

## **SURVEYING STUDENTS' OPINION USING GIS WEB APP**

*Gheorghe BADEA, Prof. PhD. Eng., Technical University of Civil Engineering of Bucharest,, Faculty of Geodesy, badeacadastru@gmail.com, gheorghe.badea@utcb.ro*  
*Ana-Cornelia BADEA, Assoc. Prof. PhD. Eng., Technical University of Civil Engineering of Bucharest, Faculty of Geodesy, badeacadastru@yahoo.com, ana.badea@utcb.ro*

**Abstract:** *In the paper is emphasized a GIS Web App that had been used having an educational and managerial purpose, for retrieving the students' proposals for Faculty of Geodesy, Bucharest. These applications proved to be very useful in collecting and analyzing students' opinion about the educational process and staff. It had been used a GeoForm to submit the students' score for the faculty and a Summary Viewer app to see the others entries.*

**Keywords:** *GIS Web App, ArcGIS Online, Map Viewer, ArcGIS for Developers, GeoForm*

### **1. Introduction**

In present the link between students and teachers is made through multiple ways as e-learning platforms, e-mail, social media and so on. At the Faculty of Geodesy had been made multiple trials to enhance collaboration and assure feedback between students and teachers, like e-learning platform. [1] Nowadays is the moment of Web Apps, developed through GIS programs or programming languages.

According with [4], crowdsourcing is the process of obtaining needed services, ideas, or content by soliciting contributions from a large group of people, especially an online community. Crowdsourcing has often been used in the past as a competition to discover a solution.

In this regard, in July 2016, in the Faculty of Geodesy, TUCEB, it had been developed a Web App, consisted in an online survey, in the purpose of identifying the students' opinion about it, strong points, weak points, proposals for enhancement, etc., for discovering the best solutions to implement in the institution.

Multiplatform or single platform, the app can be built to run on all devices including iOS, Android, Windows, OS X, and Linux, templates making it quick and easy. [5] With AppStudio, there can be converted the web maps into consumer-friendly mobile apps and publish them to popular app stores. There are two licensing models for AppStudio [6]: Basic and Standard. AppStudio Basic is free and allows to build apps from templates that can be published to the Apple and Google app stores. AppStudio Standard builds on this functionality by allowing us to create custom apps, but it requires a yearly subscription.

### **2. Case Study**

For developing the application has been used ArcGIS Online platform. It has been created a GeoForm to submit the students' score for the faculty and a Summary Viewer app to see the others entries.

This GeoForm and Summary Viewer app were generated using the same feature service and web map. It is created a feature service through the developer site, added it to a web map, and used it to create a GeoForm.

The screenshot shows the configuration interface for a survey form. It includes sections for Title, Tags, Description, Geometry, Fields, and Layer Properties.

**Title:** TO HAVE A BETTER FACULTY BASED ON YOUR THOUGHTS - PLEASE HELP US MAKE THINGS BETTER!

**Tags:** student, geodesy, cadastre

**Description:** Acesta este un formular pentru a colecta opiniile studentilor sau absolventilor geodezi. Va rugam sa il completati cu seriozitate pentru a ne fi de folos si de a incerca sa facem lucurile mai bine. Multumim!

**Geometry:** points

**Fields:**

Field	Type	Required
Nivel studii LICENTA/MASTER/DOCTORAT <code>Nivel_studii_LICENTA_MASTER_DOCTORAT</code>	String	<input checked="" type="checkbox"/> Required
Anul de studii <code>Anul_de_studii</code>	Integer	<input checked="" type="checkbox"/> Required
Nume si prenume <code>Nume_si_prenume</code>	String	<input type="checkbox"/> Required

**Layer Properties:**

- Enable the layer to be taken offline to allow it to be viewed, edited, and synchronized.
- Allow attached images and other files to individual features.

