MLS - EDUCATIONAL RESEARCH
http://mlsjournals.com/Educational-Research-Journal
ISSN: 2603-5820

How to cite this article:

Soto Paz, P. A. (2019). Analysis of Preferences in the Search for Information; Use of Internet and/or Physical Library. Case Study at the University of Puerto Rico. *MLS-Educational Research, 3* (2), 47-64. Doi: 10.29314/mlser.v3i2.215

ANALYSIS OF PREFERENCES IN THE SEARCH FOR INFORMATION; USE OF INTERNET AND / OR PHYSICAL LIBRARY. CASE STUDY AT THE UNIVERSITY OF PUERTO RICO

Pedro Antonio Soto Paz
Iberoamerican University Foundation (Puerto Rico)
Kamelotstudios@hotmail.com · https://orcid.org/0000-0002-3083-0633

Abstract. The preference is analyzed in the use of the Face-to-Face Library and its virtual databases with reliable information, which the University has over the use of the Internet with its reliable data and also with doubtful information. I executed this with third- and fourth-year students of the University of Puerto Rico University Campus of Mayagüez (UPRRUM). The purpose is to help the student to use the most correct resource to obtain reliable information in their works and university tasks. Not only will the accessibility of one or the other be evaluated, but also the ways to reach students directly and that they develop skills to use the different navigation instruments assigned to the search for information. The research focuses on the quantitative method. According to the analysis of the objectives of the research, it is concluded that when quantifying how often students access the physical library for the search of information, it was observed that although the students know the services offered in the library, they do not sponsor the use of it to search for information and perform their assigned work. Within the line of conclusive analysis, it is observed that although the students know the facilities of the virtual library, it showed great difficulty in the students to navigate the database of the same, not being the ones that they frequently use to perform their university tasks.

Keywords: Students, Internet, physical library, virtual library.

ANÁLISIS DE PREFERENCIAS EN LA BÚSQUEDA DE INFORMACIÓN; UTILIZACIÓN DE INTERNET Y/O BIBLIOTECA FÍSICA. CASO DE ESTUDIO EN LA UNIVERSIDAD DE PUERTO RICO

Resumen. Se analizó la preferencia en el uso de la Biblioteca presencial y sus bases de datos virtuales con información fidedigna, que la Universidad posee frente al uso del Internet con sus datos fiables y también con información dudosa. Esto se llevó a cabo por los estudiantes de tercer y cuarto año de la Universidad de Puerto Rico Recinto Universitario de Mayagüez (UPRRUM). El propósito es ayudar al estudiante a utilizar el medio más correcto de conseguir información fidedigna en sus trabajos y tareas universitarias. No sólo se evaluará lo

accesible que sea uno u otro, sino también se buscarán las maneras de llegar directamente a los estudiantes y que éstos desarrollen destrezas para usar los diferentes instrumentos de navegación asignados a la búsqueda de información. La investigación se centra en el método cuantitativo. De acuerdo al análisis de los objetivos de la investigación se concluye que al cuantificar con qué frecuencia los estudiantes acceden a la biblioteca física para la búsqueda de información se observó que aunque los estudiantes conocen los servicios que se ofrecen en ella no patrocinan el uso de ésta, para buscar información y realizar sus trabajos asignados. Dentro del renglón de análisis concluyente se observa que aunque los estudiantes conocen las facilidades de la biblioteca virtual, ésta demostró gran dificultad en los estudiantes para navegar por la base de datos de la misma, no siendo las que frecuentemente utilicen para realizar sus tareas universitarias.

Palabras clave: Estudiantes, Internet, biblioteca física, biblioteca virtual.

Introduction

This study analyzed the preferential use of the physical Library space and its trustworthy virtual databases owned by the University, compared to the use of the Internet, which contains reliable but dubious information. Third and fourth-year students from the University of Puerto Rico, Mayaguez Campus (UPRM) carried out this research.

The aim of this research was to help students use the best way of obtaining reliable information for their university tasks and assignments. Access to this information was assessed, and students were also helped in developing their search and browsing skills. It is vital that all students equally benefit from the high-quality and reliable control of information. According to the findings, some recommendations for the effective search of information were made within the systems used by students.

The project will help users with amenities and the library staff to make decisions to solve the issue with the use of the system, providing good use of the institution amenities and systems. There are previous theories, studies and articles about the subject that help understand the reason for this problem and gives us the answer.

The work carried out helped test the hypothesis raised in the methodology. Apart from that, the population and the studied sample were presented, and a research calendar was made and used to complete the work. During the research, questionnaires were distributed to all participants, which were later accounted to conclude whether the hypothesis were true or null.

All this research work carried out using information and communications technology (ICT), led researchers to surprises and results that helped improve the already chosen system. However, this system is supposed to be more efficient and competitive, and given that it is obsolete, it should be changed. An alternative would be the library and its amenities. The library offers different kinds of support to students for them to carry out their daily tasks. Apart from encouraging reading books about a wide variety of subjects and topics, it also has an area where everyone has access to technological devices, from projectors to desktop computers with Wi-Fi. The library has an old way of working by letting students use computers on their own. A staff member is present in the front desk in case someone needs any help, information, or look for a book. If students are alone, they are more likely to look for information in a quicker and easier manner so that they can finish their tasks.

Within the technologies accessible to students we can find different browsers such as Google, Yahoo!, Wikipedia or Bing. Nowadays, technology is constantly changing, so we need to look for available alternatives to use advanced structures and encourage significant changes to the benefit of the students. Sometimes, these alternatives are not used because their existence or their proper use are ignored. Nowadays, students have many different alternatives to their previous print books; computers are a good example. Another alternative worth

mentioning are devices that, when wearing a pair of glasses, enable us to experience life in a real-size virtual world, which is actually the place projected by the device. Using the computer helps students obtain information in an easy and unimaginable way. When using information search programs such as Google, Bing, Altavista, etc., they can obtain any kind of information in an effortless way. That's where some of them stop to think about what the type of information they need is. If what we seek is general information for personal use while having some fun along the way, it's not bad. You'll find all types of information, but if we are looking for reliable information for university tasks and assignments, we should choose non-contaminated nor altered information, given that any university work must stem from factual and reliable information. Besides, said work could be helpful for other people to obtain data. As such, we must be careful with the information we choose to use, for it to become beneficial for someone else.

