GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520
Issue 23 . No.3 2023

Mediations In The Social Utilization Of The Internet Among Cuban University Students In Information Sciences, Journalism, And Social Communication

Emily Y. Rodriguez & Jackson Q. Collins
1 Faculty of Physics, Lomonosov Moscow State University, Russia
2 School of Medicine, University of Khartoum, Sudan

ABSTRACT

The objective of this article is to investigate the main mediations that affect the process of social use of the Internet by students of the Faculty of Communication of the University of Havana, in the 2015-2016 academic year. The mediations that influence the processes of social uses that students of the Information Sciences, Social Communication and Journalism majors at the Faculty of Communication of the University of Havana make of the Internet were investigated. The mixed research approach was used based on the triangulation of quantitative and qualitative techniques such as the questionnaire and in-depth interview. The result was that students share common mediations: generational group, careers related to ICT, which is why they make intensive use of the Internet, fueled in part by the different technological subjects they receive. Most of them come from parents with high levels of education and most of them accessed the Internet for the first time when they entered the University, which was an important institutional mediation

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

in the use of the Internet. The main social uses that students make of the Internet are fundamentally academic and then socialization, among which the extensive use of social networks stands out. The university institution constitutes one of the most important mediating bodies that condition these processes by enabling access for all and the main competencies for social use in a conscious and critical manner.

Keywords: mediations; social uses of the Internet; information and communications technologies (ICT); University students; Cuba.

INTRODUCTION

In Cuban society, despite the difficulties in accessing the Internet, there has been a social and progressive use of it, particularly by young people. In the Faculty of Communication, where the careers of Information Sciences, Social Communication and Journalism are studied, the majority of students have devices for Internet access (tablets, smartphones, personal computers), which allow them to intensive and systematic use that goes beyond academic uses. However, all students do not use the Internet in the same way, due to the influence of different mediations that shape these processes.

This article shows those mediations that intervene in the process of social use of the Internet, as complex phenomena determined by various instances (individual, contextual and institutional) that can manifest themselves in a heterogeneous way according to the reference contexts of each individual. Knowing these mediations is relevant, since they can be taken into account in decision-making for the design of inclusive public policies in the midst of the computerization process that is developing in Cuba, and which is part of the development agenda towards the

society of information and knowledge, where access to the Internet constitutes one of the central pillars.

The guiding program for the computerization of Cuban society, approved in 2005, states that it is the process of orderly and massive use of ICT in daily life, to satisfy the needs of all spheres of society. In May 2015, the vice president of the Council of State and Ministers of Cuba, Miguel Díaz-Canel, raised at the closing of the I National Workshop on Informatization and Cybersecurity the will and disposition of the Cuban Government to develop the computerization of society and put the Internet at the service of everyone and achieve an effective and authentic insertion of Cubans in that space, in a short period. In this workshop, it was also agreed to develop the comprehensive policy for the improvement of the computerization of society in Cuba and its National Implementation Program. After these speeches, a greater deployment of technological infrastructure for Internet access in public places was observed in the country (wifi zones, more browsing rooms, among others), as well as the reduction of Internet connection rates by a from 4.50 CUC per hour to 2.00 CUC, which meant an increase in the number of users. Although since 2013 the Internet browsing service has been provided in the public rooms of ETECSA (Empresa de Telecomunicaciones SA) and in each Young Computer and Electronics Club, it is not until now that we can speak of a massive use of Internet in Cuba. [1] Given this scenario that the country is experiencing, this article considers that it is necessary to ask a series of questions: is there a social use of the Internet? What mediations influence this process?

Mediations, according to *Orozco* , [2] constitute moments that configure the interactions of users and that will influence the results of this process of interaction

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

with the media. Some of the most important mediations indicated are family, geographical context, neighborhood, social class, culture, school, work, skin color, religion, political orientation, gender and age. The same author suggests four groups of fundamental mediations for the study: individual, which comes from the recipient as prior conditions to socialization: belonging to a social class, race, age, gender and culture; situational mediation, which refers to the context in which the subject develops, the different situations that may arise in life and that mediate the way of acting; institutional mediation, which has to do with institutions such as family, school, friends, work, religion; and technological mediation, which is related to the Internet, the interactivity that characterizes it, active participation and construction of content in this space. Culture is an element present in all mediations.

The same author states that: "mediation is manifested through actions and discourse, but no singular action or particular meaning constitutes mediation as such. Mediation appears to be a more complex and diffuse structuring process, different from the sum of its components; it should not be understood as an object of observation, but as something similar to social class, which is inferred rather than seen. [2]

We agree with *Orozco* [2] when he states that the audience (user) has a multiple identity that intervenes in the processes of appropriation and use; Hence, by identifying and analyzing the mediations present in these processes, differences can be found that can mark certain digital (and social) gaps between one student and another. Uses and appropriations take place within structured contexts, characterized by power relations and differential access to available resources. The

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

model of the aforementioned author has served for the analysis of mediations from an empirical perspective based on the operationalization it offers, although authors such as *Vasallo de Lopes* [3] point out some criticism based on the fact that his proposal does not give the socioeconomic dimension the central role that it has in the formation of publics and in the determination of other mediating instances, by emphasizing microsocial mediations.

In *Alonso* 's opinion , [4] following authors such as *Fuentes Navarro* , [5] *Martin Barbero* , [6] *Sunkel* [7] and *Gámez* , [8] the complexity of social processes and the development of ICT, especially the Internet, have generated new approaches for the analysis of mediations that transcend theories of reception. In this way, emphasis is placed on the articulation between mediations, social agents and the provision of meaning, where subjects must be understood from their position in the social structure, that is, historically situated. With respect to social uses, *Gómez* [9] points out that: "not every object that is consumed is capable of generating a social use." He raises the need to take into account that social uses constitute a process that requires continuous practice, in which the subject interacts with technological media and with the content that is on the Internet. According to *Fuentes Navarro* , [5] social uses imply the capacity for appropriation, use and transformation of communication systems, constituted in turn by systems of transmission and processing of information and by socioculturally articulated systems of meaning.

Summarizing the main ideas about the social uses of the Internet, the aforementioned authors agree on the following elements:

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

- They are a set of routine actions generated by groups, individuals or social organizations.
- A need is satisfied through use.
- Technological resources are involved.
- They require access to and knowledge of technologies.
- They constitute a situational activity and also a sociocultural and symbolic process, endowed with meaning, and as such they can transform or serve as a tool for action and daily life.

BRIEF CHARACTERIZATION OF THE TECHNOLOGICAL CONTEXT OF THE FACULTY OF COMMUNICATION

At the Faculty of Communication of the University of Havana, three careers are studied: Information Sciences, Journalism and Social Communication. The first of the aforementioned careers trains "professionals capable of working in any organization that generates, possesses, accesses and uses information intensively (administrative and historical archives, consultancies, companies, publishing houses, libraries, information and documentation centers, teaching units, etc.)", [10] while Journalism trains professionals for performance in the mass media (printed press, digital, radio, television, information agencies), fundamentally, for which it produces informative content in its multiple and diverse expressions, in national and international news agencies, film institutions, editorial network entities; websites and other digital production environments. [11] The Social Communication degree trains professionals who can develop in different sectors such as political and mass organizations, community institutions, teaching and

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

research institutions, for-profit and non-profit entities, as well as in any mass media. [12]

According to the study plans of these careers, the intensive use of technologies and the Internet is essential for vocational training, since they constitute some of the transversal skills in school curricula. For example, in Information Sciences, students must have mastery of the appropriate technological tools to acquire, organize, retrieve, store and disseminate information; [10] in the case of Journalism, they must know how to manage, produce and socialize journalistic messages with the use of ICT; [11] and those of Social Communication must creatively use ICT and take on the challenges of scientific-technical development in the area of their activity at the national and international level. [12]

It is also highlighted that the Faculty of Communication has achieved that students have greater and better access to the Internet by recently being connected to a fiber optic cable, favoring the speed of the connection and has technological infrastructure such as computer laboratories. with machines in good condition, Wi-Fi antennas for those who want to connect from their laptop, smartphones or tablet. With this, it has been possible for teachers, during teaching activities, to help their students develop skills that contribute to better use of these new technologies.

This article shows the results of a research that had the purpose of investigating the main mediations that affect the process of social use of the Internet by students of the Faculty of Communication of the University of Havana, Cuba, in the course 2015-2016.

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

METHODS

The mixed approach was used based on the triangulation between qualitative techniques such as in-depth interviews and quantitative techniques such as the questionnaire, with the purpose of a more comprehensive and complete approach to the object of study. The questionnaire was initially applied to a total of 95 students from the three majors during the first semester of the 2015-2016 academic year. The sample constituted 30% of the total enrollment of second- to fourth-year students. It was selected casually based on the availability of the subjects to be part of the research. Criteria of representativeness were not considered, since an approach to the mediations that intervene in the social uses of a group of students was intended. The 2nd years were chosen. to 4th. because they had already taken several technological subjects, which would allow them a more systematic interaction with the Internet from the Faculty of Communication. The table shows the distribution by major of the number of students surveyed and its relationship with the population.

The fundamental variables and indicators that were measured in the questionnaire were the following:

- Sociodemographic characteristics of the students (sex, year and major the student is studying, province and municipality of residence, parents' level of education).
- First Internet access.
- Frequency and places of Internet access.
- Preferences in Internet uses.
- Social networks and Internet applications that they use the most.

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

- Ways by which students have learned to use the Internet.

Then, the in-depth interview was applied in its semi-structured modality (based on a flexible script) to five students from each major, for a total of 15 interviews, which were administered in the second semester of the 2015-2016 academic year, once processed. the questionnaires. This technique served to investigate qualitative aspects of the social use of the Internet, as support for the holistic understanding of the questions asked in the questionnaire, at the same time as allowing new questions to be asked. Some of the fundamental questions that guided the development of the interviews were: students' perception and assessment of Internet use; role given to the family, peer group, teachers, among others, as socialization agents (mediators) in the use of the Internet; and impact of Internet use on daily life routines.

An in-depth semi-structured interview was also applied to six teachers corresponding to the three careers under study, who teach technological subjects. These interviews allowed us to delve into the professional profile of each career, technological skills that students develop from the subjects they teach, and an evaluation system that could lead students to regularly use the Internet. This instrument allowed us to demonstrate how the different professional profiles and the subjects taught constitute mediations between students, which influence their social uses of the Internet.

RESULTS AND DISCUSSION

SOCIODEMOGRAPHIC CHARACTERIZATION OF THE STUDENT SAMPLE

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

As *Martin Barbero* [6] and *Orozco* state [2], sociodemographic characteristics constitute important individual, contextual and institutional mediations that influence the social uses of any technology. Based on these criteria, a sociodemographic characterization of the students was carried out.