Fig. 1. Designing the Survey Form

Field	Type	Required
Study Level (BSc/MSc/PhD Stud) - Nivel de studii (Licenta/Master/Doctorat) <code>Study_Level_BSc_MSc_PhD_Stud</code> <code>Nivel_de_studii_Licenta Master Doctorat</code>	String	<input checked="" type="checkbox"/> Required
Study Year - Anul de studii <code>Study_Year</code> <code>Anul_de_studii</code>	Integer	<input checked="" type="checkbox"/> Required
Name and Surname - Nume si prenume <code>Name_and_Surname</code> <code>Nume_si_prenume</code>	String	<input type="checkbox"/> Required
Please specify three strong points of Faculty of Geodesy - Va rugam sa mentionati trei puncte tari ale Facultatii de Geodezie <code>Please_specify_three_strong_points_of_Faculty_of_Geodesy</code> <code>Va_rugam_sa_mentionati_trei_puncte_tari_ale_Facultatii_de_Geodezie</code>	String	<input checked="" type="checkbox"/> Required
Please specify three weak points of Faculty of Geodesy - Va rugam sa mentionati trei puncte slabe ale Facultatii de Geodezie <code>Please_specify_three_weak_points_of_Faculty_of_Geodesy</code> <code>Va_rugam_sa_mentionati_trei_puncte_slabe_ale_Facultatii_de_Geodezie</code>	String	<input checked="" type="checkbox"/> Required
Please let us know your proposals for better education in the faculty - Va rugam sa faceti trei propuneri pentru imbunatatirea procesului de invatamant in facultate <code>Please_let_us_know_your_proposals_for_better_education_in_the_faculty</code> <code>Va_rugam_sa_faceti_trei_propuneri_pentru_imbunatatirea_procesului_de_invatamant_in_facultate</code>	String	<input checked="" type="checkbox"/> Required
Please specify the place/town where you are intending to work - Va rugam mentionati locatia/orasul unde ati dori sa lucrati <code>Please_specify_the_place_town_where_you_are_intending_to_work</code> <code>Va_rugam_mentionati_locatia_orasul_unde_ati_dori_sa_lucrati</code>	String	<input checked="" type="checkbox"/> Required
Please specify if you are intending to work in Public or Private sector - Va rugam mentionati daca doriti sa lucrati in sectorul Public sau Privat <code>Please_specify_if_you_are_intending_to_work_in_Public_or_Private_sector</code> <code>Va_rugam_mentionati_daca_doriti_sa_lucrati_in_sectorul_Public_sau_Privat</code>	String	<input checked="" type="checkbox"/> Required

Fig. 2. Establishing Relevant Questions

In figure 3 is presented the designing of the hosted feature layer as a collection of geographic data in the form of points, lines, or polygons that supports vector querying, visualization, and editing.

Feature layers are added to the Map Viewer in ArcGIS Online. Web maps themselves should not be shared with people who are not involved in the map-making process. The mechanism for sharing or collecting geographic information is represented by Web Apps, or Geo Apps.

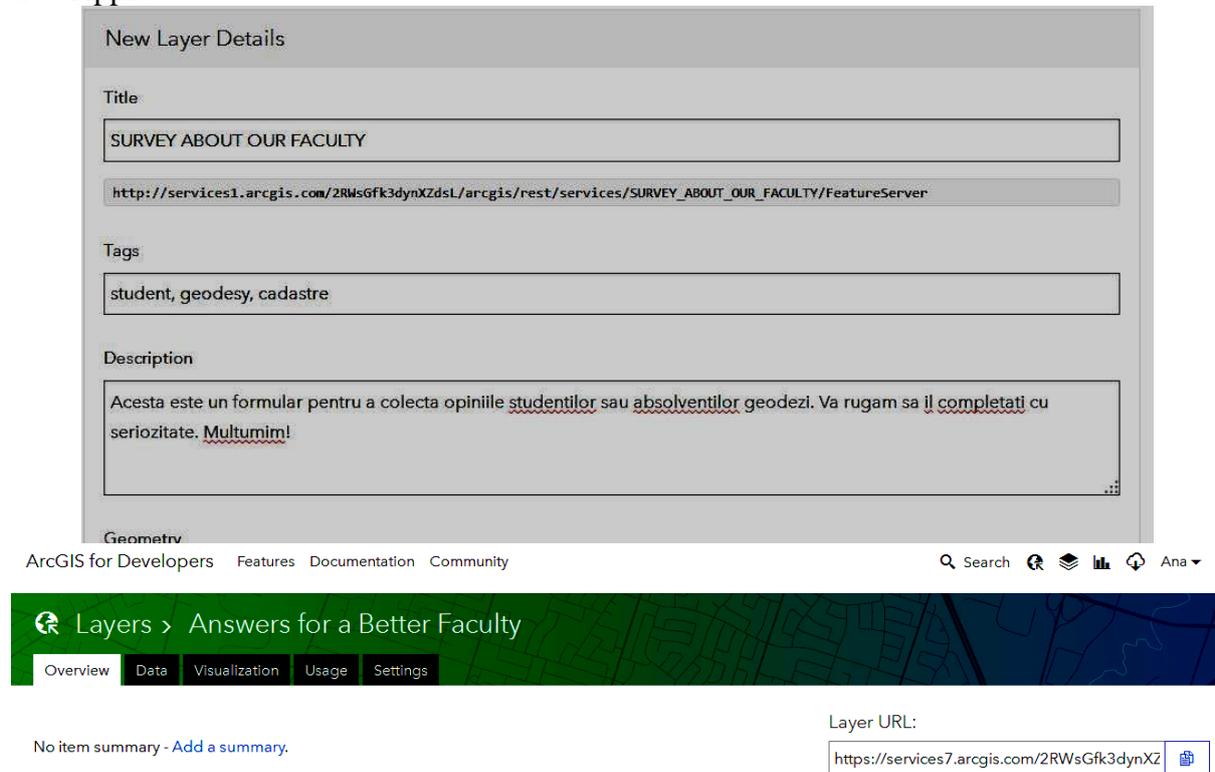


Fig. 3. Designing the Hosted Feature Layer for Application in ArcGIS for Developers

