

ASSESSMENT OF THE USE OF CLOUD TECHNOLOGIES

Birutė RAGALYTĖ, Alma PAUKŠTIENĖ

Panevėžio kolegija / State Higher Education Institution, Lithuania

Annotation. The article analyzes the importance of using cloud computing services. It presents how the size of the company influences the use of cloud computing. The results of a statistical study are presented, which provides statistical information on what cloud computing services Lithuanian businesses use in 2023.

The results of a study in which full-time students of Panevėžys kolegija participated are discussed. The aim of the study was to find out what and how often students use cloud computing services, what problems and challenges they face while using them.

Keywords: cloud application, cloud security, challenges in the use of cloud technologies

INTRODUCTION

Without the use of cloud technologies, the modern world is difficult to imagine. Cloud technologies are widely used in business. It is very important to prepare and equip students with competence in the use of cloud technologies.

In the Universal Lithuanian Encyclopedia, the cloud is defined as a set of Internet services that connect information resources and software on various servers, creating conditions for their use.

Cloud technologies are used not only in the field of education but also over a wide range of applications in public fields such as industry, marketing, telecommunication, tourism, healthcare, insurance, transportation, banking, shopping, hospital and library as well as in personal services, even cloud technologies are considered as the fifth facility following water, electricity, gas and telephone services (Monroy et al., 2013).

Cloud technologies are used in many areas of business. The advantages of cloud technologies in many areas play an important role (Korucu & Karakoca, 2020).

Technology is great, but it doesn't work perfectly 100 percent of the time. Even with redundancies and backups, it is possible to lose data because of corrupted hard drives or other types of hardware malfunctions. (Ferguson, 2021).

The combination of the potential of cloud technologies in learning and the development of critical thinking in students allows the most optimal solution of the contradictions between the needs of a modern society, which is undergoing dramatic changes due to the accelerated informatization of all spheres of human life. (Shemshuchenko et. al. 2020)

To run a profitable business, it's important to save money where you can, and cloud computing is an excellent way to do it. (Ferguson, 2021).

When preparing for future specialists in various fields, it is very important to develop their abilities to use the ever-renewed capabilities of cloud technologies, to develop the ability to use them safely.

Working in the cloud gives your company a greater degree of mobility and flexibility. (Ferguson, 2021).

Purpose of the research: Analysis of self-assessment of the use of cloud computing services by full-time students of Panevėžio kolegija.

The objectives of the research are:

1. To analyze the use of cloud computing services in Lithuanian companies.
2. To analyze how much full-time students at Panevėžys College use cloud technologies, what tools they use, and what security challenges they have encountered.

CLOUD COMPUTING SERVICES IN BUSINESS

According to the Official Statistics Portal (2023), at the beginning of 2023, 38.4% of companies purchased cloud computing services: 78.9% of large companies, 57.4% – medium and 32.7% – small businesses. It indicates that 32.1% of companies used e-mail as a cloud computing service, 20.2% – office software use service, company database hosting service – 20.2%, data file storage – 24.8%, use of financial or accounting software – 21.8%, customer relationship management software usage service – 6.6% (Figure 1.)

