

CAMPUS COMPUTING SERVICES & TECHNOLOGY SURVEY ANALYSIS

IST 736 Text Mining | Fall 2022

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1. Introduction

The University Faculty Senate's Computing Services Committee asked faculty and staff to respond to an online survey about campus computing services and technology. The survey began in late September 2022 and ended in mid-October 2022. The survey results will be reported to the University Senate, stakeholders who maintain our computing resources, as well as the University community more broadly. The response rate was 30% of those that the survey was sent out. In our project, we performed the descriptive statistical analysis, clustering, topic modeling, and sentiment analysis to gain insight into respondents' perceptions when using different software and platforms.

2. The Dataset

The dataset includes 1,723 records of survey responses and was obtained from Professor Jeff Hemsley. Below are the technologies/services that were included in the survey –

- Wireless network
- MySlice
- Video Conferencing:
 - Zoom&Teams
- Security
- Teaching Tools:
 - Blackboard, Kaltura, Playposit, Google Suite.
- Assistive Technology
- Syracuse.edu
- Accessibility
- Campus Resources
- IT Challenges

The data includes a combination of columns that have Likert scale data (agree, disagree, etc.) and text columns. All columns are nullable, ie, wherever a respondent has not added a response, we see blanks in those cells. The dataset includes a total of 55 columns for the above 15 sections.

3. Methods and Experimentation

Depending on the type of data available in different sections for different technologies, this project used different Text Mining methods to make sense of the information. In general, for clustering or topic modeling, we experimented with KMeans with TF-IDF vectors, KMeans with SBERT embeddings, BERTopic, Latent Dirichlet Allocation (LDA), and KMeans with GPT-2 embeddings. For each section, we reviewed the clusters created by each of these methods and accept the technique that results in best clusters. We also manually sample some responses in each section and label clusters and compare them with the clusters obtained with the best technique to be completely certain of our proposal. For sentiment analysis, we used unsupervised sentiment analysis and then checked its accuracy of it by adding manual labels. We added manual sentiments for all responses in a section to be able to conduct supervised sentiment analysis. We also conducted some descriptive analysis to better understand our data wherever applicable.

3.01 Wireless Network

In this section, we do not have specific data on how many people are satisfied or not satisfied with the wireless network. Respondents first selected dissatisfaction factors with wireless network. Table-1 shows that most respondents were dissatisfied with the stability of the wireless network and the ease of connection.

Table-1 Dissatisfaction Factors on Wireless Network

Dissatisfaction factor with Wireless Network	Counts
Ease of connection	131
Stability	130

Speed	96
Other	22
Information Technology Services support for using/troubleshooting	18

Then the respondents expressed their feedback related to wireless network in text form, and the most discussed issues of the 614 feedbacks in high-level categories of respondents were obtained with the help of SBERT. By summarizing several clusters' topics, we can get the following issues that respondents think the wireless network needs to be improved:

- ♦ Wireless network is unstable or difficult to connect in some places, such as South Campus, Dome, outside the Buildings, HBC, etc.
- ♦ Wireless network is sometimes difficult to connect and take a long time.

3.02 MySlice

In this section, respondents were asked to rank their satisfaction with MySlice. Table-2 captures the overall satisfaction levels among responses. The majority has no severe complaints.

Table-2 Satisfaction Degree of Myslice

Options	Strongly agree	Agree	Somewhat agree	Somewhat disagree	Disagree	Strongly disagree
Counts	224	783	374	141	114	73
Percentage	13.11%	45.82%	21.88%	8.25%	6.67%	4.27%

Table-3 Dissatisfaction factors from Myslice(all apply)

Dissatisfaction Factor	Counts	Percentage
Ease of use	244	39.42%
Platform features	160	25.85%
Platform reliability	116	18.74%
IT Support	27	4.36%
Other(text)	72	11.63%

Table-3 recorded factors to be improved from respondents' view. The main issue comes from the difficulties in usage. For other factors there are 69 in text. This report analyzed them in total. KMeans Clustering with SBERT was applied to depict high-level themes in these responses.

- ♦ 22 Respondents said that the interface design was not friendly.
- ♦ 12 Respondents found that they were unable to customize features.
- ♦ 12 Respondents complained about duplicated login.
- ♦ 8 Respondents found it's hard to locate specific items.
- ♦ 8 Respondents mentioned that it was difficult to navigate.
- ♦ 7 Respondents felt Myslice was "clunky".