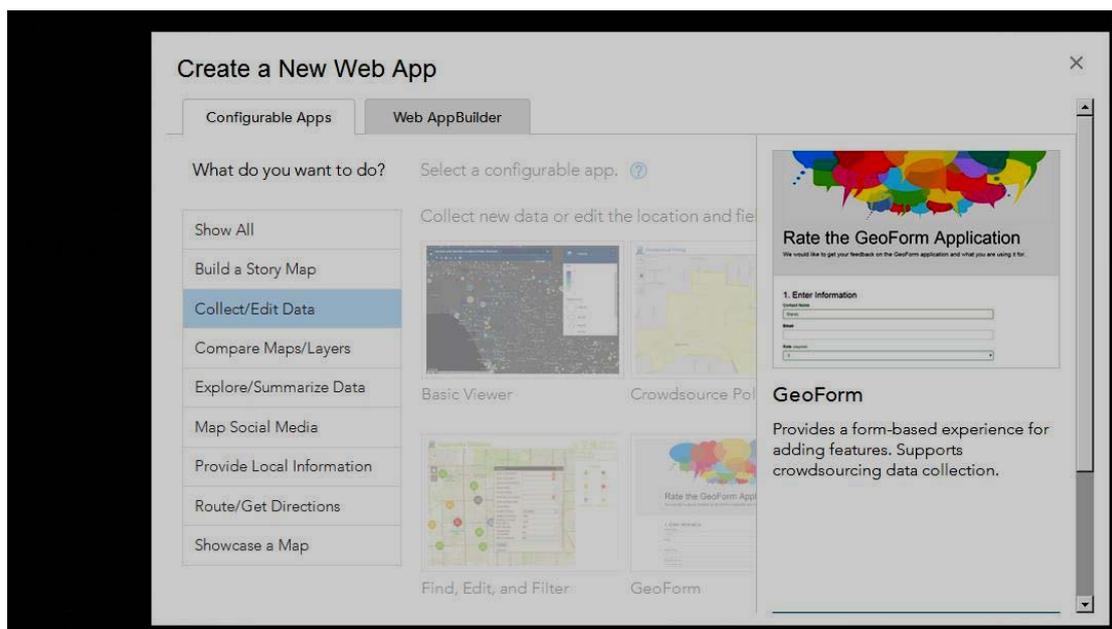


Fig. 4. Creating a Web App for Collecting Data

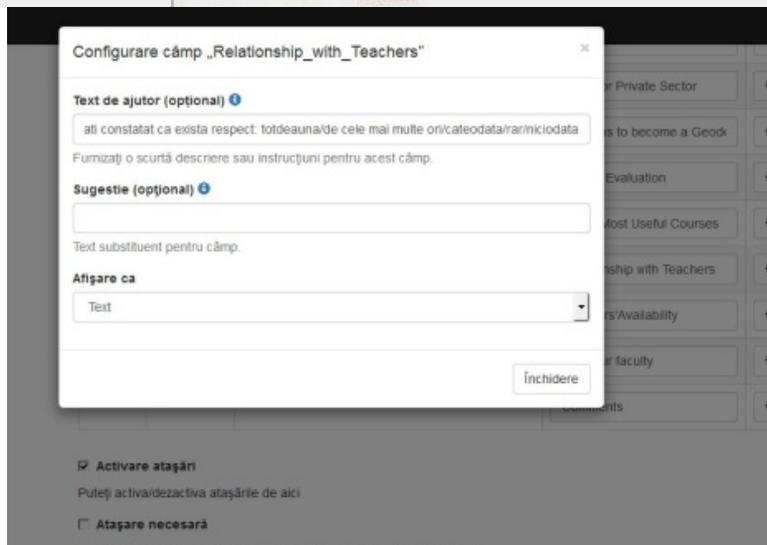
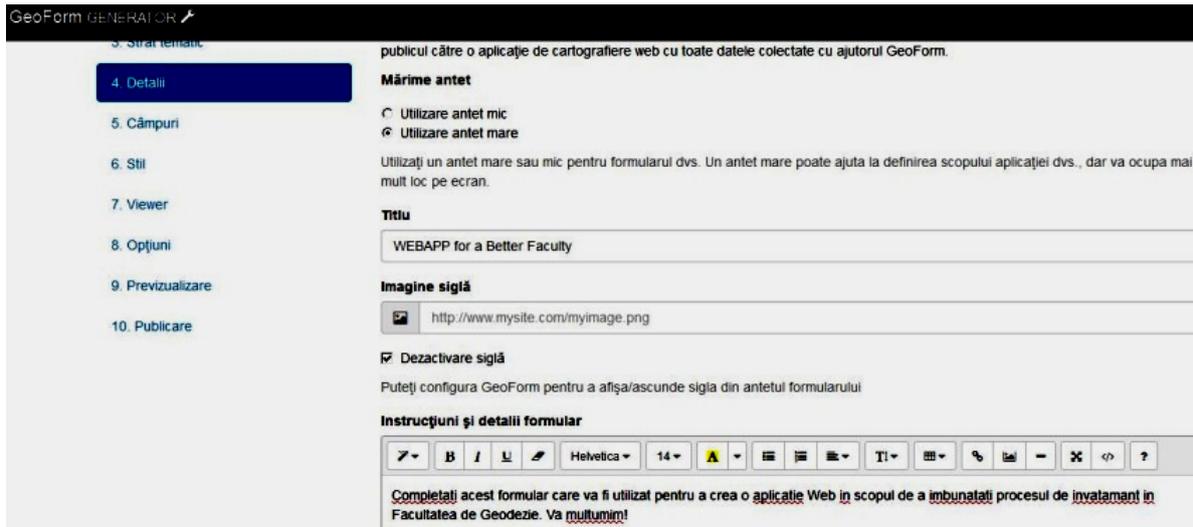