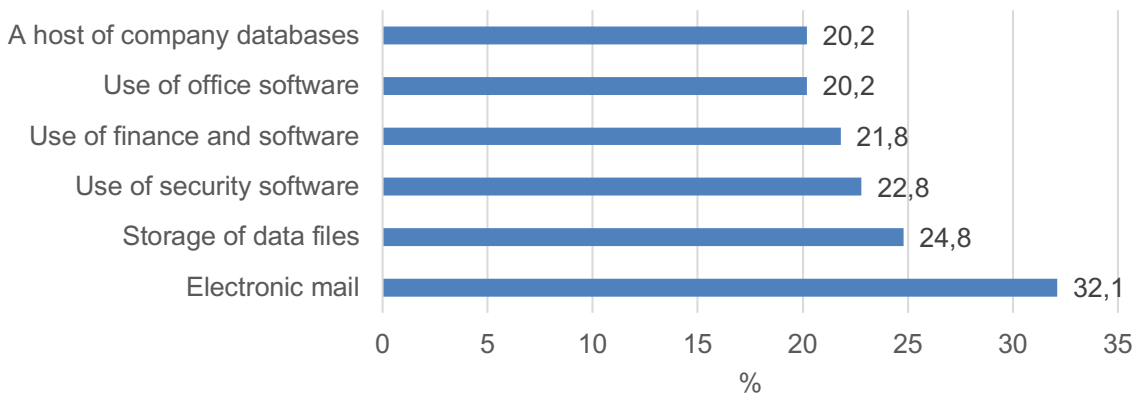


Figure 1. Cloud computing services via the Internet in 2023

Adapted by the author according to the Official Statistics Portal (2023). *Lietuva skaičiai (2023 m. leidimas)*. <https://osp.stat.gov.lt/informacines-technologijos/>

Analyzing the data of the official statistics portal Digital Economy and Society in Lithuania edition (2023), it can be observed that the number of companies purchasing cloud computing services is increasing. In 2019, the number of such enterprises was 22.6%, in 2020 – 30.8%, in 2021 – 33.6%, in 2022 – 37.7%, in 2023 – 38.4%.

According to the official statistics portal (2023), at the beginning of 2023, the more employees a company has, the higher the proportion of them using cloud computing services. This portal indicates that if a company has more than 250 employees, 78.9% purchase cloud computing services. If a company has 49-249 employees, 57.4% of companies purchase cloud computing services (Figure 2).

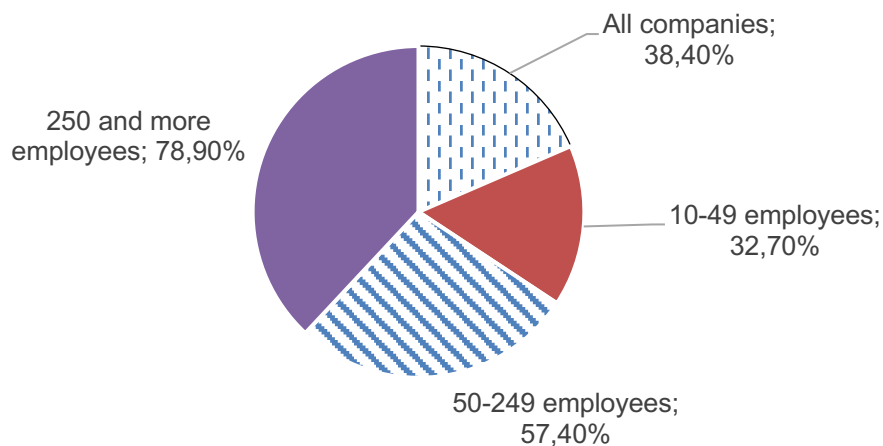


Figure 2. Lithuanian companies purchasing cloud computing services online in 2023

Adapted by the author according to the Official Statistics Portal (2023). *Skaitmeninė ekonomika ir visuomenė Lietuvoje (2023 m. edition)* <https://osp.stat.gov.lt/skaitmenine-ekonomika-ir-visuomene-lietuvoje-2023/interneto-saugumas-ir-debesu-kompiuterija/debesu-kompiuterija>

Cloud computing is one of the best IT services that will increase the productivity of the company.

In the training of specialists for the labor market, it is very important for them to develop the ability to use cloud computing services.

RESULTS OF THE RESEARCH

We found out the opinion of 73 student's full-time students of Panevėžio kolegija. The survey was designed to find out the opinion of the respondent about the use of cloud computing: what tools they use, what security challenges they have faced.

Students of 3 faculties participated in the research. Student participation by faculty is shown in Figure 3. The most active were the students of the Faculty of Technology Sciences in 39.7% of the respondents who participated in the research, 32.9% of the Faculty of Biomedicine Sciences, 27.4% of the Faculty of Social Sciences.