We can also find databases in libraries. According to Masadelante.com (2019), the definition of database is "Electronic filing system". A database would be a data collection system in which a computer program could immediately choose the pages that the user needs. Typical databases are organized in fields (unique pieces of information), records (entire field systems) and files (series of reports). According to this definition, data is organized in a similar way as gondolas in supermarkets or shelves in libraries, so that it is easier for us to obtain the required information when we want to and how we want to. Students also have this alternative for doing their university tasks. In some databases, the information is encrypted, so that no one can contaminate or alter the existing information due to user manipulation.

We live in a time of constant change for Information and Communication Technologies (ICT). They are so developed that we already have intelligent programs and computers with unbelievable features, such as video quality, sound quality and the quality of calculations that, despite being unperceivable and unnoticed, are still there. Having that on mind, libraries need to be up to date on this technological movement happening day by day, because the best computer technology tool could become obsolete from one day to another. The system installed on the library could be negatively impacted, too. This system aims to provide the best service possible to users, so that they can carry out their research works in a proper and easy manner.

Due to all this, there are diverse coexisting interests from the students' part, though for their sake, they should settle on the proper way of using the library amenities.

Third and fourth-year students from different universities are exposed to huge numbers of assignments, projects and exams. They need to develop their skills on obtaining reliable information and complete their assignments in a fast and efficient way, with the professional quality needed for their presentations. During an informal interview with Professor López from the RUM library, students from the UPRRUM are not aware of the existence of online databases containing reliable information that could help them with their assignments.

A course is being implemented for newly admitted students in order to teach them the importance of online databases and train them in the system. They were asked to come up with ideas to improve their environment and make it easier for them to study, such as each department having its own special library, a study space and a computer classroom. However, the professor says that this may work in U.S. universities, but not in Puerto Rico. Although they tried to make it that way, things did not work out due to Puerto Rico's culture, which is not the same as in the United States. Students could not adapt to said study environment (G. Lopez, Comunicación Personal (Personal Communication), March 3, 2017).

The ASEGRABCI, the Association of Graduates of the Graduate School of Library and Information Sciences, of the University of Puerto Rico in Rio Piedras (2013) encourages its graduates to attend its annual conference, which this year is called Acceso y Uso de la Internet en Puerto Rico: herramienta de desarrollo social (Access and Use of the Internet in Puerto Rico: a tool for social development). The study to be carried out is based on the premise that it is a prime requirement to have sufficient, reliable, updated information, whenever necessary and at the lowest possible cost, for any responsible decision making and action, particularly in the field of health and related areas. Keeping this in mind, a series of meetings were held to help its members use reliable sources of information so that they could carry out their research work using the best sources of information offered by digital libraries. Researching on third- and fourth-year students' preference concerning how they retrieve reliable information is becoming a pressing need, as it will allow guiding and even leading first- and second- year students in the right path, with the goal of finding quality information. It is not necessary to wait until they have finished their university studies and have started a postgraduate degree to give them that important tool known as reliable information.

According to Kioskera (2014), the search for reliable information is becoming increasingly difficult due to the excess of information in search engines. Besides, according to Kioskera (2014), there are a number of online libraries offering free access to millions of reliable documents and renown sources, but they are more frequently used and known by the already professional class. Kioskera (2014) explains that it is necessary to thoroughly research the students' position in terms of what they know about the proper way to search for reliable information. In this way, we can determine how much help they need in order to master the reliable information-retrieving process for their academic projects in order to meet their professors' demands.

According to Baldaguéz and Carrasquillo (2012), in the study conducted by the University of Puerto Rico in the Humacao Campus on Factores de Riesgo de la Deserción Universitaria: una Mirada desde la Óptica Masculina (Risk Factors of Undergraduate Drop Out: An Overview from a Male Perspective) (see Appendix), the factors that favor male undergraduates dropping out in that educational institution.

One of the most relevant pieces of data is the need that students have about the management and search of electronic databases. Based on the previous information, some research should be carried out to determine if this problem solely affects male students or the entire student body, whether male or female students. This research is praiseworthy, since it reveals within the survey that several students struggle to find reliable information. Further research is needed to verify whether other areas of the population may be vulnerable to this apparent struggle.

Literature Review

According to Cervantes (2009), we have needed to communicate with each other since the very emergence of the human species, using different forms of communication such as paintings, gestures or writing. Over time, communication has been progressively perfected to achieve better relationships among all. These advances are reflected in information and communications technologies (ICT) such as radio, TV and the Internet. Today, young people are exposed to a vast amount of information for each topic in particular, but it is necessary to

know if students know how to choose reliable information from all that maelstrom of data that runs through their hands.

White (2012) says that libraries help stimulate and create ideas in people's minds. With their help, people can quickly find ways to build things that can help economically, socially, and culturally. That is why most of society prefers libraries continue to function. There are so many creations and documents, that people cannot buy all copies, magazine or TV articles for their personal use. That is why they resort to borrowing books or technological material from different libraries.

According to Hernández (1997), in the journal Analítica, the article Breve Teoría de Internet (Brief Internet Theory) presents as-yet-scarce technological innovations as strategic. This article explains what is currently being used as the best technology to retrieve information, since it could become obsolete tomorrow. To explain this, the article mentions that Rothschild (1815) hired a steamship, which took him to witness the Battle of Waterloo. After the battle was over, he would have been the first to arrive in London and tell what had happened. This happened because he had the most advanced technology and was able to communicate what he knew faster than the other methods of that time.