As seen in the table, the major with the highest number of enrolled students is Social Communication, followed by Information Sciences and then Journalism. Regarding distribution by sex, there are no major differences between the races. In general, the female sex predominates and the trend is in the Social Sciences majors at the University of Havana. Of the total number of respondents, 78 are female and 17 are male. Regarding the provinces of residence, the majority of students are permanent residents of Havana, 71%; then the provinces of Artemisa and Matanzas represented 9% respectively, Mayabeque with 7% and the rest of Pinar del Río.

When investigating the educational levels of the parents, it was found that the majority had higher education education, which represented 75% of the total. In Journalism, the largest number of professional parents is evident, for 100% of the students surveyed in this career. It is followed by Information Sciences with 79% and then Social Communication with 69%. The results show that the students come from parents with high levels of education, which can enable them to have greater accumulated cultural capital, and therefore influence the uses of the Internet, although this is not decisive, since the professions of the students would have to be analyzed. parents, as well as their levels of literacy with ICT and the Internet and their socioeconomic levels, which can be conditioning variables.

USE AND ACCESS TO THE INTERNET

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

In relation to the first time of access, 62% of the students mentioned having had access to the Internet before entering the University; However, this does not indicate that they have had social use of the Internet, since it is necessary to have knowledge to know how to work with new technologies and use them systematically. This aspect was corroborated in interviews with some students, who stated that they had accessed it sporadically and without knowledge of what to do and what the Internet was for. Most of them accessed Facebook out of curiosity, mainly, which they were able to do from their parents' work and to a lesser extent from their homes. Figure 1 shows the percentages of students' first access.

As can be seen, the higher the level of education, the greater the access to the Internet. It should be noted that of the total number of students who accessed the Internet for the first time while in primary education, 4 of them are foreigners, for whom the infrastructural conditions of their countries made it possible for them to access the Internet from an early age in their homes and other spaces such as cyber cafes. It is evident how contextual mediations are present, because although more than half had accessed the Internet in previous education at the university level, only a few had access from their homes and from their parents' workplaces. It is important to highlight that the Internet connection in Cuba in the 90s and the first decade of the 2000s was quite limited, which influences the poor Internet access of students, especially in primary education.

These limitations are related to the economic and political blockade imposed by the United States government on Cuba since the beginning of the Revolution, which has marked restrictions on Internet access and the use of ICT on the island. As part of this blockade, access to telecommunications, hardware and

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

software from any US company or subsidiary is prohibited. Likewise, the purchase of technological equipment must be made through third countries, which makes the product, which is not always of good quality, more expensive. Due to blockade laws, any product, technology, etc. that has 10% or more "Made in USA" technology, cannot be imported to Cuba; Those who do so may incur million-dollar fines. The delay that the island has experienced with respect to Internet access is also related to the crisis known as the Special Period after the 90s with the fall of the socialist camp, which brought a series of deformations to the country's economy and, by losing its main economic partner, imposed that the Cuban Government attend to other more urgent sectors of the economy and social development, so aspects such as the renewal and expansion of the national telecommunications infrastructure, particularly fixed telephone networks, were left behind. and mobile, essential supports for data transport. Even today, as the country moves towards greater Internet access, infrastructure continues to be a limitation for the development of this task. [13]

Added to this is that Cuba was connected via satellite to the Internet in 1996 through a special license from the United States Department of Commerce, as an exception to legislation prohibiting the provision of services of commercial value to Cuban entities and citizens. In 2012, the first international fiber optic connection was declared operational through a cable laid with Venezuela. According to data from the National Office of Statistics and Information (ONEI), in 2014 about 74% of the Cuban population had not had direct or frequent contact with the Internet, which confirms the update in 2015 of the development index of ICT (IDT), where Cuba ranked 129 out of 167 countries, and obtained positions 160 and 134 in the

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

access and use indicators respectively. In contrast to these figures, this same index places the country in position 58 in the skills subindex; This is thanks to a series of programs of the Revolution, such as the Young Computer and Electronics Clubs, which since the 1980s have contributed to the socialization and computerization of Cuban society. [1]

Continuing with the analysis of the mediations, another contextual mediation is observed that conditions access to the Internet, and that is that of the total number of students who accessed it before entering the University, 83% resided in Havana, which, being the capital of the The country has greater infrastructural resources and possibilities of access at an early age. In relation to the rest of the provinces of residence of the students, only 5.5% accessed from Matanzas and Pinar del Río with the same percentage. It is evident how the geographical context mediates access to the Internet, where only in the provincial capitals has it been possible for students to access education prior to the University.

Another mediation that has influenced in a certain way Internet access prior to University is the family. This is corroborated with the data obtained from the questionnaire, since of the 18 students who had their first access in primary school, 94% of the parents are university students, while of those who accessed for the first time upon entering the University, 43 % of parents have higher education. Although this data is not decisive, the results provide some clues regarding family mediations that allow us to infer a directly proportional relationship between the level of education of the parents and the age of the students' first access to the Internet. These inferences can be corroborated with other data collected in the research, since in 94% of the students who heard about

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

the Internet for the first time in their family, their parents are university students, and of them, 36% have the possibility of access from their homes.

38% of the students declared that they had their first access when they entered higher education at the Faculty of Communication (Fig. 1), which constitutes an important mediating instance regarding this possibility, a fundamental requirement that allows the use of the Internet. , as it shows the opening of opportunities for browsing the Internet to those who previously could not do so. This institution has the necessary technological infrastructure for this, where all students obtain a free account to access the Internet without distinction of economic level, and if they do not have the necessary devices, they can go to the laboratories of computing that the Faculty has.

FREQUENCY AND ACCESS PLACES

The frequency of Internet access can be mediated by the places from which students access, the place of residence and the educational level of the parents (elements that are interrelated). The research showed that those who access it every day are those students who mostly have university parents and reside in Havana, and constitute the highest percentage with access from their homes or from their parents' work compared to those who do not have access. possibility of connecting seven days a week because they depend on other mediating bodies such as the Faculty, or going to other places such as Wifi_ETECSA points [*], which currently constitutes one of the spaces that allows greater access to Cubans who have the technological and economic resources to access this service. Figure 2 shows the frequency of students' Internet access.

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

Those who claimed to connect every day constitute the Faculty of Communication, the main mediating body that allows access, since of them, 91% claim that daily connection is possible through the Faculty. It is also notable that of these students who connect daily, 72% access from Wifi_ETECSA. Here their purchasing power is implicitly reflected. 41% of this group say they also connect from their parents' work, while only 34% can access it from home; although some comment that access from home is quite slow, which is mediated by the Cuban technological context and the socioeconomic restrictions imposed by the blockade that the United States maintains on the Island, a condition that also largely determines that greater access of the students is from the Faculty.

Regarding the sociodemographic characteristics of this group of students who claim to connect to the Internet every day, 75% are residents of Havana. White skin prevails 85% and it is the students of the Information Sciences major who access it most frequently, mainly from the Faculty.

In relation to the group of students who usually connect two or more times a week, which represents the majority, 53%, 96% do so from the Faculty, 61% from Wifi_ETECSA and 24% from home. The majority is from Havana and represents 73%. 85% of these students have parents with higher levels of education. As for the major, Information Sciences is the one with the most access.

Those who claimed to connect once a week, which is the minority for 12% of the total number of respondents, 100% claimed to use the Internet offered by the Faculty. In this group, it is observed that the majority also reside in Havana, 58%, although a decrease in the percentage is evident in relation to the groups analyzed previously, while in inverse proportion, residents of the rest of the provinces They

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

see more represented in this group of students, with 42%. Furthermore, in this last group analyzed there is also an increase in the number of parents who do not have higher levels of education, representing 34%. In general, it can be seen that as the frequency of Internet access increases, the places from which students access it diversify, and they do so not only from the Faculty, but also from Wifi_ETECSA, from their homes and from work. His parents.

The data presented show how the geographical context is an important reference mediation when analyzing Internet access, which not only conditions the first access, but also the frequency with which it is accessed. It can be considered that the most important reference mediation for the analysis of the first access to the Internet is the context of geographical origin of the students, due to the low technological and connectivity capacity that non-capital municipalities have presented in the country. It can be stated that for this group, the Faculty of Communication constitutes a fundamental mediation, and is practically the only real possibility of access.

When analyzing the access places, some differences by career are observed. Figure 3 shows that the career that most accesses from the Faculty and Wifi_ETECSA is Information Sciences, then Journalism and Social Communication in that order, while Journalism students who can access from their homes and the work of his parents, many of them journalists.

SOCIAL USES OF THE INTERNET

When investigating the usual uses that students give to the Internet, it was found that they first use it for academic purposes, followed by the purpose of

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

socialization through interaction on social networks, the use of email and chat. These uses coincide with various studies, including that of *López* , [14] carried out in Mexico, on students at the National Autonomous University of Mexico (UNAM). The author shows that the main uses of the Internet are related to socialization purposes, followed by academic purposes. Figure 4 shows the uses of the students of the Faculty of Communication.

The fact that the most common use of the Internet is for academic purposes may be conditioned by the fact that the majority access it from the Faculty, where they must optimize their Internet quotas and the time spent in the institution to complete school tasks, in addition to There is an intention in the different curricula to make systematic use of the Internet as a transversal competence of professional profiles. Teachers are essential mediators by systematically guiding school work, where Internet consultation is mandatory. However, the individual analysis by major produced results that indicate that the specialty of study is also a fundamental mediation for the social use of the Internet.

In the case of Information Sciences, 100% of the students surveyed said they regularly use the Internet for questions related to their study. This use is mediated by several factors: the fact that the majority access from the Faculty of Communication, where 83% constitute the main connection route; The place of residence is another of the mediating factors, since of the three majors it is the one with the largest number of respondents from provinces other than Havana, which is why it is easier for them to access it from the university, as commented in interviews. Furthermore, according to some students and professors of said career,

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

in accordance with their professional profile, the academic works that they are oriented to are less related to socialization, since they are more linked to the search for scientific content, as well as to the management of information in this space.

In the Journalism degree, although the majority of students used the Internet for school uses, which represented 90%, a 10% difference was observed in relation to Information Sciences, while in Social Communication it was found the lowest percentage in relation to this use, which was 77%. In the Journalism and Social Communication majors there are common elements that can constitute mediations in the use of the Internet, since in them students have greater possibilities of access from their homes. In Journalism 32% and in Social Communication 28%. Another element that they share is that their professional profiles revolve more around socialization and participation in Internet social networks, as expressed in interviews by several professors of said careers, who commented that the Internet is essential for the creation of content and for being actors. publics, as well as to develop communication strategies on social networks, where *online* interaction is an essential requirement.