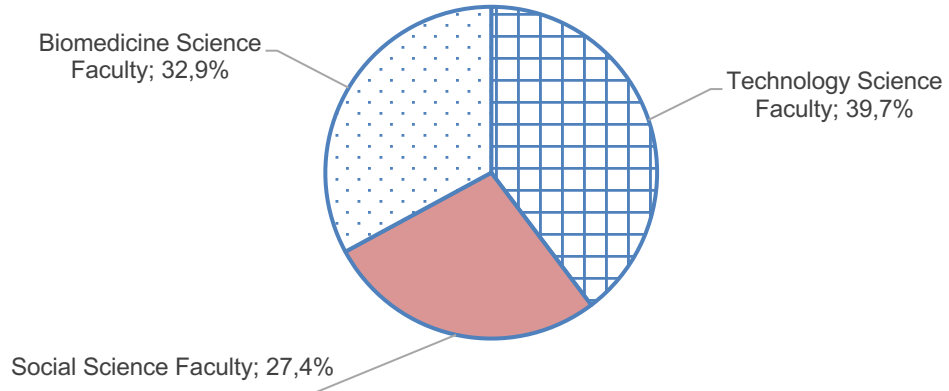


Figure 3. Distribution of respondents by faculty

The distribution of survey respondents by study course is shown in Figure 4. The most active participants in the survey were 1st year students (38.4%). 34.2% and 27.4% of the 2nd and 3rd year students took part in the survey.

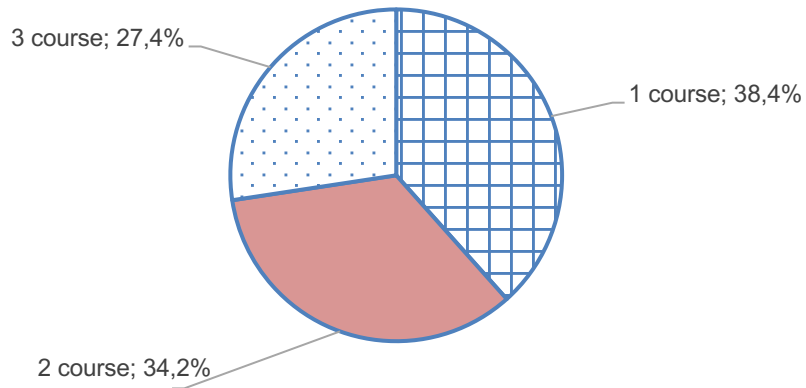


Figure 4. Distribution of respondents by course

Cloud computing capabilities are widely used in various fields. It was studied where students use cloud computing services. The results are presented in Figure 5. A total of 45.2% of respondents use cloud computing for both personal and work purposes, as well as for academic activities. Meanwhile, 30.1% use it exclusively for academic purposes, 12.3% use it only for personal matters, 6.8% use it strictly for work-related tasks.