482 Respondents expressed their feedback about MySlice. The project continued its exploration with all kinds of methods. There were several clusters sharing the same ideas with SBERT embedding. In BERTopic, each topic showed different comments on Myslice. In this column, compared to clustered results with SBERT embedding, BERTopic performed a more accessible summary. The results are the following:

- ♦ 117 Respondents mentioned that it was hard to find things needed/ugly interface

- ♦ 96 Respondents complained that the default view is not for their job positions
- ♦ 48 Respondents found that it was too slow to respond
- ♦ 33 Respondents said that it was difficult to navigate/too many clicks needed
- ♦ 29 Respondents said that there was little communication regarding updates
- ♦ 28 Respondents found some login compatibility issues

The most urgent issue among other factors and general feedback is: “hard to find things needed”. Based on responses in this topic, it could be interpreted as: users think some function should be in module A, but it’s actually in B. Also, the default view of Myslice is not personalized. Faculties have to switch it from “Student” to “Faculty” each time. Staff are also in the “academic” view which provides limited help in their career. Although “frequent login errors” don’t rank very high, it is the step everyone goes through. This report recommends developers pay attention to this. Above three are main concerns this report puts on the top of its list.

3.03 Video Conferencing

In this section of the survey, respondents were asked for feedback about two Video conferencing software: Zoom and Teams. 91% of respondents use online video conferencing at work, 6% do not, and 3% did not respond. Table-4 reflects that most respondents are satisfied with Zoom and Teams. Table-5 shows that with respect to Zoom, respondents would like to see improvements in ease of use, stability, and sound quality. Regarding Teams, respondents would like to see improvements in ease of use, stability, and sound quality.

Table-4 Satisfaction Degree of Zoom/Teams

	Agree	Strongly agree	Somewhat agree	Somewhat disagree	Disagree	Strongly disagree
Zoom	794	531	147	34	23	17
Teams	589	289	210	113	88	64

Table-5 Dissatisfaction factors from Zoom/Teams

Dissatisfaction Factor	Ease of use	Reliability	Sound Quality	Picture Quality	ITS for using/troubleshooting
Zoom	30	22	22	14	11
Teams	200	98	83	95	13

Below are some additional factors of dissatisfaction with Teams (Using SBERT):

- ♦ 18 Respondents said that it makes the computer slow and freezes a lot
- ♦ 20 Respondents said that they prefer Zoom
- ♦ 15 Respondents said that the chat function is not very good
- ♦ 8 Respondents said that it did not have enough capacity for many attendees

Additional dissatisfaction factors with Zoom (Manual summary because of low data volume):

- ♦ Logging in can sometimes be a problem.
- ♦ There is a Time limitation of the meeting.
- ♦ The simplicity of the presentation, the connectivity, and the full range of video communication are not as good as Teams.

3.04 Security

First, respondents were asked to provide their attitudes related to the following situation:

- ♦ University computing services provide a balance of security and usability.
- ♦ Campus computing security requirements have a minimal impact on me completing my work.
- ♦ The ITS groups are effective at communicating changes and updates.
- ♦ I know what to do or who to talk to if I have a security concern/issue.
- ♦ I would find yearly or semi-yearly training of security issues useful.

Table 6 shows that most respondents had a positive attitude toward the above situations.

Table-6 Responses to security related questions

	Security & Usability	Security min Impact On work	Effective communication	Know who to talk to	Security yearly training
Agree	872	761	755	752	458
Somewhat agree	227	253	265	288	425
Strongly agree	255	237	248	340	120
Somewhat disagree	110	161	101	100	206
Disagree	53	125	66	109	225
Strongly disagree	/	/	36	28	102

The questionnaire received 316 security-related feedbacks. The high-level themes obtained from these responses after clustering, and then we selected the issues that most respondents fed back as needing improvement as follows:

- ♦ Double authentication and changing passwords every year make it inconvenient to work.
- ♦ The security level set for the computers managed by SU has a negative impact on the work. For example, approval is required to download and update software, some emails cannot be received because of phishing considerations, etc.
- ♦ Receiving frequent phishing emails is a big problem with bad effects.
- ♦ The same annual security training isn't helpful, and an updated streamlined one is better.

3.05 Education Platforms

Here, respondents were asked to express their user experience about 4 technologies: BlackBoard, Google Suite, Kaltura, PlayPosit. Table-7 introduces Blackboard is the most popular one.