Fig. 5. Configuring the GeoForm

In figure 6 is emphasized the sharing operation. This is a crowdsourcing app, so it needs to be accessible to the public.

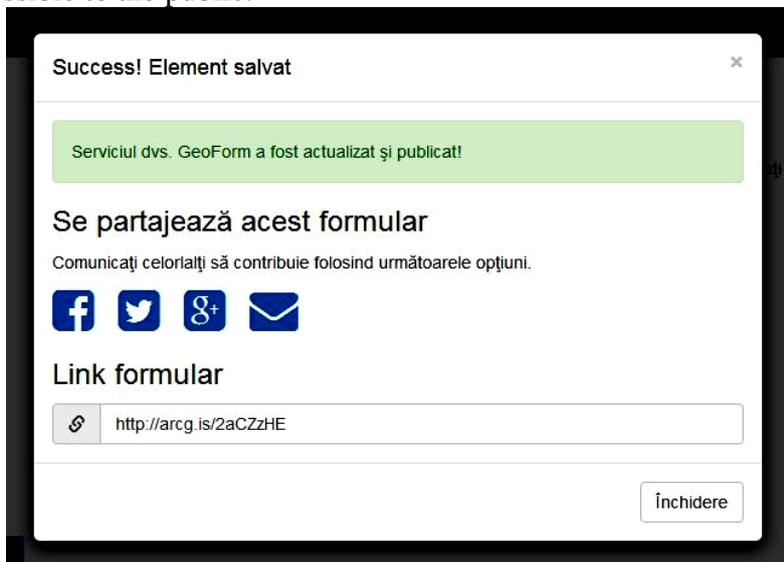


Fig. 6. Link to the GeoForm (<http://arcg.is/2aCZzHE>)

# WEBAPP for a Better Faculty

Completati acest formular care va fi utilizat pentru a crea o aplicatie Web in scopul de a imbunatati procesul de invatamant in Facultatea de Geodezie. Va multumim!

## 1. Introduceți informații

**Study Level** (obligatoriu)

Study Level (BSc/MSc/PhD Stud) - Nivel de studii (Licenta/Master/Doctorat)

**Study Year** (obligatoriu)

Study Year - Anul de studii

**Name and Surname**

**Reasons to become a Geodetic Engineer** (obligatoriu)

Please specify three reasons for which a young person choose a job as Geodetic Engineer - Va rugam mentionati trei motive pentru care un tanar ar alege meseria de INGINER GEODEZ

**Exam's Evaluation** (obligatoriu)

Which kind of evaluation is most appropriate at exams? - Care modalitate de evaluare este mai potrivita la examene? (ORAL/SCRIS /SCRIS+ORAL/GRILA/ALTA)

**Three Most Useful Courses** (obligatoriu)

Let us know three courses from your training by now that you are considering very useful - Numiti trei cursuri din formarea de pana acum pe care le considerati foarte utile

**Relationship with Teachers** (obligatoriu)

Regarding the relationship with teachers do you have found that there is respectfully: always/ most often/ sometime/ rarely/ never - In ceea ce priveste relatia cu cadrele didactice ati constatat ca exista respect: totdeauna/de cele mai multe ori/cateodata/rar/niciodata

**Teachers'Availability** (obligatoriu)

Teachers are available for advice and guidance: seldom / sometimes / often / always - Cadrele didactice sunt disponibile pentru consultatii si indrumare: rar/uneori/des/intotdeauna

**Rate our faculty** (obligatoriu)

Rate our faculty with a score between 1 and 10 - Acorda o nota intre 1 si 10 facultatii

**Comments**

**Atașare**

Fig. 7. Web App GeoForm

By default, the feature services and web maps are private. When the settings of a web map are updated for sharing, it will be received a question about whether the sharing settings for the feature services in that web map will be updated.