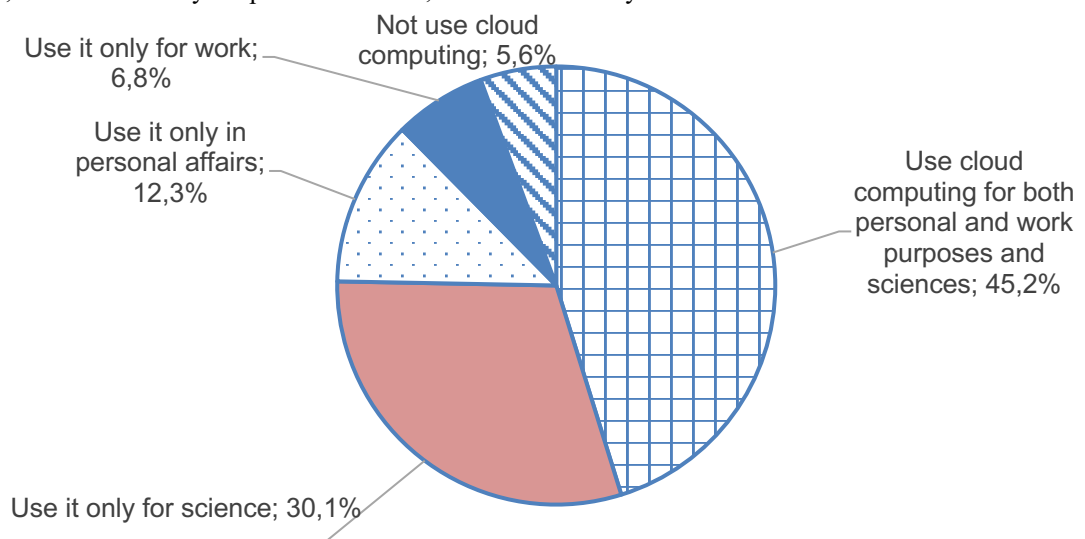


Figure 5. Using cloud computing

The study wanted to find out how often students use cloud computing services. The results of the study are shown in Figure 6. 22.0% of respondents use cloud computing services every day, compared with 27.4% every week. These indicators are low enough. Therefore, students should be more active and use cloud computing more often.

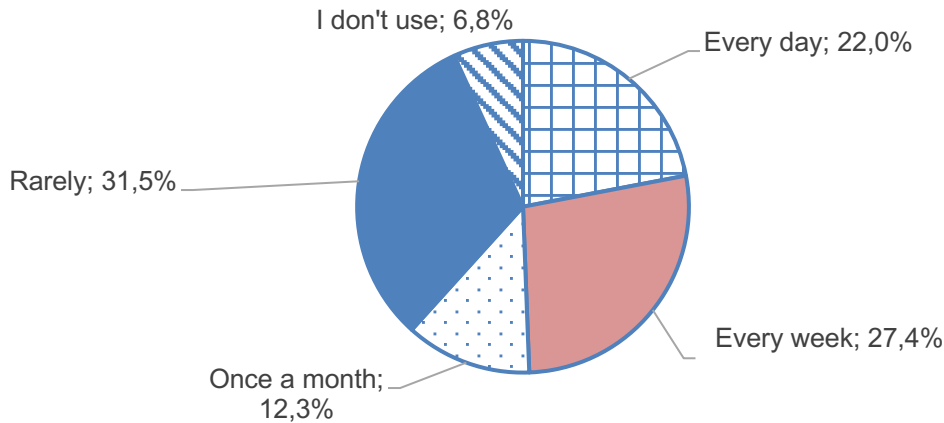


Figure 6. Frequency of cloud computing

The supply of cloud computing services is large. We tested what cloud computing services students use. The results of the study are shown in Figure 7. The most used service on Google Drive is 80.8%, and OneDrive is used by 72.6% of respondents. Students use Google Cloud – 37.0%, as well as college internal cloud services – 28.8%.

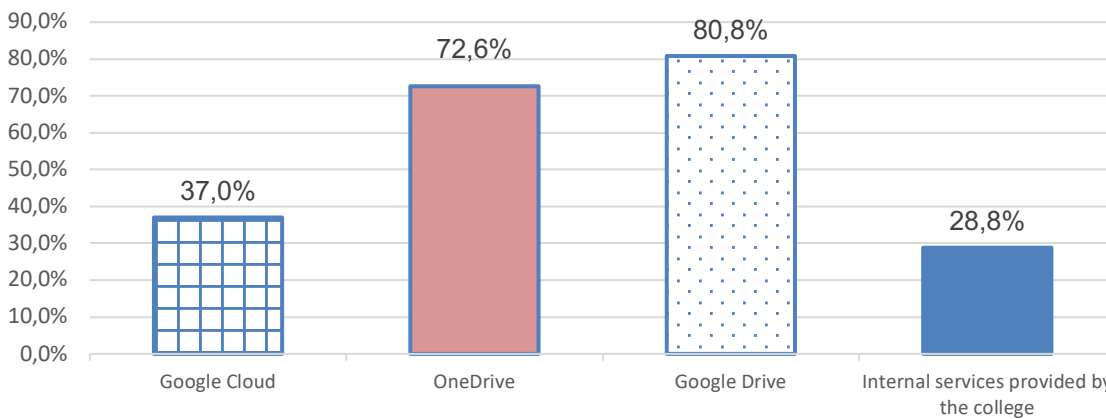


Figure 7. Using cloud computing services

Students use cloud computing services for data storage (80.8%), backup (57.5%), software use (13.7%), data analysis and processing (13.7%) (see Figure 8). In the “other” option, they indicated that files are stored on the college’s OneDrive, and that teachers provide information on Google Drive and use it to share data from one computer to another.