Email is one of the most common uses by students, representing 82%. This high percentage has been influenced by the Faculty of Communication, which offers students from the first year of their degree the possibility of having their own institutional email account. Furthermore, with Internet access, many of them have created email accounts mainly in Gmail, Yahoo and Hotmail, where 92% of those surveyed stated they have one of these accounts. Of them, 84% reported having opened these accounts only upon entering the University.

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

One of the least used uses of the Internet is participation in forums, which implies interacting with the media, creating content and also constitutes a challenge in the face of greater cognitive and technological requirements. The low percentages in this use, according to the students, are mediated by the low quality of connection, the restrictions that exist in Cuba and in the Faculty to access some sites, their low motivation, the fact that said participation is not oriented as a requirement in classes and the majority's lack of knowledge about how to participate in them and which ones to participate in, reasons that were expressed by the students in interviews. It should be noted that in terms of this social use of the Internet, slight differences are observed between the three majors, since Information Sciences students are the ones who mostly participate in forums, with 14%, followed by Journalism with 10%. and Social Communication with 7%.

In relation to the use of blogs, where only seven students claimed to have one, some differences by major are also evident. Of them, four students are from Journalism, two from Information Sciences and only one from Social Communication. Here it is evident how the career and professional profile constitutes an institutional mediation, since this is a way for future journalist students to practice their profession, and as several professors of this specialty point out, the basic function of a journalist is to create content. for everyday public work, so they are not only information managers, but participation managers, and the use of blogs can contribute to this.

Figure 4 also shows that the least uses of the Internet by students are downloading music, applications, videos and games (frequent uses by young Mexicans, as previously noted), and they allude to the fact that due to the connectivity

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

conditions in The Faculty and the country in general find these uses difficult. The fact that students use the Internet less for leisure and entertainment purposes responds to contextual mediations and limitations in the quality of connection, speed and time they can remain connected. Although the connection at the Faculty has greatly improved by being connected to a fiber optic cable, each student is given a fee ** monthly Internet access that increases progressively depending on the year, so they must be careful and manage it for matters of greatest need, such as completing academic work. It is also interesting that the least common uses are those that require more speed and connection time. It must also be taken into account that the time in which they can remain in the Faculty is only during teaching hours (until 6:00 pm).

The importance of contextual mediations when analyzing the social uses that young people make of the Internet is fundamental. To cite an example, the study by Mexican women *López* and *Ortiz* [15] based on a systematization of the results of various investigations in Mexico on the social use of the Internet by young people, shows that habitual uses are largely associated with related activities. with entertainment (leisure forums, listening to music, *online* audiovisuals). However, in the Cuban context, where connectivity is limited and of low quality, greater interaction on the Internet for recreational purposes is an obstacle for students, in particular staying *online* for a long time to listen to music or watch videos. The most common thing is that students download some short songs and videos, as expressed in interviews. These contextual limitations also affect the social networks most used by students, as well as the applications for communication on the Internet, which marks some differences compared to the results obtained by the

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

Mexican research of *López* , [14] *López* and *Ortiz* [15] and *Crovi* and *López* , [16] who point out that young Mexicans tend to regularly use applications such as What's app (which has come to be positioned in first place along with Facebook), Viber, FaceTime and Skype, which allows communications of text, voice and video over the Internet, and that in Cuba these last two applications do not work, which is why they were not identified by the Cuban students surveyed. As alternatives to these applications, in Cuba an application called IMO has been increasingly used due to the proliferation of Wi-Fi zones, which allows video calling services, *online* calls and an instant messaging network for mobile devices, which allows them to communication with family and friends living abroad. This has made it one of the most used applications on the island, together with the low connection speed it needs to work. According to *Oramas* , [1]The word "IMO" was one of the most used in Cuba in 2015, as well as other associated words "Verse por IMO", "Imotearse". However, it should be clarified that the use of this application by the students surveyed is only possible through access to the Wi-Fi zones, since its use is not possible at the Faculty as it is blocked. The differences in the social uses of the Internet noted above once again demonstrate that the geographical context from which these uses are analyzed is key to their study. Figure 5 shows those social networks and applications most used by the students surveyed from the Faculty of Communication.

Facebook is the preferred social network, followed by Twitter, with a visible difference of 43%. Apparently, these networks are the most popular among young people, as evidenced by the aforementioned studies

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

by *López* y *Ortiz* , [15] *Crovi* and *López* , [16] and that of *Oramas* [1] in Cuba, in which these networks stand out as the two first most used. Regarding the use of scientific and academic social networks, low participation percentages were generally observed among students, who mentioned only two networks: LinkedIn and Academia.edu. Those in Information Sciences are the ones that predominate in them, although there are not many differences with the rest of the majors.

Among the fundamental reasons for using these professional networks are sharing information, following the academic career of professionals of interest, acquiring visibility from their Abstracts and, to a lesser extent, making comments. Regarding these uses, the year that the students are in turned out to be an institutional mediation, since an increase in participation in these networks was observed to the extent that the school grade increases. For example, 2nd year students. year of Journalism, only one student reported having a LinkedIn profile and using it to create and share scientific information and to chat with professionals; Between the third and fourth year of that degree, 26% participate in these networks to create and share scientific information.

In general, the little use of these networks responds in part, according to the students, to the fact that they are not frequently mentioned in classes and it is not a requirement to create a profile in them; Unlike Facebook and Twitter, networks in which it is mandatory to have a profile created according to the guidelines of teachers who teach technological subjects to support teaching, which constitute a fundamental element to acquire certain skills in managing networks. as well as for the analysis of information and public opinion that is generated in these spaces, according to the professors interviewed. This demonstrates, once again, the

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

importance of the university institution as a mediator in students' use of the Internet. As has been explained, there are diverse uses that students make of the Internet and the skills they have acquired from subjects received, friends, family, etc. Figure 6 shows the ways in which they have learned to interact on the Internet.

As can be seen, the majority of students claim to have learned to use the Internet through self-taught and through the help of friends, classmates, and family. However, these learning paths refer to the direct or non-direct accompaniment of a person for the rather instrumental and technical use of the Internet, such as how to connect, open an email account, a profile on social networks, do searches, etc., that many have found it necessary, based on the technological context in which they live, to spend time on their technological literacy, sometimes by way of trial and error. It should be noted that few students make their parents visible as the people who have most influenced their learning regarding the Internet, and that although they have sometimes provided them with access, in practice they have few competencies for their children's literacy, therefore that the most important influence is reflected in their friends, in addition to the fact that the greatest possibility of access to the Internet is through the Faculty, where they are within reach. It is noted that the highest percentage of students who have learned to use the Internet self-taught is in the Journalism major, which at the same time coincides with the major that showed the highest percentages of students with the Internet at home and at work for their parents. , at the same time that it concentrates the largest number of students who had their first

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

access before entering the University, data that provides some clues for the analysis of mediations.

On the other hand, it is important to highlight that, although a lower percentage of students mentioned teachers in learning their technological skills, they all reported that thanks to the subjects received and the teachers' efforts they have been able to make better use of Internet, by using it critically and as support for solving problems in their daily lives, so it can be inferred that it is from entering the University that students have achieved social use of the Internet.

However, it cannot be omitted to mention that the processes of social use of the Internet are complex phenomena, mediated by a technological context that increasingly tends towards interactivity, interoperability and collaboration, essential characteristics of web 2.0, where Social subjects can act as both consumers and creators of content. Meanwhile, this complexity can be evidenced in the fact that at certain times and contexts the same subject or user can be a passive or active consumer, as some of the interviewees mentioned. The results of this research coincide with those of the study by *López* and *Ortiz* , [15] who showed the existence of a dichotomy between technology consumer and content producer, since both can occupy these roles alternatively and with different degrees of interest. In the same way, those who share and create more serious content can also do so with somewhat more frivolous content. The authors maintain that each network user is at the same time the same subject with several nuances that allow them to go from the anecdotal to the analytical, from the simple to the complex.

CONCLUSIONS

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

After the analysis presented on the social uses of the Internet by the students of the Faculty of Communication, the following most important mediations that influence these processes stand out:

- Institutional mediation, where the Faculty of Communication has had great influence as the most important mediating body, not only because it has provided them with free access to the Internet, but also because it has made them literate for its social use. In this sense, it was explained how the majority of students begin to have systematic and frequent use once they enter said institution. Its importance is also visible in those students who had their first access to the Internet through university. Although the school institution has been important in these processes, it cannot be ignored that students come from different geographical and family contexts; They present different starting points that condition the assimilation of the contents, competencies and skills made possible by the university institution through its school curriculum. Starting from this point, a close relationship was observed between family mediation (as institutional mediation) and contextual mediations, which refers to the geographical context of the students, which influences access (primary condition for Internet uses). As explained, the greater the frequency of access, the more places of connection, which are represented in these groups, mainly those students permanently residing in Havana who have parents with higher levels of education, while as the frequency decreases In access, students residing from other provinces increase; It reduces the diversification of places for connection and also the educational levels of parents. It was also found that the majority of students who connect from Wifi_ETECSA are residents of the capital and have parents with higher levels of education; In this way, higher

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

socioeconomic levels of their parents are inferred. Likewise, geographical selectivity was also evident when investigating the students' first time accessing the Internet. Once again, those who reside in Havana with professional parents and who entered before entering university are more represented.

- The country context is another of the contextual mediations that was common for all students, where the majority referred to the connection conditions in Cuba, the speed, the restrictions for access to various sites conditioned by the blockade that the United States has imposed. to the country, which constitutes an obstacle to interactivity on the Internet, such as participation in forums, listening to music, watching movies, playing *online* games, participating in *online* courses and making large downloads, etc. which largely restricts the uses that students can make of the Internet, while drawing a distinction between the uses of these students and those of other countries.

In general, all these mediations are conditions that structure the social use of the Internet, but they do not act mechanically, but in a flexible and dynamic way. The particularities by major in terms of social uses do not harbor major differences, since the selected sample has common features as it is made up of (young) university students, and it has been seen in different studies how belonging to this age group or generation, called Many times as digital natives, they share elements of a digital culture that increasingly tends towards globalization (or homogeneity) in terms of the uses given to the Internet and their ways of participating in the network.

At the same time, students share another common mediation of an institutional nature and that is that they pursue careers where the use of technologies constitutes

a transversal competence of their professional profiles. However, slight differences are evident between the three careers, mainly mediated by the professional profile; the subjects received that show their particularities depending on the degree; the individual capabilities and motivations that are also reflected in the social uses that young people give to the Internet.