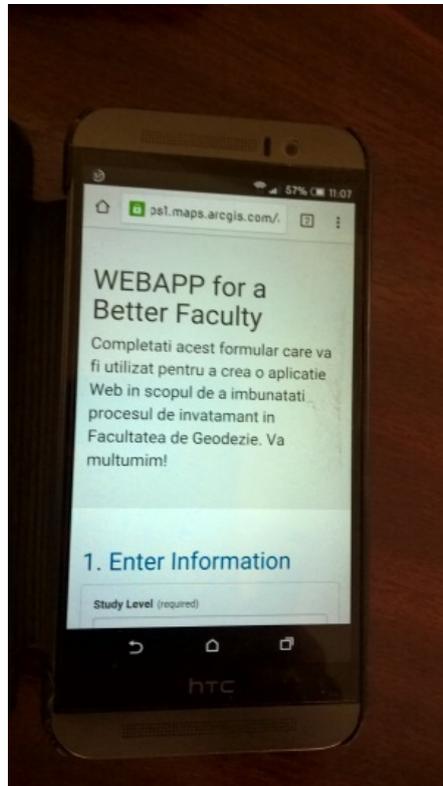


Fig. 8. Web App Form on HTC One M9 Android Phone

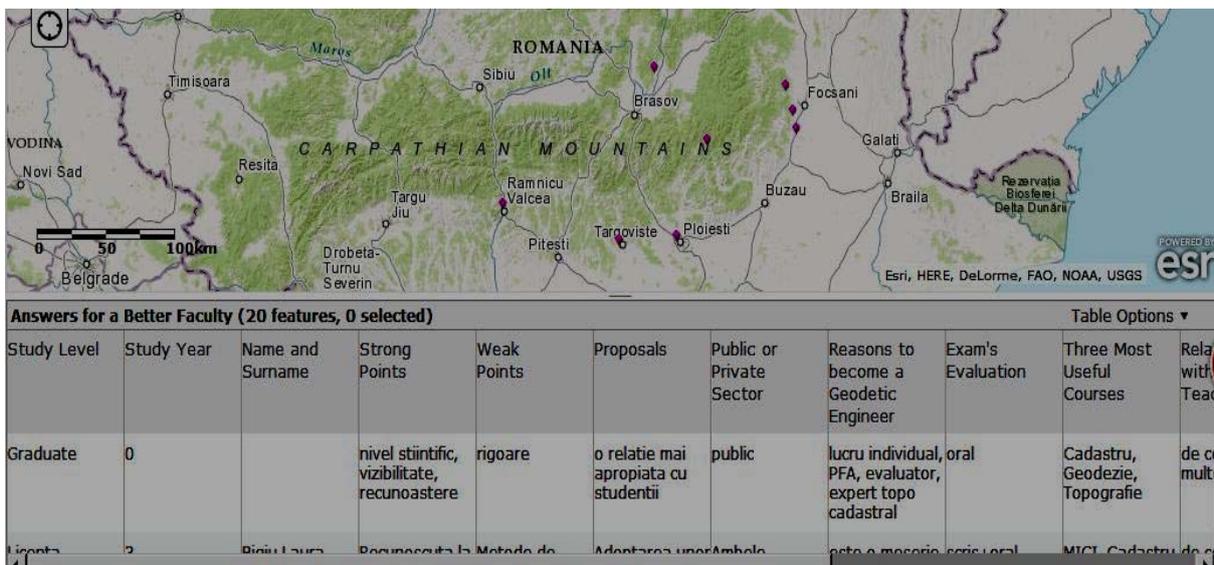


Fig. 9. Map as a Base for Exploring/Summarize the Results

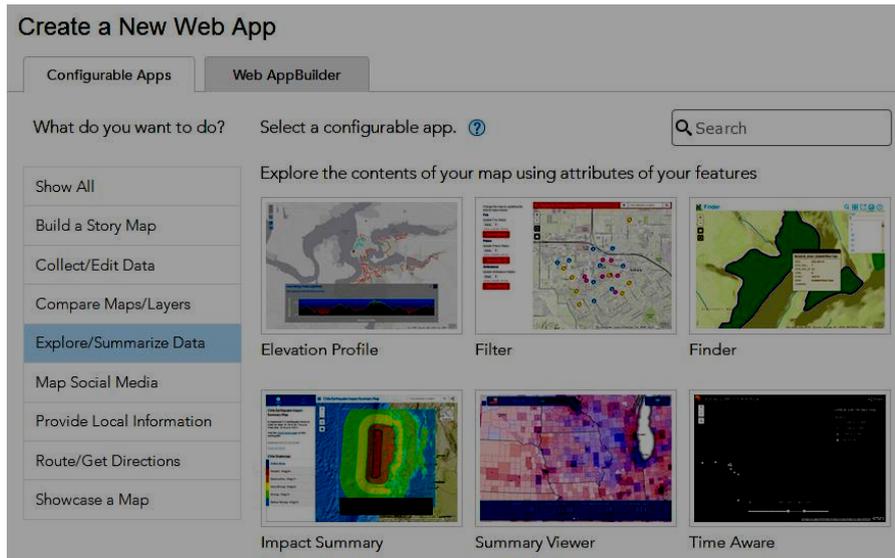


Fig. 10. Designing a Web App for Exploring/Summarize the Results

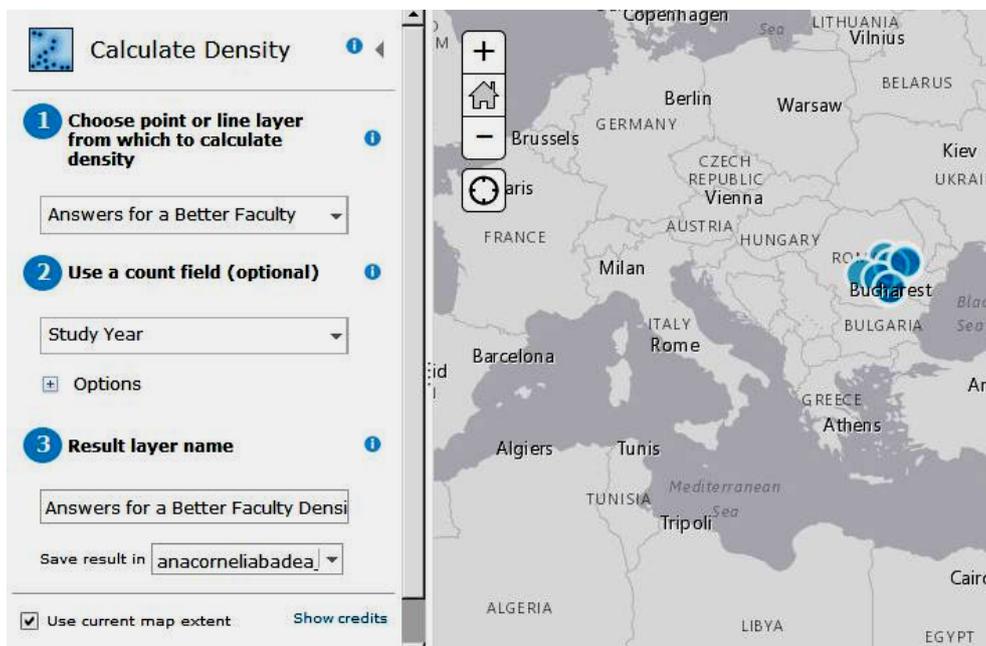


Fig. 11. Analyzing Data: Density

The Summary Viewer allows us to view the number of features that are within the map extent and also the summary statistics for particular values.

In our application we have the count and the average score for all of the points (students' scores about the faculty) within the map extent. (figure 12) This is a good possibility to explore data for different geographic areas by panning and zooming. This application was created using the same feature layer and web map that the GeoForm was built from.

Using the same elements for collecting and displaying app from a single feature layer, any new data from the collection app is added to the display app in real time. As observation, this workflow is a good approach only if the collected data does not need to be vetted before it is made public.