Students have high technology at their service to perform their tasks, as well as methods and databases and the Internet. Despite this, each student needs certain skills to achieve quality information, that is, to retrieve reliable information. However, how do we know if students have that choice? One can demonstrate the methods of the Internet and the methods for using databases offered by physical and/or virtual libraries.

In computer science, several theories explain the procedures for students to prepare assignments. According to Kuhlthau (1991), the Information Search Process model, known as ISP, is one of the most cited papers in Library Science and Documentation. It is defined as a description of the experiences that people go through when having to search for information.

The paper by Kuhlthau's (1991) divides the Information Search Process into six steps: a) Initiation - when a person first becomes aware of a lack of knowledge and feelings of uncertainty are common; b) Selection - when a problem is identified and initial uncertainty gives way to optimism; c) Exploration - when inconsistent, incompatible information is encountered and uncertainty, confusion, and doubt increase; d) Formulation - when a focused perspective is formed and uncertainty diminishes; e) Collection - when information pertinent to the focused perspective is gathered; f) Presentation - when the search is completed with a new understanding enabling the person to explain his or her learning to others.

According to Guevara (2010), Bourdieu explains that everything in life leads to a disposition to do certain things, what he calls Habitus. This refers to the collection of experiences from childhood to adulthood. Experiences change, but the essence of what was first acquired remains. Someone’s habits will affect their choice between what is recommended and their personal preferences.

In this case, it will be affected by the technology they found during their life. For example, among someone’s first technologies, we could mention the pencil, chalk and the abacus in contrast to the one who found pens, markers and a computer. Young people have access to different ways of obtaining information and it will depend on their habit of seeking information for it to become a habit and be the first choice for that field. If when someone was little, they did not have said guidance and training, they will find it more difficult after growing up and will choose to obtain the first information without verifying if it is true or not. It is important to study the frequency of the habit through research because it can shed light

on how to help the student body in this matter. This research determines whether the frequency of the habit of looking for information is optimal to achieve the objective.

A study by Yoon (2016) explains that the findings proved that undergraduates need mobile device software applications (apps) for library use. Students want to use library apps due to the visual, interactive and intuitive features of these software. Having these tools improves the functioning of libraries. If universities want to attract the interest of their students to use library apps, they will have to convince them of their advantages in academic libraries. The study concluded that mobile applications must be useful and easy to use.

The information technology was researched on print, as it is one of the tools used by the university being researched, since it is another one of the library's tools available to students for their assignments, just as electronic technology. Another reason why print information is included in this research is the fact that not all the information available to them is found in digital form when teachers send educational assignments to their students. Wanting to research this approach led to a better understanding of the problem libraries are going through. In addition, the library of the university campus of Mayagüez, in Puerto Rico, is recognized by its support for the use of paper books. It even has a room specially prepared for the care and use of books more than 100 years old.

According to Tírziman (2014), in another example of why they are digitalizing information, the purpose of the Manuscriptorium digital library is that people can have access to old documents from the Naţionale a Românieique culture, dating back to 1800. Manuscriptorium is the cooperative outcome between several companies dedicated to digital programming. Naţionale a României is asking other libraries to meet the technical requirements and become partners. According to Nelson and Huffman (2015), university professors are concerned, since much of the literature is being published and manipulated by "predator" editors. These are editors who publish questionable magazines in order to advertise themselves. This would cause those magazines published by predator editors and leaked into library databases to contain unreliable research. The study revealed that the editors doing this are few but are affecting some areas of study. According to Alonso-Arévalo and Cordón (2012), the number of people interested in buying and acquiring tablets and electronic books is increasing.

They also claim that people's interest in electronic devices will grow in the coming decades, in order to download books in digital format. They also explain that there is an available virtual app called EbookFling, which allows people to borrow books. The software is free and allows people to have the book stored in their device for fourteen days and is then automatically deleted and returned to the system, to the person who lent it.

According to Cordón (2010), when Google Ebooks came into the scene, it represented a change in the rules of the system; it was not known by then if Apple iBooks would be the weapon to read books on computers. This would reduce the number of people reading print books. Indeed, in subsequent years, the e-book has infiltrated the publishing market with strength in a short period of time. It is expected that it will go beyond previous technologies. There is already a device which was created exclusively for the e-book system and is different from the static system that was in use. The debate is between what prevails in the interest of people, the print book or the e-book.

On the other hand, Jiménez (2015) states that something unexpected is happening in book sales. What was believed to be the victory of digital books over print ones has not yet materialized. Some bookstore companies and large shopping malls will close their fiscal year with an increase in print book sales. The preference for print books is 8 out of 10 books sold. The interest in the market and among users for digital books is decreasing. The data

associated with this statement would be the extent to which printed books are academic texts used in the curricula of educational institutions, since nothing is mentioned about the regulations that each region's ministry of education determines regarding libraries and the bibliographic collection associated with the curriculum being taught.

Toteng, Hoskins and Bell (2013) state that 75% of surveyed law students said to have used the university's database during their studies. The students learned about the use of these resources thanks to other friends and librarians, who informed them and taught them how to use them.

According to Otón's idea (2016), an option for the graphical interface (a computer program that uses images to represent information) for the users is the so-called virtual reality interface, which enables achieving an effect known as immersion. Here, users can work on an artificial system. When building a virtual library, the desired size and floors can be designed, just as in a real library. This way, users will interact with the environment of the real library and they will be able to find the book they seek, since they will already know where it is.

According to Jaeger, Bertot, Shuler and McGilvray (2012), the increase of information and communication in our environment raises many questions, such as how it provides access and management. The government demands less use of paper and more electronic technology in libraries. They also created a page called e-Government (e-Gobierno in Spanish), where they concentrated a number of electronic and public libraries for students to work with the electronic government using the e-Government page.