Authors' contribution

- María Karla Cárdenas Berrio (designed the study, analyzed the data and wrote part of the first version of the manuscript).
- Daniela Paret (collected the data through questionnaires and interviews, analyzed the data and wrote part of the first version of the manuscript).
- Raúl Campos Posada (was involved in the process and statistical analysis of the data, as well as the contribution of comparative data about research in Mexico and wrote part of the first version of the manuscript).
- Gloria Elisa Campos Posada (was involved in the statistical analysis of the data and its comparison with Mexican studies).

All authors reviewed the writing of the manuscript and approved the version finally submitted.

Conflict of interests

The authors declare that there is no conflict of interest in this article.

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

REFERENCES

1. Oramas S. looking for a signal. About the social uses of the WIFI-ETECSA network made by users who access it from Parque de 51 in the Havana municipality of La Lisa thesis]. Havana: Faculty of Communication, University of Havana, Cuba; 2015.

2. Orozco G. Towards a dialectic of television reception: the structuring of strategies by viewers. Rev Com Polit Am Lat. 1993;22,23,24,25:107-28.

3. Vassal of Lopes MI. Reception of media, classes, power and structure. Theoretical-methodological issues of qualitative research of the mass media audience. Rev Com Soc. 1995;24:85-96.

4. Alonso MM. Mediation and construction of meanings: notes on their theoretical-methodological articulation in the study of Internet appropriation. Social mediations. Rev Ci Soc Comunic. 2010;6:3-37 cited Jan 23, 2016]. Available at: http://www.revistas.ucm.es

5. Fuentes Navarro R. The emergence of the internet in the field of Communication studies. In: Fuentes Navarro R. (comp.): Education and Telematics. Bogotá: Latin American Encyclopedia of Socioculture and Communication. Norma Publishing Group; 2000. p. 23-44.

6. Martín Barbero J. Clues to glimpse means and mediations. Preface to the fifth edition of: From media to mediations. Bogotá: Andrés Bello Agreement. 2003 cited January 15, 2016]. Available at: http://www.scribd.com/doc/7868146/Pistas-para-entrever-medios-y-mediaciones-Prefacio-a-la-V-edicion-DMM

7. Sunkel G. Another look. Culture from consumption. In: Mato D (ed.). Studies and other Latin American intellectual practices in culture and power. Caracas:

CLACSO, Latin American Council of Social Sciences. 2002 cited January 15, 2016]. Available at: http://bibliotecavirtual.clacso.org.ar/ar/libros/cultura/sunkel.doc

8. Gámez Torres N. The paradigm of mediation: criticism and perspectives. Social Mediations. Rev Ci Soc Comunic. 2007;1:195-213 cited April 13, 2016]. Available at: http://www.ucm.es/info/mediars

9. Gómez C. Is the Internet a space for the construction of indigenous multiculturalism? A perspective based on the theses of the strategies and tactics of *Michel de Certeau* . In: Symposium on multiculturalism. XV Congress of Philosophy. In: Philosophical Association of Mexico, AC; 2010.

10. Curriculum D of the Information Sciences career. Havana: Ministry of Higher Education; 2008.

11. Curriculum D of the Journalism degree. Havana: Ministry of Higher Education; 2008.

12. Curriculum D of the Social Communication degree. Havana: Ministry of Higher Education; 2008.

13. Recio M. The time of the disconnected. Evaluation of the design of the "social access" Internet policy in Cuba in a context of changes. Havana: Coursework; 2013 cited February 25, 2016] Available at: http://biblioteca.clacso.edu.ar/becas/20131219083409/Recio_trabajo_final.pdf

14. López R. Access, use and appropriation of information and communication technologies (ICT) in UNAM university students. In: X National Congress of Educational Research. Mexico City: 2007 cited February 25, 2016]. Available

at: http://www.comie.org.mx/congreso/memoriaelectronica/v10/pdf/...tematica_14/.../0505-Fp

15. López R, Ortiz G. Expression, interaction and social activism: towards the construction of digital scenarios among Mexican youth. In: COPANAM 2013. Córdoba, Argentina: 2013 cited January 23, 2016]. Available at: http://wwwpanam2013.eci.unc.edu.ar

16. Crovi D, López R. The imprint of digital technologies in the daily lives of university students. In: Hinojosa Córdova L (coord.). Education, science and culture. Introspective looks at university communities in Mexico . Spain: Social Communication; 2012. p. 11-44 cited February 25, 2016]. Available at: http://www.uv.mx/personal/albramirez/files/2014/02/literacidad_reid.pdf

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

Integration Of Mobile Devices In Physiotherapy Practices

Ava N. Palmer & Logan G. Baker
1 Department of Chemical Engineering, Seoul National University, South Korea
2 Faculty of Agriculture, American University of Beirut, Lebanon

ABSTRACT

The objective of the present review was to identify the current use of mobile applications in physiotherapy. An integrative review of literature developed in four databases was carried out, without language restriction, in an observation window from 2010 to June 2016, where a total of 46 articles were found that address the topic of mobile applications in physiotherapy. , of which —according to the purpose of the articles— 8 were of a descriptive conceptual type, 1 of financial analysis, 14 of valuation, 3 of monitoring and 20 of intervention. Regarding the use of applications in the articles, 6 on healthy habits, 3 informative, 15 on assessment, 4 on treatment and 13 on specific applications were identified. There were also 4 review articles found. It is concluded that there are various uses of mobile applications for physiotherapy. Together, these can increase access to health services, facilitate health promotion and detect specific deficiencies early; support the examination and evaluate different aspects, especially ranges of mobility, as well as the evaluation of gait and balance, which can facilitate therapeutic action and optimize the physical therapist's clinical practice.

Keywords: physiotherapy; mobile apps; cellphones; telemedicine.

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

INTRODUCTION

Currently, there are a variety of technological devices that promote the continuous improvement of the population's health. When these devices are mobile, their use in health is called *mobile heatlh* or *mHealth* . *The Global Observatory for eHealth* (GOe) defines " *mHealth* or mobile health, as the practice of medical and public health supported by mobile devices, such as mobile phones, *smartphones* , user/patient monitoring devices, personal digital assistant (PDA) , and other wireless devices. *mHealth* includes the use of the core functions of mobile phones such as voice and text messaging (SMS), more complex functions and applications including general packet radio service (GPRS), third and fourth generations mobile telecommunications (3G and 4G systems), global positioning system (GPS) and *bluetooth technology*". [1]

Mobile health applications can be directed to heterogeneous audiences that include patients and health professionals and even people without a diagnosis. [2] Their easy access and rapid growth in number has generated a wide variety of options. Currently, the market has more than 100,000 health-related mobile applications on the largest operating systems on the market: *Apple* and *Android* . [3]

It has been pointed out that these technologies make it possible to advance research, prevent diseases, improve diagnosis, treatment and education, reduce inequalities, increase access to health services, and even reduce their costs. [4] Furthermore, mobile applications facilitate communication with the user/patient, and have shown promising and more economical results in the clinical setting, since they shorten distances and avoid unnecessary efforts in the vulnerable population. [4,5] According to these developments, which demonstrate

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

frequent use; [6,7] easy access associated with health; [8] the availability [9-11] and the opportunity of health services, [1,6,12] mobile health applications can provide tools to physiotherapists and provide opportunities to maintain, enhance and optimize human body movement in search of greater well-being.

Although in Latin America mobile applications constitute an underutilized resource in the health area, professionals in this sector, and mainly physiotherapists, must direct their efforts towards a new digital era, where professionals and experts in mobile technology work together to carry out research with mobile applications in favor of users/patients. The creation and use of mobile applications must respond to the specific conditions of each person and provide the possibility of evaluating the cost-benefit of the use of the application to enhance care by all health professionals, in this case of physiotherapists.

A challenge for physiotherapy is then to project itself into the digital era using information and communication technologies in order to minimize risks and facilitate adherence to rehabilitation programs. The present study aims to compile and analyze research experiences with mobile applications in order to provide an overview of possible fields of application and possible research of mobile applications in physiotherapy.

METHODS

An integrative review of the literature was carried out, which followed the criteria proposed by *Ganong* , [13] in a process composed of six stages: 1) formulation of the problem based on a guiding question, 2) definition of selection criteria for the literature that will form part of the sample, 3) incorporation of the information

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

collected in table format considering all the common characteristics, 4) analysis of the findings, 5) interpretation of the results 6) presentation of the results.

The selected question was: For what purpose are mobile applications currently being used in physiotherapy? To answer this question, the databases PEDro (Evidence-Based Physiotherapy), Proquest, Pubmed and ScienceDirect were analyzed, under license from the University of La Sabana. Regarding the types of articles included, original research, literature reviews, and reflections were selected, as long as they were found in indexed journals and available in full text for review and analysis, taking into account a window of observation of the years 2010 to 2016.

The search in the databases was carried out in the period from March to June 2016, using the formulas *Physiotherapy* AND *Mobile app* , *Physiotherapy* AND *mhealth* and *Physiotherapy* AND *Smartphone* . An exception was made in PEDro, where the words *mhealth* , *Smartphone* and *mobile app* were searched separately, since the formulas initially proposed did not yield results.

The data was collected in three moments: in the first, a count of the articles that appeared after the search in controlled language in the aforementioned databases was carried out; During the second moment, the titles and abstracts were read, excluding duplicates and selecting the articles that would be included in the data collection log. The inclusion criterion was that the application mentioned in the analyzed study was part of the results or their analysis; and in the third moment, data collected from reading the included articles were organized and tabulated through a log prepared by the authors, which included two categories for the

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

analysis of the articles. These categories are not exclusive and are proposed as a result of a prior search of literature on the topic. The first category sought to identify the purpose of the article regarding the application and was based on the categorization proposed by *Lee* and *Harada* in 2013. [5,14] The second category referred to the use of the application within the article, and allowed classifying the studies according to the categorization found in the article by *MT Sánchez Rodríguez* and [15] others for applications in neurorehabilitation. In the present review, the classification was applied in a general way to determine the use of the application in the study carried out (Table 1).

Based on the information organized in the aforementioned log, the analysis was carried out looking for similarities, complements and differences of the topics related to the phenomenon studied. Based on the critical analysis of the findings, the documents were grouped in an integrative way to interpret, from them, the state of the art on the phenomenon studied and, finally, the results were written, seeking to make them easily understandable to generate this review.

.

