMENTS

The reported study was funded by RFBR according to the research project №17-16-70004 “Research of social networks' potential for identification, attraction and retention of talented youth at regional higher educational institutions based on big data analytics”.

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