A study conducted by King, Cataldi-Roberts and Wentz (2017), concluded that library and computer technicians from computer centers exhibit very good workplace communication, which is very important since their services are homogeneous. A good understanding between the two systems, that is, administrating the library and the electronic information system, work with much order and responsibility from one to the other. Creating projects and being able to provide help on time is what is sought to be successful in what you are doing.

According to (Craven, Jefferies, Kendrick, Nicholls, Boynton, and Frankish, 2014), they conducted a study where they proved that not all interfaces work with the same data translation speed.

Note: In Definición.DE (2014), an Interface is the "connection that occurs physically and at the utility level between devices or systems." It is a connection between different machines connected by a support, where one communicates with the other for the exchange of information. The interface can cause problems in the university community.

Library users may have other alternatives to solving problems regarding their studies, as it would be impossible otherwise. For some people, having to go to certain places where that specific information is found, is difficult because they do not have access to it. An example of this information, tells us (Berquist, Gledhill, Peterson, Doan, Baxter, Yopak and Frank, 2012), that a museum holds a large number of databases concerning animal anatomies. In order to avoid this difficulty, it is proposed that they be digitized into a program using 3D technology so that their anatomy and morphology can be studied in combination with rapid online information system and exchange of information. An example of this system is the Digital Fish Library (DFL, http://www.digitalfishlibrary.org), in which magnetic resonance imaging (MRI) is used within online information to obtain the best image.

In the Badilla, Cortada and Riera (2012) document, they studied the behavior of primary and secondary school students using Information and Communication Technologies (ICT). They wanted to know if students were working well in terms of searching and having

access to the right information. The purpose is to see if students who use ICT are well trained in using the tools properly, and if they are able to search for the best information that the Internet can provide. The result was that the students do, in fact, know how to use ICT, but they do not know how to search for the most reliable information for their assignments. They were unable to assess, summarize and analyze the information during the Internet search.

According to Mutula (2016), libraries can offer the public information that cannot be stored in traditional systems. There is something known as Big Data, which is a large amount of heterogeneous information, too large to be stored in normal information management systems.

Big Data cannot be used in the same way as using a file with a Megabyte or Gigabyte capacity, which would be the case of a user looking for a book. In libraries, we are speaking of a need for large amounts of information at one point, as a large user population is served. Therefore, the amount of information handled is equal to a Terabyte, Petabyte or Exabyte, as we have access to all written information. For example, having access to all the books in the world.

Another reason is that the user will depend on the library to be able to access the information found in the Big Data. From a normal computer, with normal programs, these devices will not serve or be able to manage the information that is desired from that place. People are not using Big Data, which is why only 5% of the information available in the world is being used. This is because there are limitations in the use of computers, with limitations in the ability to store information and programs that help gain access to that data as well.

In the informal professional interview with Gerinaldo Camacho, Doctorate in Library Science, and Librarian at the Pontifical Catholic University of Puerto Rico in the Mayagüez Campus, states that students do not know what they prefer when in the library in order to carry out their assignment. This is to say, whether to use books, the Internet or the virtual library. He also states that there is no study that can shed light on these results, adding that they have the proper facilities, but it is the student who in the end decides what tool to use (G. Camacho, Comunicación Profesional, October 1, 2013).

In the informal professional interview with Professor López, university students at the University of Puerto Rico in the Mayagüez Campus are not aware of the existence of online databases with reliable information in order to be able to carry out their assignments. It also mentions that students and professors do not know how to use the University’s online databases correctly.

According to Christine (2014), information technologies (IT) are turning the cloud into an innovative storage system. This helps people gain access to information wherever they are with a mobile device; whether it's a tablet, cell phone, or any other device. One of the features is that the information can be stored almost infinitely, and the data can be stored on multiple servers.

Note: The topic regarding the museum has to do with the fact that innovative technology is used to send data from one place to another using the Internet. The student can also use this technology to carry out their assignments, since it serves to see whether they are more interested in the use of the library, as it establishes communication concerning reliable data between library and museum and vice versa.

Methodology

Design

The research focuses on the quantitative method. The survey was conducted among third- and fourth-year bachelor's degree students at the University of Puerto Rico, Mayagüez Campus. Two measurement scales were used; one of them is the Likert scale, which specifies the level of agreement or disagreement with a statement, and the other, the Semantic Differential Scale, which presents values from 1 to 10 where the individual must mark one according to what they think about the object presented.

The instrument was created to carry out research and collect data and information, which consisted of interviewing third- and fourth-year bachelor's degree students through a survey. The most important part of the survey was knowledge on the library's databases, as well as of other areas of information seeking, and also the knowledge of the students themselves and their preferences.

The survey respondents were students from the University of Puerto Rico, Mayagüez Campus, and belonged to different departments such as Business Administration, Information Systems, Biology and Education. The different parts of the research consisted of contacting the Institution and explaining the purpose of the interviews in order to obtain their approval. It was also communicated to the departments in order to proceed with a random selection of the sample and to be able to carry out the survey. With the data obtained, we assessed descriptive statistics: average frequency, percentage and mode, etc., library and the Internet, their preferences, how skilled users are, the proper use according to its purpose and the proper use of both areas.

Participants

The sample consisted of 150 students from the University of Puerto Rico, Mayagüez Campus. The study was conducted with third- and fourth-year bachelor's degree students. There are four university groups in the student population that were sampled.

Instrument

The instrument used to carry out the research is a questionnaire with multiple choice questions, aimed at information seeking that consists of three parts developed by the researcher. The first part focuses on the student's personal and general information. The second part addressed the use and preference of the respondent's search for library information. In the third part, there was an analysis of the use and preference of the student's information seeking on the Internet. In the first questions the students answered questions regarding their gender, age and grade. Then they revealed whether or not the library is helpful for them and how often they used it. These questions also provided information on whether they knew how to use the virtual library properly and whether it was easy for them. In the last questions the researcher obtained information about the use of the Internet in information seeking. They included the tools they use to find information such as Yahoo, Google, Wikipedia, Bing, etc. They also showed the frequency and ease of use, as well as their preferences. The information obtained is strictly confidential and used specifically for this research. The instrument was validated by experts of the University Institution and the Thesis Director of the Graduate Program of the UNINI University, Dr. Sulynet Torres.