RESULTS

After searching in controlled language in the different databases, a total of 728 articles were identified. When reading the titles and summaries, 124 texts were accepted for detailed review, which, when read in their entirety, allowed us to identify 46 articles that were incorporated into the log (table 2) when it was found that the mobile application detailed in the Abstract made part of the results or their analysis (Fig. 1).

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

PURPOSE OF THE STUDY

Within this category, it was found that 8 texts focused on delving into conceptual or descriptive aspects of the mobile application: 1 article addressed a financial analysis of the development and use of the application; 14 studies showed applications with functions for the detection, examination or evaluation of health condition; 15 articles proposed mobile applications for the intervention of pathologies or referenced their use in rehabilitation processes; and only 1 text referred to applications that had patient monitoring as their functionality (Fig. 2).

Conceptual-descriptive

The articles classified in this subcategory provide an overview of mobile applications in health and their use in physiotherapy. [5] 8 articles were identified, of which 4 were systematic reviews of the literature. They addressed topics such as palliative care in cancer, how to measure the level of physical activity, mobile applications in the area of neurorehabilitation and their usefulness in general medical care regarding chronic pain management, avoiding the risk of falls, among others. . For example, in the study *Measuring and Influencing Physical Activity with Smartphone Technology: A Systematic Review*, by *Bort-Roig* et al., [16] articles on mobile applications that promoted physical activity were identified. It was concluded that the keys for an application to facilitate regular physical activity are the creation of physical activity profiles, real-time feedback, encouraging the use of social networks, enabling consultation with experts and having clear the

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

objectives and goals within physical activity. Furthermore, it was identified that the pedometer is the most common external device for monitoring physical activity.

Financial sphere

Articles related to this subcategory describe the economic impact of applications on the health system; for example, in services such as clinical visits, home nursing, among others. [5] Only one study of this type was identified and it was a literature review about mobile applications for asthma self-care in terms of adherence to treatment and identification of symptoms. It was concluded that there is a significant difference between the use of a mobile application and the use of an intervention using handwritten records in a control group in terms of treatment adherence and other asthma complications. Furthermore, it was estimated that frequent use of a mobile application has positive effects on the values of forced expiratory flow (PEFR) and forced expiratory volume in the first second (FEV_1) compared to those of the control group. However, the mobile application-based intervention had a higher cost associated with the use of written records. One possible explanation given by the authors was the study design. [17]

On the other hand, the identification of a single article within this subcategory responds to what was previously identified by *Lee* and *Harada* , [13] who recommend increasing research that makes evident the reduction in costs and effectiveness of telehealth services in physiotherapy, since these aspects They are identified as a barrier to the inclusion of information and communication technologies in physiotherapy practice.

Detection, examination and assessment

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

Most of the articles in this subcategory set out to determine the reliability and validity of measurements using a mobile application in a population group or in comparison with a traditional method. [5] A large number of articles found were classified in this subcategory and one of the possible explanations is the need for health professionals, especially physiotherapists, to reduce assistance times and improve the effectiveness of evaluations. [18] Within this subcategory, applications were found for measuring ranges of motion (goniometers) of the neck, shoulder, hip and knee; gait measurement applications; standardization of tests such as the *Romberg test* ; measuring scoliosis levels, and more complex ones such as fall detectors. A clear example is the study by *Balg* , *Juteau* and *Theoret* , [19] with the title *Validity and Reliability of the iPhone to Measure Rib Hump in Scoliosis,* where a mobile application was compared with a traditional scoliometer. The results showed insignificant differences between both methods and highlighted the ease of use of the application.

Monitoring

Studies in this subcategory describe the use of mobile technologies in a patient during a given time interval. [5] Three studies were identified within this subcategory. *The study by Smith* stands out , who in 2014 conducted a qualitative study of the perception of adolescents who were monitored after the management of their obesity using text messages. [20] However, it should be noted that monitoring was present, in many of the articles, in the background. An example is the study by *Turner-McGrievy , Beets* and *Moore,* [21] with the title *Comparison of traditional versus mobile app self-monitoring of physical activity and dietary intake among overweight adults participating in an mHealth weight loss program,* where it was

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

found that the use Mobile applications that collect information about daily calories ingested are important when you want to lose weight with physical activity.

Mobile applications in intervention processes

The studies on this subcategory were the most numerous and were characterized by focusing on measuring the effectiveness or efficiency of an application for a group of people with a specific health condition. From a total of 15 articles, applications were found for the management of diabetes and weight control, asthma, chronic obstructive pulmonary disease, Parkinson's and metabolic syndrome, which incorporate recommendations for physical activity and therapeutic exercise. A study of three case reports about family dysautonomia and balance training with a mobile application stands out. The results showed improvement in static and dynamic balance for those who trained at least twice a week. [22]

USE OF THE APP

With respect to this category, 6 healthy habits type applications were found, 2 informative type applications, 14 assessment type applications, 1 treatment type application and 10 specific type applications. Additionally, there were 4 articles where the category did not apply as they were literature reviews (Fig. 3).

Healthy habits

Within this subcategory, 6 applications were found that promoted physical activity. Some examples are the *Fitbit*, [23] *Zombies , Run and Get Running* [24] and *Accupedo-Pro Pedometer* [25] (available on Android and iOS). Some of these used external devices such as pedometers.

Informative

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

In relation to this subcategory, only 3 studies were identified where the applications had the purpose of informing. Highlights an application called *iCanCope with Pain* , which is used to manage chronic pain in adolescents. The program stood out by the participants as a tool that allowed access to relevant information such as ways to control symptoms and guidance in social support in a healthy context for the population. [26]

Assessment

The largest number of applications appears in this subcategory. It is important to mention some, such as *the Knee Goniometer App* by Ockendon© [27] for measuring the range of joint mobility in the knee, which replaces the traditional goniometer, and the *Breath 10 Count group of applications* [28] for measuring respiratory rate in children.

Treatment

This subcategory included those applications that generally contribute to the treatment of any pathology. Only 4 applications were identified where one called G *ymskill* [29] stands out for improving fitness and proprioception.

Specific

Here 13 articles were found with applications for pathologies already mentioned in the category "purpose of the study " (intervention). It is worth noting applications such as *Reactive app,* [30] for obesity; *Versterk je Enkel* , [31] for the prevention of sprains; *Cupid app,* [32] for gait management in patients with Parkinson's, and *ActiveLifestyle*, to promote physical activity in older adults. [33]

CONCLUSIONS

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

The use of mobile devices is increasing, which means that their use in physiotherapy treatment allows us to change the view of the interaction of physiotherapy from an episodic model to a model of continuous support, where applications include specificity in aspects such as therapeutic exercise. , as well as elements that promote health promotion and prevention of diseases and their complications. In the case of applications with informational purposes, these must be conceived as elements of empowerment of people regarding the functioning of their health system and access to it.

The literature reports various uses of mobile applications for physiotherapy. In general, it was found that regarding the purpose of the articles that are currently published using mobile applications in health, the majority of developments are aimed at the detection, examination and evaluation of different aspects of human body movement, such as ranges of mobility, gait and balance, which show these tools as more objective alternatives to traditional methods in physiotherapy. The above has an impact on an improvement in the capacity for early diagnosis and the search for training of professionals. It also invites us to explore new fields of action where the physiotherapist can be included in the teams that together with the developers create applications for evaluation purposes. [34] However, the small number of articles referring to cost-benefit analysis stands out, which give the possibility of identifying the effectiveness of incorporating applications to reduce the long-term costs of problems such as sedentary lifestyle and non-adherence to treatments. .

Regarding the use of applications in the articles, the number of applications found for the promotion of physical activity and healthy lifestyles stands out. *Mauro*

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

Martín and others identified that there is a difference between the applications used by users and those used by professionals, so many of the results cannot be extrapolated. [35] However, they conclude that mobile applications are effective in generating adherence and greater monitoring of activities related to the promotion of healthy habits in general, treatment and monitoring in specific pathologies.

Conflict of interests

The authors declare that there is no conflict of interest in this article.

REFERENCES

1. World Health Organization. mHealth: new horizons for health through mobile technologies: Based on the findings of the second global survey on eHealth (Global Observatory for eHealth Series, 2011 cited March 25, 2017]3. Available at: http://www.who. int/goe/publications/goe_mhealth_web.pdf

2. Fiordelli M, Diviani N, Schulz PJ. Mapping mHealth research: a decade of evolution. J Med. 2013;15(5):e95.

3. mHealth App Developer Economics. The state of the art of mHealth app publishing. Berlin, Germany: Research2guidance website. 2014 cited August 21, 2015]. Available at: http://research2guidance.com/r2g/research2guidance-mHealth-App-Developer-Economics-2014.pdf

4. Doswell WM, Braxter B, Dabbs AD, Nilsen W, Klem ML. mHealth: Technology for nursing practice, education and research. J Nurs Educ Pract. 2013;3(10):99.

5. Lee ACW, Harada ND. Telerehabilitation as a Means of Health-Care Delivery. In: Kumar S, Cohn RE, editors. Telerehabilitation. London: Springer London; 2013 cited August 21, 2015]. p. 79-89. Available at: http://dx.doi.org/10.1007/978-1-4471-4198-3_6

6. Dicianno B, Parmanto B, Fairman A. Perspectives on the evolution of mobile (mHealth) technologies and applications to rehabilitation. Phys Ther. 2015;95(3):397-405.

7. Conroy DE, Yang C, Maher JP. Behavior change techniques in top-ranked mobile apps for physical activity. Am J Prev Med. 2014;46(6):649-52.

8. Xu W, Liu Y. mHealth apps: a repository and database of mobile health apps. JMIR mHealth and uHealth. 2015 cited March 25, 2017];3(1):e28. Available at: http://mhealth.jmir.org/2015/1/e28/

9. Ministry of Information and Communication Technologies. Colombia: figures for the fourth quarter of 2015. Quarterly ICT Bulletin. 2015 cited March 25, 2017]. Available at: http://colombiatic.mintic.gov.co/602/w3-article-15179.html

10. Mobile Colombia. Updated Forecasts and Key Growth Trends. Colombia: eMarketer report; 2016 cited March 25, 2017]. Available at: https://www.emarketer.com/Report/Mobile-Colombia-2016-Updated-Forecasts-Key-Growth-Trends/2001863

11. Valenzuela JI, Camacho JC, Argüello A, Cendales JG, Fajardo R. Perceptions of health sector workers regarding the Internet and mobile technologies in Colombia. Rev Panam Public Health. 2009;25(4):367-74.

12. Institute of Electrical and Electronics Engineers. Applying smartphone apps to drive greater patient engagement in personalized physiotherapy. New York:

International Symposium on Medical Measurements and Applications (MeMeA); 2014.