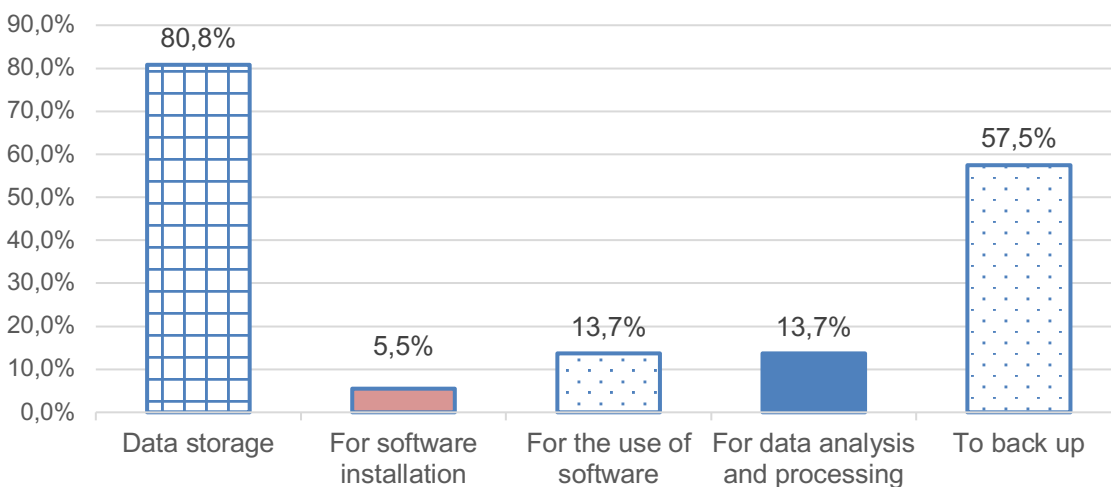


Figure 8. Using cloud computing technologies

Using cloud computing gives users a fairly large number of advantages. Students cited the biggest advantage of convenient data availability (74.0%), data security and backups (60.3%). The results of the study are presented in Figure 9. When answering the survey questions, it also indicated the minus that it is possible to lose information.

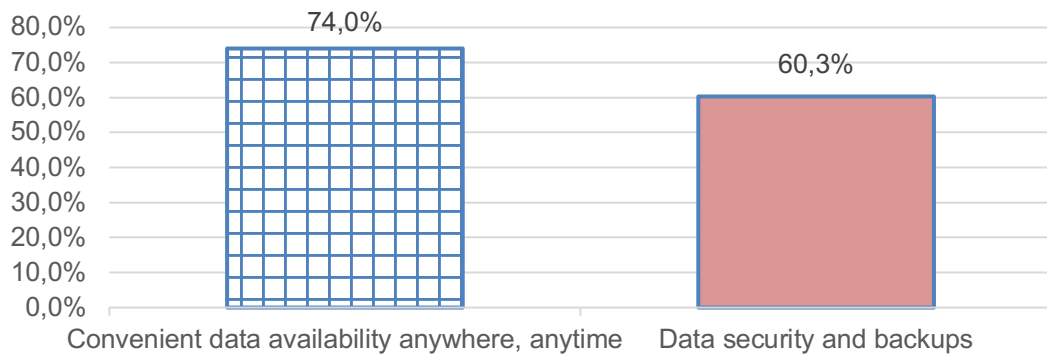


Figure 9. Benefits of using cloud technologies

The use of cloud technologies also faces problems and challenges. Students see the biggest problem with internet connection dependence (75.3%) and data privacy and security issues (27.4%). The results of the study are presented in Figure 10.