Results

Figure 1 shows how many participants use the physical library. According to Figure 5, the results show that 7% very frequent, 14% frequent, 27% sometimes, 37% rarely and 14% never.

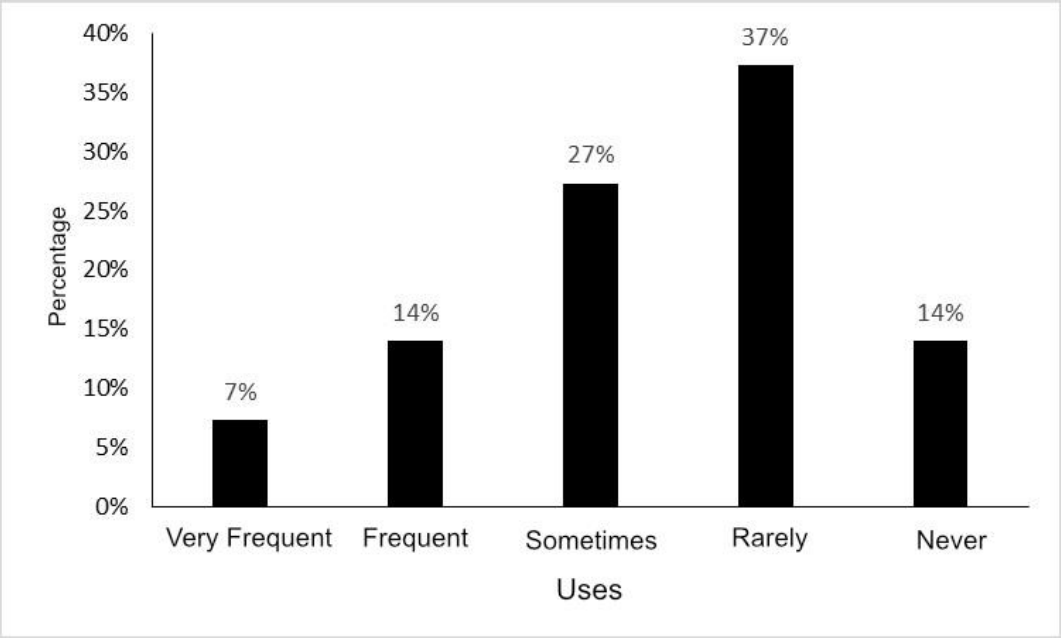

Figure 1. How often do you use the physical library to search for information

Figure 2 shows how many of the participants use or do not use the virtual library facilities. Figure 6 shows that 13% very frequent, 21% frequent, 29% sometimes, 27% rarely and 9% never.

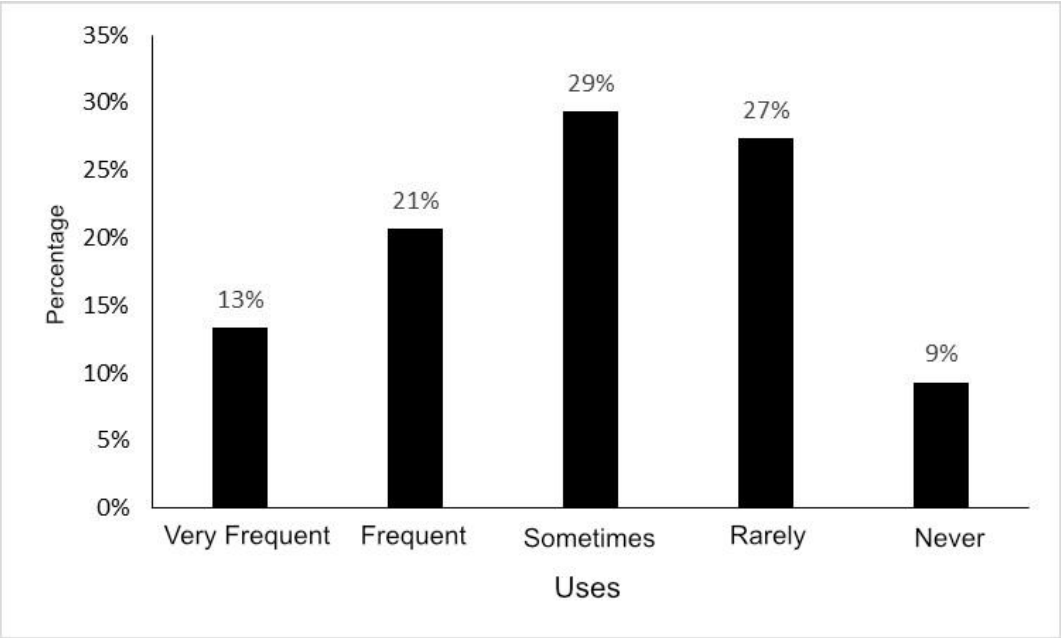

Figure 2. Frequency use of the virtual library and library databases

Figure 3 shows the frequency use of the Internet to search for information. According to Figure 17, the findings show that 88% very frequent, 11% frequent, 1% sometimes, 0% rarely, 0% never.