13. Ganong LH. Integrative reviews of nursing research. Res Nurs Health. 1987;10(1):1-11.

14. Lee ACW, Harada N. Telehealth as a means of health care delivery for physical therapist practice. Phys Ther. 2012;92(3):463-8.

15. Sánchez Rodríguez MT, Collado Vázquez S, Martín Casas P, Cano de la Cuerda R. Neurorehabilitation and apps: A systematic review of mobile applications. Neurology. 2015 December 17, 2015]. Available at: http://dx.doi.org/10.1016/j.nrl.2015.10.005 16. Bort-Roig J, Gilson N, Puig-Ribera A, Contreras R. Measuring and influencing physical activity with smartphone technology: a systematic review. Sports Med. 2014;44(5):671-86.

17. Marcano Belisario JS, Huckvale K, Greenfield G, Car J, Gunn LH. Smartphone and tablet self-management apps for asthma. C ochrane Database of Systematic Reviews; 2013, Issue 11. Art. No.: CD010013. DOI: 10.1002/14651858.CD010013.pub2.

18. Russell T. Goniometry via the internet. Austr J Physioth. 2007;53(2):136.

19. Balg F, Juteau M, Theoret C, Svotelis A, Grenier G. Validity and Reliability of the iPhone to Measure Rib Hump in Scoliosis. J Pediatr Orthop. 2014;34:774-9.

20. Smith KL, Kerr DA, Fenner AA, Straker LM. Adolescents just do not know what they want: a qualitative study to describe obese adolescents' experiences of

text messaging to support behavior change maintenance postintervention. J Med Internet Res. 2014;16(4):e103.

21. Turner-McGrievy GM, Beets MW, Moore JB, Kaczynski AT, Barr-Anderson DJ, Tate DF. Comparison of traditional *versus* mobile app self-monitoring of physical activity and dietary intake among overweight adults participating in an mHealth weight loss program. J Am Med Inform Assoc. 2013;20(3):513-8.

22. Gefen R, Dunsky A, Hutzler Y. Balance training using an iPhone application in people with familial dysautonomia: three case reports. Phys Ther. 2015;95(3):380-8.

23. Cadmus-Bertram LA, Marcus BH, Patterson RE, Parker BA, Morey BL. Randomized trial of a Fitbit-based physical activity intervention for women. Am J Prev Med. 2015;49(3):414-8.

24. Direito A, Jiang Y, Whittaker R, Maddison R. Apps for IMproving FITness and increasing physical activity among young people: The AIMFIT pragmatic randomized controlled trial. J Med Internet Res. 2015;17(8):e210.

25. Glynn LG, Hayes PS, Casey M, Glynn F, Álvarez-Iglesias A, Newell J, et al. Effectiveness of a smartphone application to promote physical activity in primary care: the SMART MOVE randomized controlled trial. Br J Gen Pract. 2014;64(624):e384-91.

26. Stinson JN, Lalloo C, Harris L. iCanCope with Pain™: User-centered design of a web- and mobile-based self-management program for youth with chronic pain based on identified health care needs. Pain Res Manag. 2014;19:257-65.

27. Milanese S, Gordon S, Buettner P, Flavell C, Ruston S, Coe D, et al. Reliability and concurrent validity of knee angle measurement: smart phone app versus

universal goniometer used by experienced and novice clinicians. Man Ther. 2014;19(6):569-74.

28. Black J, Gerdtz M, Nicholson P, Crellin D, Browning L, Simpson J. Can simple mobile phone applications provide reliable counts of respiratory rates in sick infants and children? An initial evaluation of three new applications. Int J Nurs Stud. 2015;52(5):963-9.

29. Kranz M, MöLler A, Hammerla N, Diewald S, PlöTz T, Olivier P. The mobile fitness coach: Towards individualized skill assessment using personalized mobile devices. Perv Mob Comput. 2013;9(2):203-15.

30. O'Malley G, Dowdall G, Burls A, Perry IJ, Curran N. Exploring the usability of a mobile app for adolescent obesity management. JMIR mHealth and uHealth. 2014;2(2):e29.

31. Vriend I, Coehoorn I, Verhagen E. Implementation of an app-based neuromuscular training program to prevent ankle sprains: a process evaluation using the RE-AIM Framework. Br J Sports Med. 2015;49(7):484-8.

32. Ginis P, Nieuwboer A, Dorfman M, Ferrari A, Gazit E, Canning CG. Feasibility and effects of home-based smartphone-delivered automated feedback training for gait in people with Parkinson's disease: A pilot randomized controlled trial. Parkinsonism Relat Disord. 2016;22:28-34.

33. van Het Reve E, Silveira P, Daniel F, Casati F, de Bruin ED. Tablet-based strength-balance training to motivate and improve adherence to exercise in independently living older people: part 2 of a phase II preclinical exploratory trial. J Med Internet Res. 2014;16(6):e159.

ISSN : 1533-1520

GARDEN JOURNALS

Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics

Association Between Smartphone And Facebook Use With Self-Perceived Academic Performance In Medical Students From Peru

Andrea M. Costa,

Institute of Geology, University of Buenos Aires, Argentina

ABSTRACT

The study had the objective of determining the association between the use of *Smartphone* and Facebook with the self-perception of academic performance in students of a Faculty of Human Medicine in the Peruvian mountains. A prospective analytical cross-sectional study was carried out. We worked with medical students from the Continental University in Huancayo-Peru and used a survey to measure the use of *Smartphones* and Facebook, as well as the perception of whether these improved academic performance. Bi- and multivariate statistics were performed, using generalized linear models and with a value of $p < 0.05$ as statistically significant. 173 students were surveyed, 61% (106) were women and the median age was 21 years (interquartile range: 19-22 years). 76% (131) stated that the *Smartphone* improved their academic performance. This was positively related in the bivariate analysis to the number of *Smartphones* , whether it had training applications and whether it used medical applications; and negatively with hours used the *Smartphone* per week, if you have internet on the *Smartphone* , if you use internet on the *Smartphone* , the frequency of using Facebook, the frequency in which you wrote on Facebook profiles and the number of contacts on Facebook (all with p values < 0.05). In the adjusted multivariate, the average hours spent

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

using the *Smartphone* per week was negatively associated with the perception of improved academic performance (PRa: 0.98; 95% CI: 0.97-0.99). The more hours of *smartphone* use per week, the students perceive that this worsens their academic performance. This should be studied to quantify the real decrease in academic performance.

Keywords: smartphone; medical students, medical education; Facebook; learning.

INTRODUCTION

In recent years, technology has made tools available to students to help their academic training, such as mass communication technological devices and storage. The most common are cell phones and electronic tablets, among others. The increased frequency of use of mobile computing devices on university campuses has the potential to create new options for medical students, as well as the exploration of social media as a teaching strategy, [1,2] which It allows students to access course content and interact with teachers and classmates wherever they are. [3] These interactions are made even more accessible through the use of so-called social networks, which allow communication and improvement of learning. [4]

Some scientific reports have focused only on evaluating the effectiveness of the application of these tools for academic teaching. [5] However, it has been seen that higher education students are not immune to developing dependency and misuse of social networks through their *smartphones* . [6] This dependency is often associated with mental health problems such as depression, anxiety and self-esteem, in addition to insomnia problems, poor socialization and the loss of a large amount of

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

academic time. [7-9] Added to these problems is the possibility that technology becomes a distraction, which could impact students' academic performance. Despite this, no studies have been found that explore this problem; That is why the objective of our study was to determine the association between the use of *Smartphone* and Facebook according to the self-perception of academic performance in students of a Faculty of Human Medicine in the Peruvian mountains.

METHODS

An observational, analytical, cross-sectional and prospective study was carried out. The population was made up of students enrolled in the 2015-II academic semester of the Faculty of Medicine of the Continental University, located in the city of Huancayo-Peru. The sampling was stratified random based on the data obtained in a previous research work. [10] With this, a minimum sample size of 150 students was calculated. For randomization, the Epidat program was used according to the list of those enrolled in the aforementioned semester.

Students who were eligible to complete the survey and who were enrolled in a Medicine degree during the study period were included. Students who responded with abnormal response patterns, students who did not answer the main questions, and students who did not have a *Smartphone* (less than 5% survey exclusion) were excluded.

Our dependent variable was the perception of whether the *Smartphone* improves academic performance (possible answers: Yes/No). The independent variables were age (taken quantitatively), sex (possible answers:

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

male/female), *Smartphone* use variables (number of *Smartphone* owned, average hours spent using the *Smartphone* per week, whether it has applications for academic training, if it stores academic information, if it has medical applications, if it uses said medical applications, years that it has been using the *Smartphone* , if it has internet on the *Smartphone* and if it regularly uses the *Smartphone* 's internet) and the variables about the use of Facebook (if you have more than one Facebook account, the frequency of use, if you use Facebook for academic purposes, the frequency with which you write on other profiles and the number of contacts you have).

According to these variables, a self-administered survey was created. After proceeding with the formal authorizations for data collection, the surveys were carried out during in-person class time in the classrooms of the Faculty of Human Medicine of the Continental University. A researcher was present during its completion, to be able to answer any questions. The data obtained were tabulated in the Microsoft Excel 2010 ® program, and then processed in the statistical program Stata version 11.1®.

For the descriptive analysis, the absolute and relative frequencies of the categorical variables were determined. In addition, the medians and interquartile ranges were obtained, since they all had a non-normal distribution according to the evaluation of the normality of the numerical data with the Shapiro Wilk statistical test.

For the inferential analysis, a confidence level of 95% was used. *In the bivariate statistics, p* values and crude prevalence ratios—PRc (with their respective 95% confidence interval -95% CI)—were obtained using generalized linear models. *In the multivariate statistics, the p* values and the adjusted prevalence ratios were

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

obtained —PRa (with its respective 95% confidence interval -95% CI); In both cases it was performed with the Poisson family plus the log link function. *A* *p* value < 0.05 was considered statistically significant.

Ethical parameters were respected at all times. The surveys were anonymous, the respective permission was requested and approval was obtained from the university's Research Methodology chair, since the study was presented as a practical result of the course in question.

RESULTS

After applying the selection criteria, 173 students were surveyed. Of these, 61.3% (106) were women; the median age was 21 years (interquartile range: 19-22 years). The vast majority (71.7%) only had a *Smartphone*. Almost all of the respondents (92.5%) stated that they used their *Smartphone* several times a day and only 36.4% had applications for medical training. The characteristics of *Smartphone* use are detailed in Table 1 .