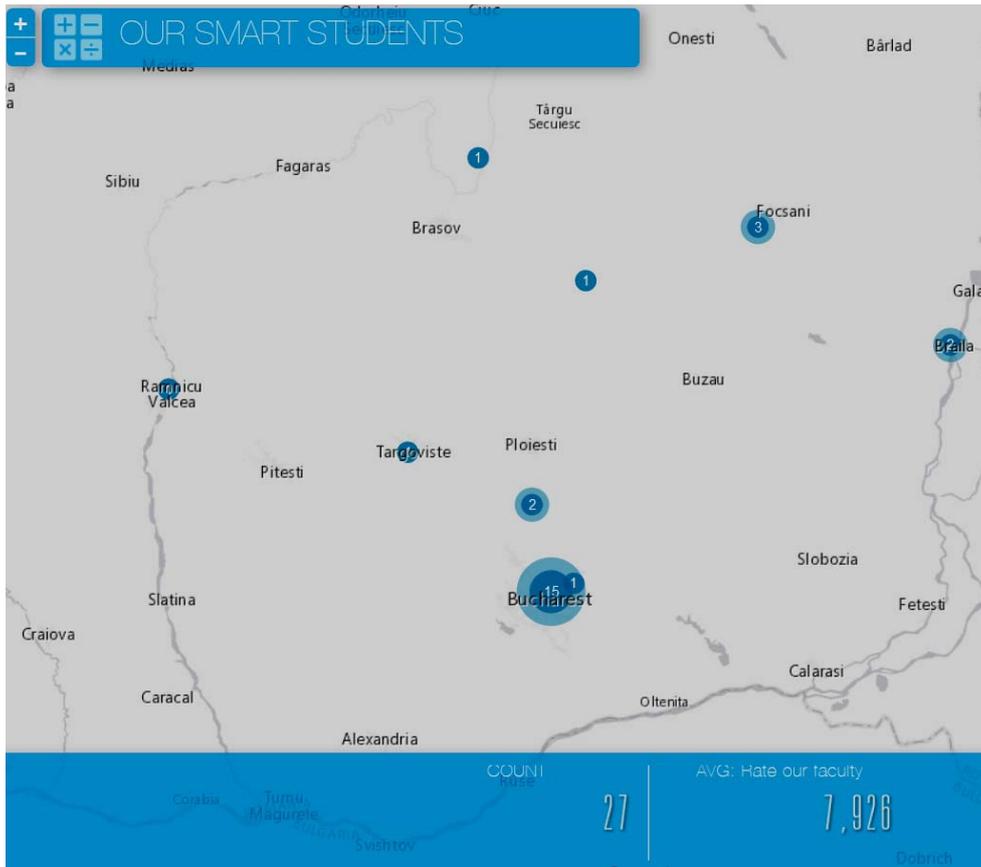


Fig. 12. Preview of Summary Viewer Application – September, 2016

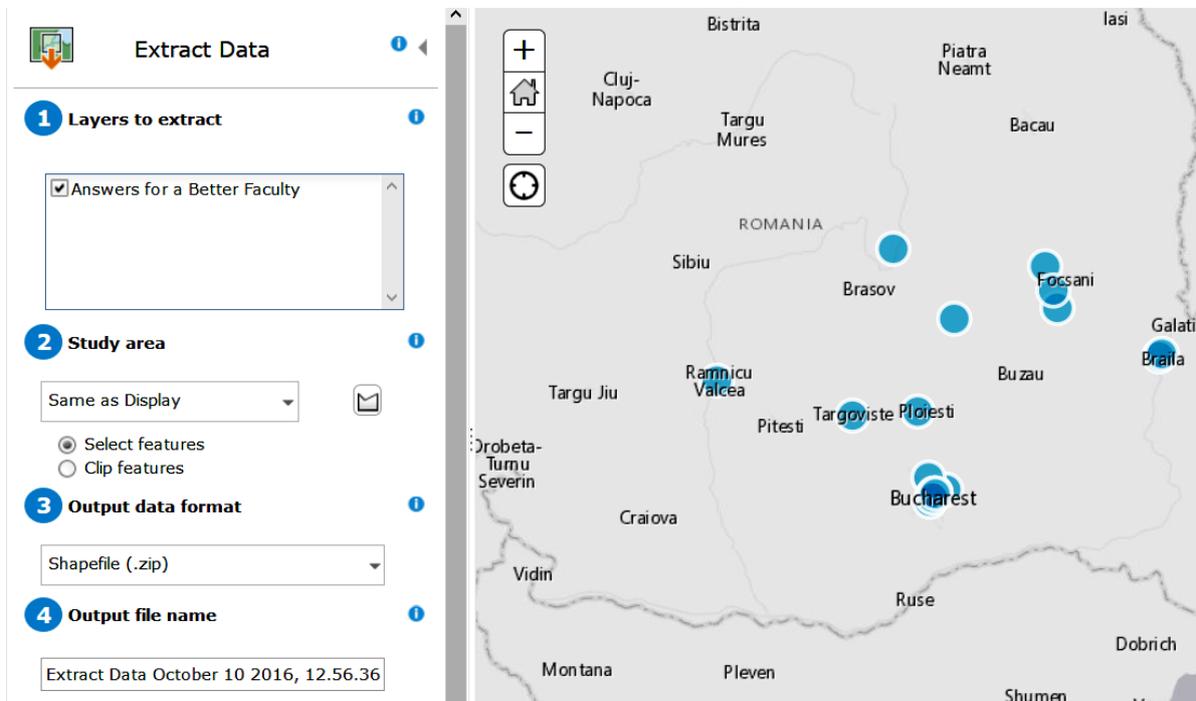


Fig. 13. Extract Data – Analysis Tools

In figure 15 is a graphical representation of the rating, made in ArcGIS Pro.