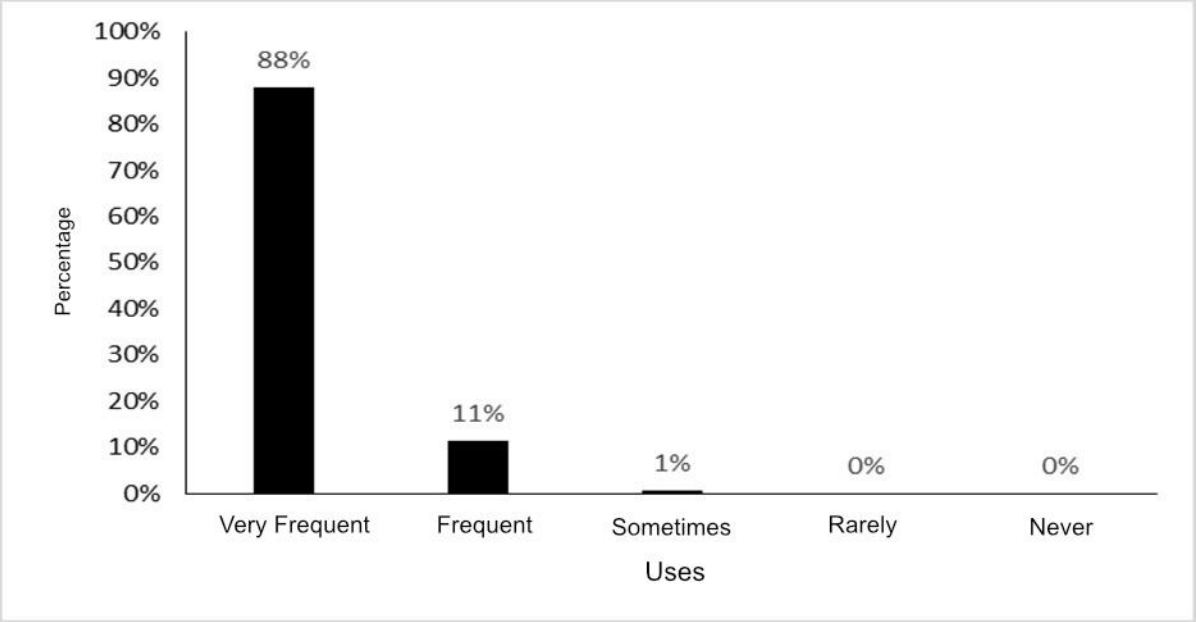

Figure 3. Frequency use of the Internet to search for information

Figure 4 shows us the first tool used at the moment to seek information. The findings show that 91% Internet, 0% physical library and 9% virtual or online library.

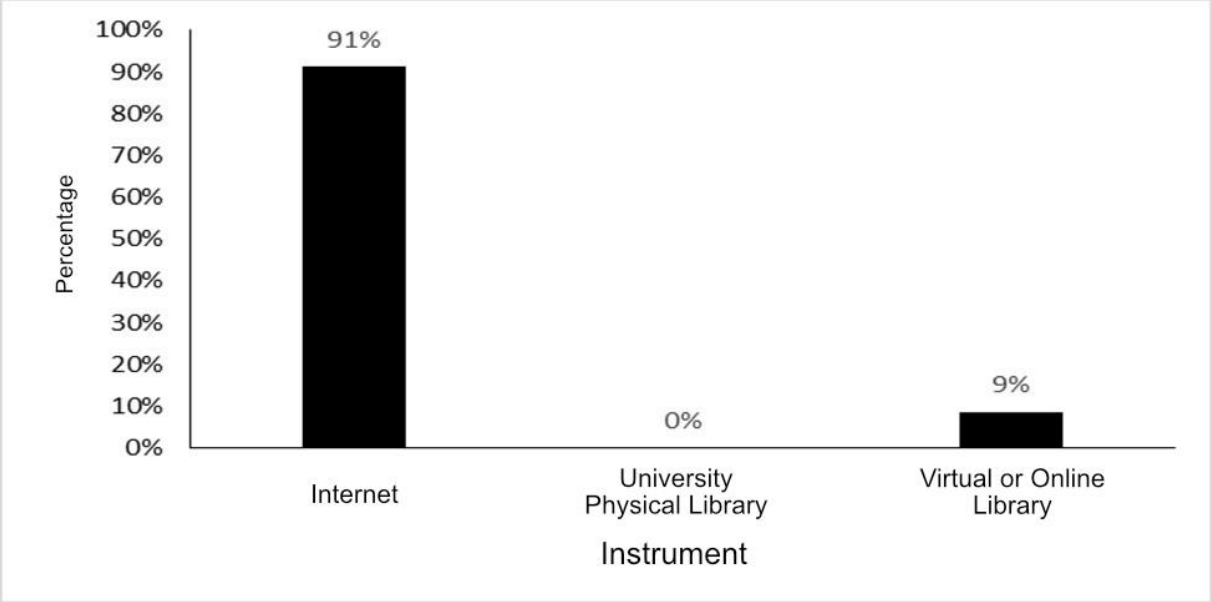

Figure 4. First tool used at the moment to seek information

Data Analysis

How often do students use the library to seek information?

information.

Ho2: third- and fourth-year bachelor's degree students do not often use the library to seek information.

Data shows that out of 150 respondents, 118 do not often use the library to search for information. This means that 78% do not visit the library very often or not at all versus 22% who do.

Data shows that out of 150 respondents, 136 would use the library more often if they had innovative technology. This means that 90% would use the library more often if they had innovative technology versus 10% that would not use it at all even with technological advances to search for information.

In addition, data shows that out of 150 respondents, 137 prefer the Internet when seeking information for an assignment. This means that 90% versus 10% use the physical, virtual or online library when seeking information for an assignment.

If 78% of the respondents do not use the library and 90% use the Internet as their first option to do an assignment, this shows that students do not often use the library to search for information and, therefore, Ho2 is accepted.

If 28% of the respondents use the library, 90% would visit the library more often with innovative technology and 10% use the physical or virtual library as their first option to do an assignment, this shows that students do not often use the library to search for information and, therefore, the Ha2 hypothesis is rejected.

How often do students use the virtual library (database) to search for information?