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

Tabla 1. Características del uso de *Smartphone* de los estudiantes de Medicina encuestados en la serranía peruana

Variable	n	%
Cuántos *Smartphone* tiene		
Uno	124	71,7
Dos	49	28,3
Frecuencia de uso		
Varias veces al día	160	92,5
Una o dos veces al día	6	3,4
Dos a tres veces a la semana	7	4,1
Horas promedio que usa el *Smartphone* por semana*	15	5-35
Cuenta con aplicaciones para capacitación académica		
Sí	63	36,4
No	110	63,6
Almacena información académica en el *Smartphone*		
Sí	13	7,5
No	160	92,5
Tiene aplicaciones médicas en su *Smartphone*		
Sí	98	56,7
No	75	43,3
Usa aplicaciones académicas en su *Smartphone*		
Sí	69	39,9
No	104	60,1
Años que lleva usando el *Smartphone*		
Uno	48	27,7
Dos	35	20,2
Tres	48	27,7
Cuatro	28	16,2
Cinco	7	4,1
Seis	7	4,1
Tiene internet permanente en el *Smartphone*		
Sí	126	72,8
No	47	27,2
Usa regularmente internet en el *Smartphone*		
Sí	153	88,5
No	20	11,6

*Mediana y rango intercuartílico.

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

All of the students surveyed who had a *Smartphone* also had a Facebook account. Most used Facebook once (43.9%) or more than once (40.4%) per day; and only 27.8% used it for academic purposes. The main characteristics of the use of Facebook are seen in table 2 .

Tabla 2. Características del uso del Facebook de los estudiantes de Medicina encuestados en la serranía peruana

Variable	n	%
Más de una cuenta Facebook		
Sí	27	15,6
No	146	84,4
Frecuencia de uso Facebook		
Más de una vez al día	70	40,4
Una vez al día	76	43,9
Más de una vez a la semana	20	11,6
Una vez a la semana	7	4,1
Usa el Facebook con fines académicos		
Sí	48	27,8
No	125	72,2
Frecuencia en la que se escribe en perfiles Facebook		
Más de una vez al día	21	12,1
Una vez al día	34	19,7
Más de una vez a la semana	21	12,1
Una vez a la semana	21	12,1
Menos de una vez por semana	76	44
Número aproximado de contactos en Facebook*	500	200-750

*Mediana y rango intercuartílico.

75.7% had the perception of improved academic performance thanks to the use of the *Smartphone* (table 3). When carrying out a bivariate analysis, it was found that the perception of good academic performance was positively associated with the number of *Smartphones* you have, whether you have applications for academic training and whether you use medical applications on your *Smartphone* ; On the

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

other hand, it was negatively associated with the average hours that you use the *Smartphone* per week, if you have permanent internet on the *Smartphone* , if you regularly use the Internet on the *Smartphone* , the frequency of using Facebook, the frequency in which you write on Facebook profiles and the approximate number of Facebook contacts. In the multivariate analysis that was carried out with the factors statistically associated in the bivariate analysis, the average hours spent using the *Smartphone* per week was negatively associated with the perception of improved academic performance (aPR: 0.98; 95% CI: 0 .97-0.99).

DISCUSSION

The present research explores the overall impact of technology on the academic performance and development of students in general, and it is found that it can affect both positively and negatively. In this study we have found that three out of four students perceived that the use of their *Smartphones* improved their academic performance, which contradicts a study in which it was reported that the use of social networks brought difficulties in academic development, mainly due to the time they dedicated to it. [11] This may respond to the fact that the populations and questions of interest were different (ours was focused on the general use of the *Smartphone*), so in general this technological tool can offer the perception of benefit, but when only the The use of social networks focuses on part of the range of options that come with the use of these smartphones.

Likewise, in this study we have found that there is a negative association between the number of hours the Smartphone is used and the perception of improvement in

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

academic performance. These data agree with a study carried out on 173 medical students in Ecuador, in which a direct relationship was found between the time spent using cell phones and having worse academic performance; [12] Likewise, another study from the same country, carried out on adolescents, also found a relationship between the number of hours of smartphone use and the number of academic problems. [13] In the United States, high school students were surveyed, and a higher prevalence of mental health problems was found according to the use of smartphones. [14] This relationship has been explained by *Lei* and *Zhao* , who report that the use of technology can be harmful if it is not oriented towards a greater objective, such as improving the academic condition of the user, so the quality of the technology is more important. content compared to the amount of time you use the technology. [15] For example, in a study carried out on Psychology students at a university in the United States, the researchers noticed that when using cell phones as a means of academic information, students who had ringtones had better note-taking and retention performance. much less information than students who had their phones on silent. [16]

According to the frequency with which they wrote on Facebook profiles and the number of contacts they had on it, they had a negative relationship with the improvement of academic performance; However, these associations lost their statistical significance when adjusted for other variables (in the multivariate analysis). This coincides with the study carried out by *Kolek* and *Saunders* , who found a null association between the use of Facebook and the content of the profiles of this social network with the perception of good academic performance; [17] Likewise, a study conducted by *Pasek* , with a large sample of

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

North American students, did not find a relationship between Facebook use and academic performance. [18] This should be studied with more varied populations and other variables (these and other variables had results close to the cut-off point for statistical significance, so studies should be carried out in larger populations and from different origins), since there are some reports that do They find that the use of Facebook is associated with poor academic performance. [19]

Likewise, it has been found that three out of ten of the students surveyed use Facebook for academic purposes; that is, a minority. This agrees with a study on university students where the content of their Facebook accounts was analyzed, in which there was a much smaller percentage of student accounts in which academic and university information was found, and the majority of the content was of the type recreational and personal information. [18] This must be evaluated and improved from academic areas and in courses related to the topic of information in health sciences, since currently social networks, technology and communications are important pieces for teaching and training, [20, 21] as long as there are adequately trained teachers [22] and who have adequate knowledge of the use of information sources. [23]

One of the limitations of this study is that the perception of academic performance was not compared with the final grades of the courses; However, a measurement of academic performance based on the student's own perception is a method that encompasses the many determinants involved in academic performance, which include emotional aspects and strategies considered appropriate. [24] This measure has been used in many other studies. [25.26]

We conclude that the number of hours spent using the *Smartphone* is negatively associated with the perception of good academic performance among Medical students studying at a university in the Peruvian mountains. We recommend that more studies be carried out, multicenter, and that they measure a greater number of variables related to this topic.

Thanks

We thank the students Narcia M. Dolorier, William A. Gonzalo, Luis Y. Huamán, Raisa N. Iparraguirre, Renzo R. Vega and Karen Villanueva, from the School of Human Medicine of the Continental University in Huancayo-Peru, for the contribution in data collection.

Author contributions

All authors participated equally in the design of the study, analysis and interpretation of data, writing and revising the manuscript, and approving the final version.

Conflict of interests

Christian R. Mejia and Salder D. Flores belong to the institution where the work was carried out, but this did not influence the results or other part of the article. The other authors declare that there is no conflict of interest in this article.

REFERENCES

1. Cavus N, Ibrahim D. m-Learning: An experiment in using SMS to support learning new English language words. Br J Educ Technol. 2009;40(1):78-91.

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

2. Day-Black C, Merrill EB. Using Mobile Devices in Nursing Education. ABNF J Assoc Black Nurs Fac High Educ Inc. 2015;26(4):78-84.

3. Gikas J, Grant MM. Mobile computing devices in higher education: Student perspectives on learning with cellphones, *Smartphone* & social media. Int High Educ 2013;19:18-26.

4. Rodríguez JE. Social Media Use in Higher Education: Key areas to consider for educators. J Onl Learn Teach. 2011;7(4):539-50.

5. Wu WH, Jim Wu YC, Chen CY, Kao HY, Lin CH, Huang SH. Review of trends from mobile learning studies: A meta-analysis. Comput Educ. 2012;59(2):817-27.

6. Salas Campos I, Umaña Mata AC. Analysis of the debate on the effect of technological means on learning processes. Rev Electr Act Investig Educ. 2011;11(1):1-22.

7. Farooqi H, Patel H, Aslam HM, Ansari IQ, Khan M, Iqbal N, et al. Effect of Facebook on the life of Medical University students. Int Arch Med. 2013;6(1):40.

8. Koc M, Gulyagci S. Facebook addiction among Turkish college students: the role of psychological health, demographic and usage characteristics. Cyberpsychol Behav Soc Netw. 2013;16(4):279-84. 9. Masters K. Social Networking Addiction among Health Sciences Students in Oman. Sultan Qaboos Univ Med J. 2015;15(3):e357-63. 10. Mejía CR, Valladares-Garrido MJ, Luyo-Rivas A, Valladares-Garrido D, Talledo-Ulfe L, Vilela-Estrada MA, et al. Factors associated with the regular use of information sources in medical students from four cities in

Peru. Rev Peru Med Exp Salud Publ. 2015;32(2):230-6. 11. Mejía Núñez R, Bautista Jacobo A. The habit of social networks in medical students. Bol Clín Hosp Infant Sonora State. 2014;31(1):19-25. 12. Maldonado Daza FP, Peñaherrera Yépez DP. Relationship between excessive use of the cell phone (*Smartphone*) with the level of anxiety, academic performance and degree of personal satisfaction in students of the Faculty of Medicine of the PUCE Thesis]. Quito, Ecuador: Pontifical Catholic University of Ecuador. Faculty of Human Medicine; 2014. 13. Salazar Paredes MT. Internet social networks and their impact on the academic performance of students in the tenth year of basic education at the Indoamérica minor school, in the city of Ambato, in the period 2011-2012 Thesis]. Ambato, Ecuador: Technical University of Ambato. Faculty of Psychology; 2013. 14. Lepp A, Barkley JE, Karpinski AC. The relationship between cell phone use, academic performance, anxiety and Satisfaction with Life in college students. Comput Hum Behav. 2014;31:343-50. 15. Lei J, Zhao Y. Technology uses and student achievement: A longitudinal study. Comput Educ. 2007;49(16. End CM, Worthman S, Mathews MB, Wetterau K. Costly Cell Phones: The Impact of Cell Phone Rings on Academic Performance. Teach Psychol. 2009;37(1):55-7.

16 Kolek EA, Saunders D. Online Disclosure: An Empirical Examination of Undergraduate Facebook Profiles. NASPA J. 2008;45(1):1-25.

17. Pasek J, More E, Hargittai E. Facebook and academic performance: Reconciling a media sensation with data. 2009 cited April 25, 2016];14(5). Available at: http://ojs-prod-lib.cc.uic.edu/ojs/index.php/fm/article/view/2498

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

18. Kirschner PA, Karpinski AC. Facebook® and academic performance. Comput Hum Behav. 2010;26(6):1237-45.

19. Mejia CR, Herrera CZ, Enríquez WF, Vargas M, Cárdenas MM, Oliva GJ, Quezada MA, Chacón JI, Pérez-Uceda G, Curioso WH. Use of smartphones and applications for self-training and telemedicine in Peruvian doctors. Rev Cubana Informac Cienc Salud. 2016;27(3):286-97.