Table-7 Number of Responses in Each Education Platform

Technologies	Blackboard	Kaltura	Google Suite	Play Posit
Counts	583	168	157	42

Table-8 Satisfaction Degree of Education Platforms

Options	Blackboard	Google Suite	Playposit	Kaltura
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Agree	216	77	24	83
Somewhat agree	168	22	9	49
Somewhat disagree	64	3	1	4
Strongly agree	59	51	4	25
Disagree	43	2	3	4
Strongly disagree	33	1	1	3

From table-8, most respondents think these 4 education platforms could meet their daily needs.

Table-9 Dissatisfaction factors from education platforms

Dissatisfaction Factor	Blackboard	Google Suite	PlayPosit	Kaltura
Ease of use	120	4	4	8
Platform features	99	3	2	4
Platform reliability	23	2	2	4
IT Support	16	0	1	2

Table-9 reveals unsatisfied factors of each platform. Nearly half responses in each section chose usability as their complaints. Below are other suggestions and problems about Blackboard:

- ♦ Can't find things when needed.
- ♦ Switch to canvas
- ♦ Keep the old grading system
- ♦ Clunky

The most significant issue is that Blackboard is less intuitive. In addition, users mentioned Playposit and Kaltura were clunky and are worried about their future inability to use Google Suite. From their overall feedback in teaching tools, this project clustered samples by KMeans with SBERT embedding. Below are the general topics that were mentioned.

- ♦ 30 Responses complained that Blackboard is too complicated and cumbersome.
- ♦ 28 Respondents felt that Blackboard did not fit their teaching scenario and required too many steps to complete a daily task.
- ♦ 26 Respondents urged that SU is over technologized in the teaching aspect.
- ♦ 24 Respondents express their thankfulness to the IT support department.
- ♦ 18 Responses mentioned that they don't know/have updates of software.
- ♦ 17 Respondents said that tutorials and support to software are not user friendly.

The feedback from education platforms indicates that the IT support department improved and smoothed user experience in education platforms past year. Users have great experiences with the IT support department, especially communicating with technology. Among all teaching tools, online or offline, Blackboard is the worst one. Maybe it is because all courses must use Blackboard more. It is also possible that blackboard is indeed very unfriendly to users. “Too cumbersome” and “Too many steps for a simple task” all show that Blackboard fits for very few teaching situations. This project suggests Blackboard be adapted for various ways of organizing courses.

35 Respondents mentioned tutorials for software. This report suggests simplifying solutions and updating them timely.

3.06 Assistive Technology

In this section, respondents were asked if they use assistive technology and if they responded in affirmative, they were asked to select the technologies from a list or add in a text field if not in the list. Since 91% of responders do not use assistive tech, and only 3% of them use these, it is evident that these technologies are not widely used. From Table-10, of the 52 Respondents that responded that they do use assistive tech, only 19 added the names of these techs. It indicates that more than half of respondents are unfamiliar with assistive technologies.

Table-10 What assistive technology do you use?

Assistive Tech	Usage Count	Assistive Tech	Usage Count
Voiceover for Mac	11	Medicat	1
JAWS for Windows	6	Read & write	1
Magnification	3	Keyboard navigation without mouse	1
NVDA	2	Fusion	1
Google/Search button	2	/	/

3.07 Syracuse.edu Website

Table-11 shows the satisfaction level of the official website. As the results indicate, almost half of the respondents are satisfied with the Navigation and organization of the SU website.

Table-11 Is Syracuse.edu easy to navigate and are you satisfied with the Organization of Information?

Responses	Ease of Navigation	Organization of Information
Agree	690	608
Somewhat agree	429	450
Somewhat disagree	148	193
Disagree	98	131
Strongly agree	155	96
Strongly disagree	30	53

We received 326 responses of feedback about Syracuse.edu website and all its departmental and campus websites. The best clusters were obtained using SBERT embedding with KMeans clustering. The top issues that have been highlighted with Syracuse.edu are:

- ♦ 158 Respondents complained about navigation, structure, and layout of the website
- ♦ 59 Respondents added concerns about the consistency of the design and information, especially between various department websites
- ♦ 87 Respondents found difficulty in finding the right information easily

3.08 Accessibility

In this section of the survey, respondents were asked if they were:

- ♦ Knowledgeable about the campus information technology accessibility policy.
- ♦ Minimally impacted by accessibility policies while creating documents.
- ♦ Familiar with the IT Services Accessible Technology Toolkit.
- ♦ Interested in training sessions about accessibility guidelines and techniques.