Ha3: third- and fourth-year bachelor's degree students often use the virtual library to seek information.

Ho3: third- and fourth-year bachelor's degree students do not often use the virtual library to seek information.

Data shows that out of 150 respondents, 99 do not often use the virtual library to search for information. This means that 65% of the respondents do not visit the virtual library very often and 35% do.

Data shows that out of 150 respondents, 137 prefer the Internet when seeking information for an assignment. It is relevant that 91% prefer using the Internet to 10% who use the physical, virtual or online library to search for information.

If 65% of the respondents do not use the virtual library and 91% use the Internet as their first option to do an assignment, this shows that students do not often use the virtual library to search for information and, therefore, the Ho3 is accepted.

If 35% of the respondents use the virtual library and 10% use the physical and virtual library to do an assignment, this shows that students do not often use the virtual library to search for information and, therefore, the Ha3 is rejected.

How often do students use the Internet to search for information?

Ha4: third- and fourth-year bachelor's degree students often use the Internet to seek information.

Ho4: third- and fourth-year bachelor's degree students do not often use the Internet to seek information.

Data shows that out of 150 respondents, 144 claim that the use of the Internet helps in the information seeking process. This means that 96% do use the Internet very often versus 4% who say it does not help them in the information seeking process.

The results in Table 19 show that out of 150 respondents, 145 state that the Internet is easy to use in order to search for information, representing 97% versus 3% who think it is difficult.

Data results show that out of 150 respondents, 149 often use the Internet. So, 99% of them use the Internet regularly versus 1% who do not use it at all.

If 96% do use the Internet frequently, 97% think it is easy to use and 99% use it very often, this means that users often use the Internet to seek information and the Ha4 hypothesis is accepted.

In contrast, only 4% state that it does not help to search for information, 3% think that it is difficult to use, and the results show that there was 1% of respondents claiming that they do not frequently use the Internet to seek information, so the hypothesis Ho4 is rejected.

What is the first tool students use when searching for information for an assignment?

Ha5: third- and fourth-year bachelor's degree students use the library as the first tool to search for information for their assignments.

Ho5: third- and fourth-year bachelor's degree students do not use the library as the first tool to search for information for their assignments.

The data shows that out of 150 respondents, 125 believe that libraries help when searching for information. This means that 83% agree that it does help when searching for information versus 17% who think it does not.

Results show that out of 150 respondents, 118 do not visit the library, which translates in 78% versus 22% who do.

They also show that out of 150 respondents, 137 use the Internet as the first tool for their assignments. It is clear that 91% use the Internet as the first tool for their assignments, versus 0% who use the physical library, and 9% who use the virtual library.

Even though the vast majority, 83%, agree that the library helps when searching for information, the truth is that 78% do not use it and 91% use the Internet as the first information seeking tool over the library and its services, such as the library database or virtual library. This shows that students do not find the university library useful and therefore the Ho5 is accepted.

Although 83% agree that libraries help in the information seeking process, the same group of respondents are those who do not use the library (78%) and do not use it as the first tool when doing an assignment (91%), which is why the Ha5 hypothesis is rejected.

Conclusions

Relying on research analysis, the following findings are presented:

Analyzing the data obtained, it has been shown that the vast majority of students are acquainted with the services offered in libraries; yet, there is a minority who do not know the applications and services it offers for university research. The percentage of students who find it easy to use the virtual or online library was somewhat the same. This means there is clear awareness about the library's digital amenities. In terms of the use of library amenities, according to research, the percentage of students that find the university library easy to use for seeking information is decreasing, while students who find it difficult is increasing. The percentage of students that frequent the library is quite limited or poor, although they claim that the majority would visit the physical library more often if innovative technology were available.

Research findings reveal the following information: more than a half of students do not visit frequently the library or databases despite knowing the service offered for their university research. Navigating library databases is, as we can deduce, complicated for students and they are not willing to do their work this way when there are alternative means to do it faster. Based on the results, as a conclusion, students prefer, or are more willing, to use easier and faster information search systems. Such systems should have user-friendly and simple interfaces. The study shows that the Internet is not a problem for the library, but a complement. The University must refocus the library area with a greater emphasis on computer changes, knowledge acquisition of their databases and prevent the student from not having professional help.

Almost one hundred percent of students use the Internet as their first option for information research, while a minimum percentage access the physical library. This means that they do not find the physical or virtual library useful and prefer the ease of Internet access to obtaining a great deal of information. The use of technological advances, such as Augmented reality, favors interest of university students in the use of libraries to search for information.

By quantifying the frequency of the students accessing the physical library to search for information, it was concluded from the objectives obtained that, although students know of the services the library offers, they do not search for information or carry out assigned work. In the same part of the analysis it is observed that, although students know the amenities of the virtual library, they find it difficult to navigate the virtual library database and to use it frequently. The Internet is determined to be the most widely used for them to carry out their university research because of its ease for navigating and find information.

The researcher concludes, from the results obtained, that the following should be allowed:

1. That hardware and software, and consequently database systems, be modified to improve their agility, with a simpler interface.

2. A more user-friendly database should be built so that students feel attracted to the tool.

3. Research into other innovative technological measures such as the EBSCO digital databases, which can help in searching for information and are of interest to students, or the ICT.

4. To implement a course for the first academic year on the library and its database use, so that students can search for reliable information from the very beginning.

5. Create a site through technological advances and experiences so that a librarian can be consulted through the Internet, and for student to know where to resort when needing information. This student-library interface could make young people want to use the library's resources again, allowing them to choose the most reliable, fast and recommended ones.

6. That librarians conduct periodic satisfaction questionnaires for students using library tools to discover how physical and virtual library functions can be improved.

7. That the library has a search interface similar to those of the Internet, such as Google or Yahoo, to make the search easier and faster. Yet, search engines should be associated with formal sites to find arbitrated articles, books, and so on.