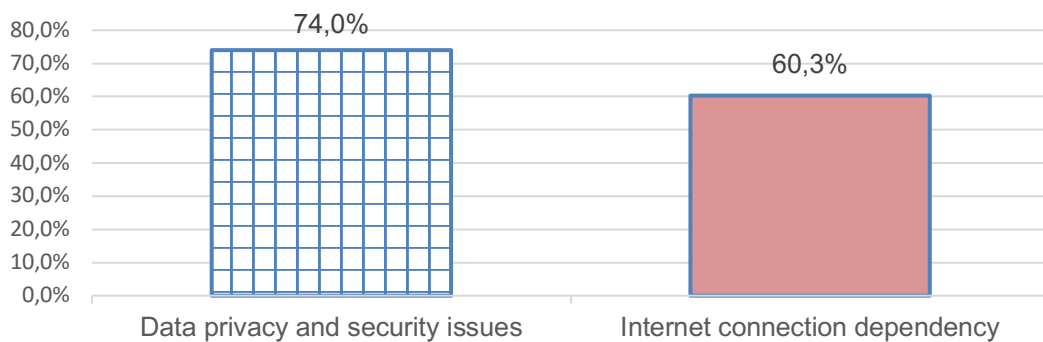


Figure 10. Challenges and disadvantages of using cloud technologies

The college provides cloud computing services to students. The number of students who are completely satisfied with the services provided is 43.8%, and partially satisfied is 26.0%. Considering that 27.4% of students do not use the services offered by the college, the information literacy and education of students should be improved so that they use cloud computing services more effectively.

After analyzing how students use the cloud technologies offered by the college (table), we could state that the first-year students of the Faculty of Technological Sciences are the most satisfied with the cloud computing services provided. (73% answered Yes, I am completely satisfied), and third-year students of the Faculty of Social Sciences (71% answered Yes, I am completely satisfied).

Table
Evaluation of cloud computing services offered to Panevėžys kolegija/ State Higher Education Institution students

	At the Faculty of Biomedicine Sciences	At the Faculty of Social Sciences	At the Faculty of Technology Sciences	Grand total
1 course	38%	40%	38%	38%
I don't use the cloud services provided by the college	67%	13%	27%	36%
<i>Yes, I am completely satisfied</i>	22%	50%	73%	50%
<i>Yes, partially satisfied</i>	11%	38%	0%	14%
2 course	38%	25%	38%	34%
No, I am not satisfied with the services	0%	0%	9%	4%
I don't use the cloud services provided by the college	44%	40%	9%	28%
<i>Yes, I am completely satisfied</i>	11%	0%	55%	28%
<i>Yes, partially satisfied</i>	44%	60%	27%	40%
Course 3	25%	35%	24%	27%

No, I am not satisfied with the services	17%	0%	0%	5%
I don't use the cloud services provided by the college	17%	14%	14%	15%
Yes, I am completely satisfied	33%	71%	57%	55%
Yes, partially satisfied	33%	14%	29%	25%

After evaluating the results of the student survey, we can say that students need to be more informed about the opportunities and applications of cloud technologies provided to college students, both in their studies and in their work activities.

The security of cloud technologies is very important. Most students are concerned about data security (The answer yes was chosen by 16.4%, Yes a little 35.6%). Students should be given more information about data security using cloud technologies.

The use of cloud technologies can lead to data loss. Most students have never lost data using cloud technologies (68.5%). 13.7 respondents admitted to losing data.

The college uses advanced data protection measures, so students do not lose data using the cloud technology services it offers. Their data and information are safe. To reduce the likelihood of data loss, it is necessary to have a backup copy of data. Most students believe that having backup copies is very important (20.5%), important (49.3%). (Figure 11).