Table-12 I am satisfied with the below aspects.

Responses	Knowledgeability	Impact of document creation	Awareness Toolkit	Interest in Training
Agree	565	453	352	385
Somewhat agree	505	311	305	338
Somewhat disagree	181	223	186	129
Strongly agree	144	77	91	158
Disagree	126	173	303	163
Strongly disagree	29	85	57	49

Respondents were also asked to share feedback about the University's accessibility guidelines and creating accessible content or webpages. We received 154 responses. The best clusters were obtained using LDA method. The top issues that have been highlighted with Accessibility are:

- ♦ 62 Respondents talked about software recommendations/guidelines for document creation.
- ♦ 25 Respondents had mentioned inadequacies with the current training.
- ♦ 22 Respondents had shown interest in new training.
- ♦ 21 Respondents had added examples where the current guidelines have been a hindrance.
- ♦ 12 Respondents complained that the department is understaffed.

More than half of responses require new guidelines which demonstrate current training does not fit their needs, especially software usage. For the convenience of faculties and staff, we recommend updating software guidebooks with the latest version.

3.09 Campus Resources

In this section, 523 respondents listed the campus resources that work well for them. The best clusters were obtained using SBERT embeddings with KMeans clustering. The top patterns are:

- ♦ 127 Respondents mentioned remote work technologies and functionalities.
- ♦ 113 Respondents mentioned that the IT department was helpful.
- ♦ 112 Respondents mentioned that they were completely satisfied with all computing resources.
- ♦ 74 Respondents have mentioned tools like Teams, Blackboard, Zoom, MySlice, Office, etc.

A lot of respondents are satisfied with technologies and IT support. From their feedback, the IT department has made great efforts to smooth the user's experience. The current technologies can satisfy most needs of faculties and staff.

3.10 IT Challenges

In this section, there are 1,085 responses about what IT support or service challenges you are currently facing that affects you. The most efficient topics were obtained using LDA method. Below we captured the top 10 issues among all technologies:

- ♦ 306 Respondents understaffed IT Department resulting in insufficient support.
- ♦ 120 Respondents expressed difficulty in finding the right information on campus website.
- ♦ 61 Complaints about Blackboard.
- ♦ 55 Complaints about MySlice.
- ♦ 53 Respondents Said choppy wireless network in/around Dome or other campus areas.

Although the IT department offered great help in teaching tools, section 3.05, “insufficient support” states that faculties and staff still need more support in other fields of IT technologies. Respondents address their awful experience on frequently used platforms/websites, such as Blackboard, Myslice, and the campus website. It brings up the priority of solving issues among different platforms. Overall, the challenges are very diverse. We suggest focusing on IT support/precise guidelines and main platforms on campus.

4. Challenges and Thoughts

The main challenge in this project is to depict attitudes towards each platform or technology. We started with analyzing the feedback and satisfaction levels to determine the sentiments towards these different technologies. We tried all common classifiers and BERT; the accuracy was lower than the baseline. Even with adjusted stop-word lists and varied tokenizers, the accuracy was still below 40%, way below the desired amount. The main reason could be that respondents write feedback to bring problems to light, so feedback is not directly aligned with satisfaction levels. For instance, even if they “agree” or are satisfied with some technology, they could write some feedback to improve the technology. The unexpected outcome could also come from subtle emotion changes between 6 levels.

The project conducted an unsupervised sentiment analysis (VADER) of the feedback in the “accessibility”. This mechanism labels most of the sample (in the feedback from the teaching tool) as “neutral”. By comparing the results obtained from this unsupervised sentiment analysis with the human annotated results, a significant difference is found. The reason for this result may be that respondents mostly use neutral words when expressing feedback, which VADER cannot accurately determine. The results of sentiment analysis are not presented in the report because most of the feedback requires the use of unsupervised sentiment analysis methods, which were not effective in this project. Therefore, we focused our project on exploring the content of the feedback to get a more comprehensive understanding of respondents' feedback on different platforms and software. We believe the results of this experiment will be more useful to the relevant departments.

5. Statement on Ethical Concerns and Practices

The data that we received from Prof. Jeff Hemsley did not include any columns that revealed any information private to either the University or the respondents or the surveyors. All data that was received was only used for the purpose of this project. We have conducted this project independent of any other group. None of our methods were obtained from any other team whether they worked on similar dataset or other datasets. There was no conflict of interest for anyone involved with this project.

6.0 References

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