8. That libraries evolve to Web 2.0 as the Internet did so that they can be open to the general public.

9. That they are willing to adopt technological changes of the future and that they have sophisticated and modern hardware and software for students to use the libraries.

10. Libraries should update their technology according to the needs and profile of the student of this era. Programs should be more user-friendly and easier to use by students.

11. That Google search performs a service integrated to that of libraries with which the user can access both from the same website.

That the use of programs with Artificial Intelligence be implanted so that students can have a support with which they can obtain reliable information, in addition to other resources with which to improve academic work.

It is only up to the researcher to analyze the facts corresponding to the research questions and to provide recommendations according to results. it is not appropriate to create possible scenarios or a strategic plan because this is inherent to each institution that benefits from the findings and not to the researcher.

Constraints

In this study, only the third- and fourth-year students of the University of Puerto Rico from the Mayagüez Campus were surveyed. The study could only be done in the western area. Students under the age of 21 could not be surveyed since they are minors.

Continuity proposal

A study is recommended in which the best tools and suggestions that can be suggested for implementation in the procedure that a library should have are known. In this way, students will be helped in improving their search for information as there are many technological changes at the moment, and children live with them from birth.

References

Badilla M., Cortada, M. & Riera, J. (2012). Internet navigation and information search strategies: how do children are influenced by their participation in an intensive ICT project. International *Journal of Technology & Design Education, 22*(4), 513-529. doi: 10.1007/s10798-011-9158-4

Berquist, R. M., Gledhill, K. M., Peterson, M. W., Doan, A. H., Baxter, G. T., Yopak, K. E., & ... Frank, L. R. (2012). The Digital Fish Library: Using MRI to Digitize, Database, and Document the Morphological Diversity of Fish. *Plus ONE, 7*(4), 1-16. doi:10.1371/journal.pone.0034499

Cervantes, J. (2009). Cómo fomentar el hábito de la lectura y la comprensión. Retrieved from https://www.scribd.com/document/338489527/Como-Fomentar-El-Habito-de-La-Lectura-y-La-Comprension-Lectora

Christine, L. (2014). Cloud Storage: Virtual Databases. *Young Scientists Journal,* (15), 39-41

Cordón, A. (2010). El fin del libro y el principio de la lectura: los libros electrónicos y el fenómeno Ipad. Retrieved from http://gredos.usal.es/jspui/bitstream/10366/83054/1/DBD_Cordon Garcia._Elfinaldellibro.pdf

Definición.DE.(2014). Definición de Interfaz. Retrieved from https://definicion.de/interfacz/

Jaeger, P. T., Bertot, J. C., Shuler, J. A., &McGilvray, J. (2012). A new frontier for LIS programs: E-government education, library/government partnerships, and the preparation of future information professionals. *Education For Information, 29*(1), 39-52.

Jiménez, A. (2015). El libro sigue siendo de papel Papel. Retrieved from http://www.elmundo.es/tecnologia/2015/04/23/5538ca01268e3e1b378b456d.html

Hernández, R. (1997). Breve teoría de Internet. Retrieved from http://www.analitica.com/archivo/vam1997.04/doc5.htm

Guevara, H. (2010). Integración Tecnológica del Profesor Universitario Desde la Teoría Social de Pierre Bourdieu. Retrieved from http://www.udgvirtual.udg.mx/apertura/index.php/apertura/article/view/133/136

King, S., Cataldi-Roberts, E., & Wentz, E. (2017). Meeting at the crossroads: collaboration between information technology departments and health sciences libraries. *Journal of The Medical Library Association, 105*(1), 27-33. doi:10.5195/jmla.2017.104

Mutula, S. (2016). Big Data Industry: Implication for the Library and Information Sciences. *African Journal of Library, Archives & Information Science, 26*(2), 93-96

Nelson, N., & Huffman, J. (2015). Predatory Journals in Library Databases: How Much Should We Worry? *SerialsLibrarian, 69*(2), 169-192. doi:10.1080/0361526X.2015.1080782

Kioskea. (2014). Encontrar fuentes de información confiables en Internet. Retrieved from file:///C:/Users/Tommy%20Soto/Downloads/encontrar-fuentes-de-informacion-confiables-en-internet-7029-lpolfz%20(4).pdf

Kuhlthau, C. (1991). Información, proceso de búsqueda. Retrieved from http://comminfo.rutgers.edu/~kuhlthau/information_search_process.htm

Otón, S. (2016). Interfaces de Realidad Virtual en Bibliotecas Digitales. Retrieved from file:///C:/Users/Tommy 20Soto/Downloads/Interfaces_de_Realidad_Virtual_en_Bibliotecas_Digi.pdf

Tîrziman, E. (2014).Elena Tîrziman, Patrimoniu documentar românesc prezent în baze de date europene. Contribuţia Bibliotecii Naţionale a României la biblioteca digitală „Manuscriptorium".Retrieved from https://revistatransilvania.ro/elena-tirziman-patrimoniu-documentar-romanesc-prezent-in-baze-de-date-europene-contributia-bibliotecii-nationale-a-romaniei-la-biblioteca-digitala-manuscriptorium/

Toteng, B., Hoskins, R., & Bell, F. (2013). Use of Electronic Databases by Law Students at the University of Botswana Library. *African Journal of Library, Archives & Information Science*, *23*(1), 59-74.

White, B. (2012). La función que desempeñan las bibliotecas para garantizar el acceso a los conocimientos. Retrieved from http://www.wipo.int/wipo_magazine/es/2012/04/article_0004.html

Yoon, H. (2016). User Acceptance of Mobile Library Applications in Academic Libraries: An Application of the Technology Acceptance Model. *Journal Of AcademicLibrarianship, 42*(6), 687-693. doi:10.1016/j.acalib.2016.08.003

Date delivered: 06/04/2019
Date reviewed: 20/05/2019
Date accepted: 12/11/2019