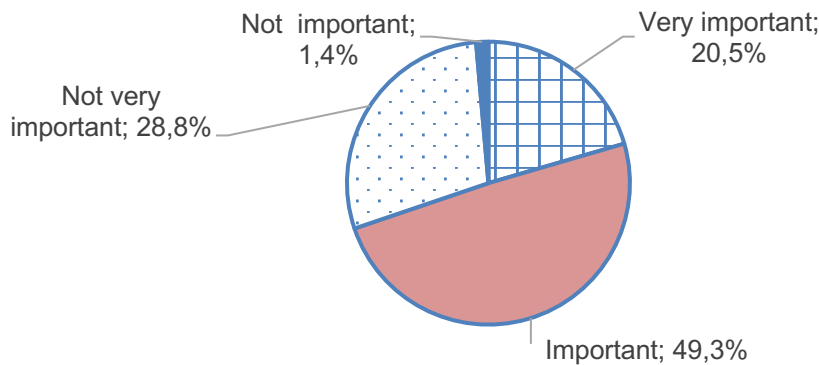


Figure 11. Student opinion on having backups

Only a small percentage of students use backup services in cloud computing (21.9% regularly, rarely 42.5%). 26% of students do not use full backup services. Students, while not backing up their data, believe that having a backup of their data is very important

Students trust cloud providers. They believe that they provide sufficient data security. The answers "Yes, I have full confidence in the data security provided by the suppliers" or "Yes, but I still have some doubts" were chosen by 20.5% and 53.4%, respectively.

In the media, we can often hear information about cyberattacks. 8.2% of respondents say they have experienced cyberattacks.

When analyzing students' opinions about what are the main risks that pose a threat to data security, the majority singled out data theft (82.2%). According to respondents, a significant threat to data security in cloud computing is influenced by cyberattacks (65.8%) and human error (56.2%). We can see the results of the study in Figure 12.

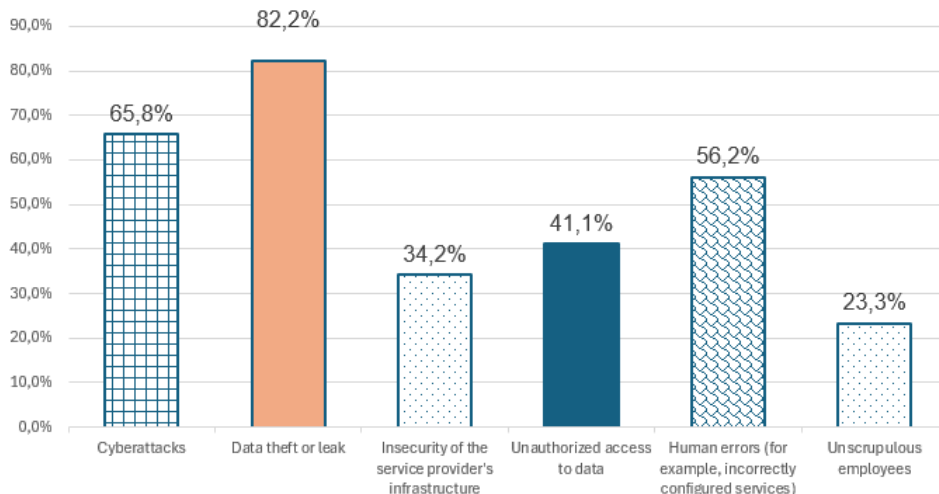


Figure. 12 Student opinion on the threat to data security in cloud computing

One of the important factors ensuring data protection in the cloud is password updating. Students rarely update their passwords, which may affect the hacking of their data. 2.7% of respondents update their passwords regularly every month. 15.1% update their passwords once every six months. A significant proportion of students update their passwords only when necessary (56.2%). 26.0% of students never update their passwords. It is necessary to educate students about the importance of data security in cloud technologies.

CONCLUSIONS

1. An analysis of the data of the official statistics portal showed that the use of cloud computing services in Lithuanian companies is growing. Most of these services are acquired by companies with more than 250 employees. The most used cloud computing services are e-mail, storage of data files, and the use of security software.

2. Analysis of the survey of Panevėžys kolegija students showed that 94.4% of students use cloud computing services, such as Google Drive, OneDrive, Google Cloud. Internal services are provided by the college. Students use cloud computing services for data storage, backups, software use, data analysis and processing. Students are satisfied with the cloud computing services provided by the college. After conducting the survey analysis, we can state that students need to be more familiar with cloud computing security measures.

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