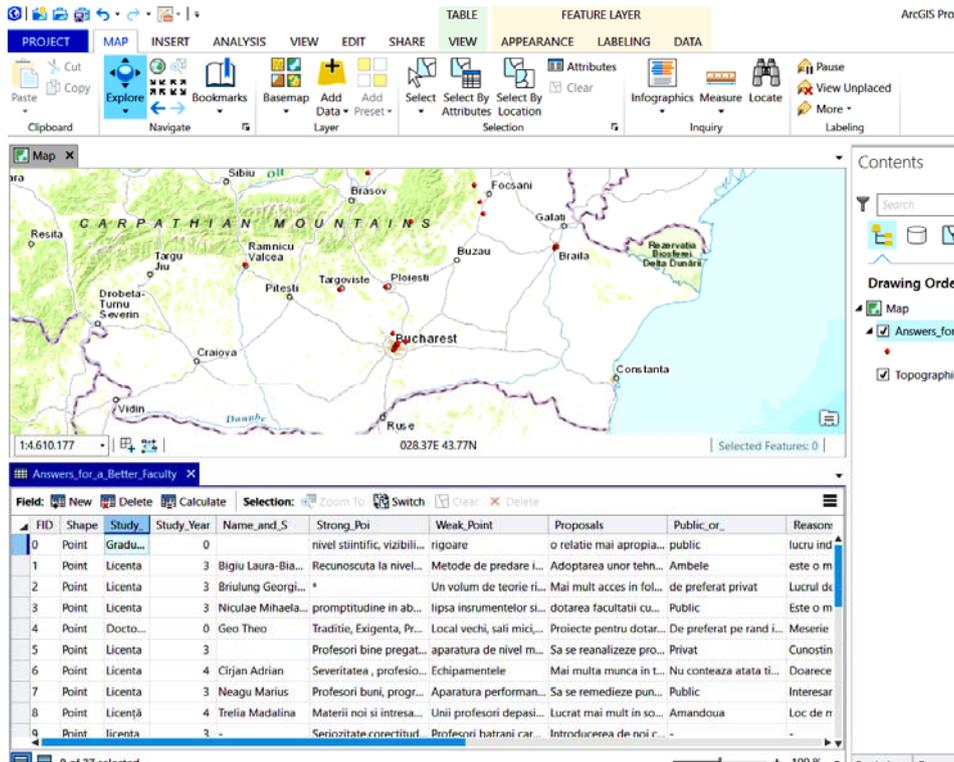


Fig. 14. Analyzing Data in ArcGIS Pro

### 3. Conclusions

GIS Web App had been used having an educational and managerial purpose, for retrieving the students' proposals for our faculty. These applications proved to be very useful in collecting and analyzing students' opinion about the educational process and staff. It needs also to be highlighted the potential of a workflow that collects and publishes data through the same feature service.

As main conclusion, we made an analysis related to our faculty (table 1), based on students' answers and proposals.

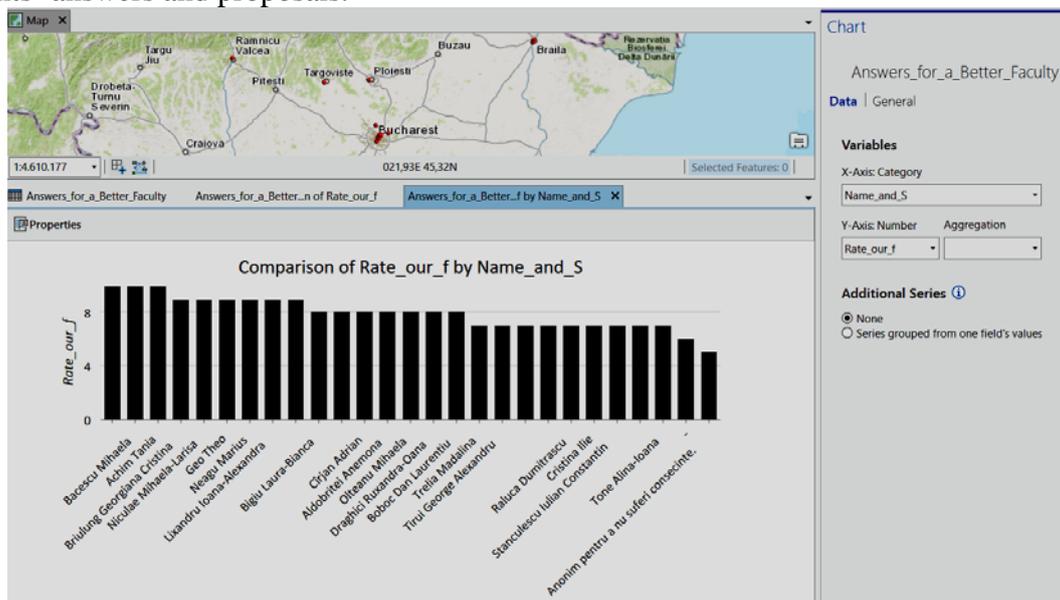


Fig. 15. Graphic of Answers by Given Rate

Table 1 – Analysis and Main Proposals

Strong Points	Weak Points	Proposals
<ul style="list-style-type: none"> <li>- admission based <b>only</b> on the documents</li> <li>- <b>teachers</b></li> <li>- faculty reputation</li> <li>- seriousness</li> <li>- professionalism</li> <li>- close college homes</li> <li>- access to specialized equipment</li> </ul>	<ul style="list-style-type: none"> <li>- overloaded curricula</li> <li>- small classrooms</li> <li>- too short practice period</li> </ul>	<ul style="list-style-type: none"> <li>- technical specialized camps</li> <li>- longer practice period</li> <li>- WiFi network for students</li> <li>- projectors in all the classrooms</li> <li>- interactive courses</li> <li>- upgrading faculty website</li> <li>- closer monitoring by teachers of exam cheating</li> </ul>

#### 4. References

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