20. Gomero R, Murguía L, Calizaya L, Mejia CR, Garay J. Information technology and adherence to clinical practice guidelines at the primary care level: private experience, 2013-2014. Horiz Med. 2016;16(4):20-4.

21. Pereyra-Elías R, Huaccho-Rojas JJ, Taype-Roldan A, Mejia CR, Mayta-Tristán P. Publication and associated factors in university professors of scientific research in medical schools in Peru. Rev Per Med Exp Salud Publ. 2014;31(3):424-30.

22. Mejia CR, Cáceres OJ, Vera CA, Nizama-Vía A, Curioso WH, Mayta-Tristán P, et al. Use of information sources in recently graduated doctors from Lima. Rev Peru Med Exp Salud Publ. 2014;31(4):716-20.

23. Oliva Mella P, Narváez CG. Perception of academic performance in dental students. Educ Méd Sup. 2013;27(1):86-91. 24. De La Fuente Arias J, Martínez Vicente JM, Peralta Sánchez FJ, García Berbén AB. Perception of the teaching-learning process and academic performance in different instructional contexts of

1. .

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

Comprehensive Methodology For Auditing Information And Knowledge Within Organizations

Sofia H. Vasquez,
School of Business, University of Santiago, Chile

ABSTRACT

This work presents an integrative methodology for information and knowledge (I+C) auditing for organizations, made up of seven stages with a hybrid approach, aimed at reviewing the I+C management strategy and policy, identifying, inventorying and map these resources and their flows, as well as assess the processes associated with their management. It integrates the diagnosis and evaluation of R&C management jointly; It allows its planning and execution with a lower expenditure of resources and brings additional benefits to the team of auditors and their preparation prior to the execution of the audit, by having a methodology and a unique and flexible instrument, which can adapt to the specific characteristics of any organization **.**

Keywords: Information and knowledge (I+C) audit; information management; knowledge management; diagnosis and evaluation of I+C.

INTRODUCTION

Information audits (IA) appeared in 1987 and were linked to Library and Information Sciences. Starting in 2000, they focused on evaluating information management (IG) policies and automated systems in the business field. In the last five years, they have moved towards network-based systems and machine learning

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

in educational and business environments. Its leading authors come from China, the United States, Great Britain and Spain. [1]

These audits provide a greater understanding of organizations and their capabilities, [2] focus on explicit assets, and identify whether there is redundancy, duplication, inconsistency and incompatibility in the GI system. [3] They evaluate the informational competencies of their members [4] and the quality and use of information services in a web environment, [5] in addition to the generation, protection and management capabilities of intellectual capital, [6] and identify the barriers that prevent the exchange of information and knowledge. [7]

Knowledge audits (CA) appeared in 1994 and were also linked to Library and Information Sciences at the beginning. Starting in 2000, they focused on measuring intellectual capital in the government sector and in academic institutions. In the last five years, eight new approaches have appeared, aimed at analyzing how knowledge is developed and protected as a function of organizational learning, and their leading authors come from China, the United Kingdom, the United States, Bulgaria and Australia. [8] Its definition is emerging as an important diagnostic tool to evaluate the behavior of processes linked to knowledge within a professional group or in an organization, and determines how it is exchanged and transferred, what its typology and topology is, and how it is appreciated and valued. Both audits are generally applied when organizations are unaware of how information and knowledge management (I&C) processes behave; where these resources are located internally and in their environment to preserve, share and reuse them. Furthermore, when performance indicators decrease or when there is a

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

tendency not to socialize them. Its results benefit both the organization and its members.

In both topics, works dedicated to the critical analysis of the most recognized methodologies have been published and there is a wide range of case studies. After analyzing 13 AI and 14 CA methodological proposals, it was found that both processes have similarities and differences. Among the great similarities is the tendency to carry out audits with hybrid approaches that undertake actions that converge towards common objectives such as: evaluating the state of information management (IG) and knowledge management (KM) and the establishment of a comprehensive policy that promote the culture of learning and professional development, examine the systems designed to manage these resources, as well as propose redesigns in management policies and evaluate whether the strategies for IG and KM correspond to the requirements of key processes and promote the generation of knowledge. [9]

Among other objectives, both audits identify and represent internal and external information flows and networks of knowledge and experts; They evaluate the effective use of the organization's R&C resources as a competitive advantage and whether the information services satisfy the current needs of its members; They assess the costs and benefits of these resources and analyze how the processes of creation, acquisition, retention, distribution, transfer and reuse of I&C occur. While the main differences are given by their approach, since some analyze the processes, others the resources, and others the strategies. In addition, there are those that have a hybrid approach that covers more than one of the previous directions.

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

Among the most significant methodological approaches of AI, taking into consideration the level of application in various contexts and case studies, the depth in the description of the stages, the techniques and instruments used and because they are more flexible and comprehensive, are those of *Orna* and *Villardefrancos Álvarez* , the methodologies of *Soy Iaumatell* , *Buchanan* and *Gibb* , *Henczel and the González-Guitián* procedure . [10-15] In the case of AC there are the methodologies of *Burnett* and others, that of *Cheung* and others, that of *Pérez Soltero* and others, the method of *Jurinjak* & *Klicek* , and the models of *Hylton* and *Ganasan* and *Dominic* . [16-21]

In the literature on these topics, methodologies are not reported that allow evaluating the state of R&C management jointly. [22] The scientific literature, experience and accumulated knowledge on AI is approximately thirty years old, but there is still no universally accepted methodology to carry it out. [23] For their part, QA methodologies and their field of application vary widely in the literature and, despite the development achieved by KM, there is still no globally accepted procedure for evaluating systems designed to manage knowledge. [24] Furthermore, despite the popularity and importance of KM and its diagnosis for an organization, there is still no generic definition or model to carry out initiatives of this type, the first step of which is the audit. [24]

Although the two processes have similarities, there is no procedure that integrates both audits into one, but rather several methodologies, models and approaches appear. Hence, there is sufficient objective evidence on the feasibility and convenience of carrying out the design of a practical, flexible and well-founded methodology that includes the best and most widespread practices, through which

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

I&C audits can be carried out jointly. and that provides the tools, instruments and models necessary for its execution. In this sense, the work presented aims to design an integrative information and knowledge audit methodology for organizations. This study was part of a broader investigation that formed the doctoral thesis of one of the authors, defended at the Faculty of Communication and Documentation of the University of Granada, Spain.

METHODS

Analysis-synthesis was used to examine the AI and AC processes as a whole and independently for each of its stages and components, and their relationships were detected; the historical-logical to check the evolution of these themes and their behavior chronologically; that of induction-deduction to conceive the proposal of a methodology that integrates both audits, taking as reference the main similarities and differences of the preceding methodological approaches; the systemic-structural to address the processes involved in these issues, with a comprehensive overview and, at the same time, its components and relationships, with a systemic approach. In addition, documentary analysis to locate theoretical and conceptual references in the various sources of information available.

RESULTS

CHARACTERISTICS OF THE METHODOLOGY

- It has a logical sequence of the structure and interrelation of the aspects that make it up.

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

- It can be applied to the universe of organizations in a specific sector or adapted to others (business, scientific, academic, research, non-profit and public, among others), and incorporate modifications and adjustments in the stages and actions, which makes it contextualizable.
- It can cover the organization as a whole, an area or a process and is aimed at evaluating resources, strategies and R&C management processes; that is, it has a hybrid character.
- Its application implies the participation of the members of the organization from the beginning to the end of the audit and promotes a reflective process about what people do, how they do it, what results they obtain, what the search, selection, and analysis skills are. and evaluation of R&C and what role is assumed in the construction of new knowledge.
- Its application benefits the organization and its members; hence its retributive nature.
- Ensures systematic control and surveillance to improve the I&C management system, and benefits feedback, through recurring audits.
- It must be understood within the philosophy of continuous improvement, since it generates in the organization a capacity for permanent change in R&C management.
- It has a formative nature, since during its application collaborative attitudes, professional skills are manifested and autonomy and critical reflection are developed.

STAGES OF THE INTEGRATIVE METHODOLOGY OF THE R&C AUDIT

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

The methodology consists of seven stages (Fig.), each of which has its objective defined, the actions that comprise it, the tasks to carry them out, the techniques to use and the partial results to achieve.

Stage 1. Organizational analysis

Objective: Form the audit team, know the strategic aspects of the organization and its position in relation to GI and CG.

Techniques to use: Document analysis, surveys, exploratory interviews, informal meetings (personal and group) and participatory observation.

Results: Report on the analysis of strategic documentation; report with the deficiencies detected in the strategy and policy related to R&C and, if none exist, recommendations will be prepared that will form part of the final report. Document with detailed description of the equipment.

Actions:

1. Form the team and familiarize it with the organization. They can be internal or external auditors but, due to the complexity of the process, it is advisable to use a multidisciplinary team.

Main functions: Conduct interviews, determine the elements of analysis, process the information collected and responsibly assume the code of ethics or the internal regulations of the organization .

2. Perform organizational strategic analysis (top-down); characterize the organization and define its type, mission, objectives and goals; hierarchical and geographical structure (specify processes, functions, activities, interrelationships and forms of coordination and control); review and select key processes to detect

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

where improvement in I&C management levels is required; analyze the R&C management policy and strategy and determine the scope, content and updating.

Stage 2: Planning the I&C audit

Objective: Plan the audit and motivate workers.

Techniques: Document analysis, surveys, exploratory interviews, informal meetings (personal and group) and participatory observation.

Results: Document with the audit planning, the schedule by stages, the distribution of team tasks and the techniques and instruments to be used in the process.

Actions:

1. Define objectives, scope, time and resources for the audit, the behavior of the GI and GC processes, the analysis of corporate policy and culture, the identification and representation of I&C resources, the behavior of its flows, as well as the accessibility, availability and valuation of resources based on the organization's key processes and tasks.

2. Review the results of previous audits to take into account the deficiencies and recommendations previously noted and check if they were resolved.

3. Adapt the instrument and questionnaires to be used in the interviews.

Characteristics of the instrument: It contains semi-structured questions with different measurement scales concerning the qualities of the I&C resources accessed, taking into account how they impact organizational performance. It analyzes general aspects of the respondents, followed by 19 statements about organizational issues. The different types of I&C resources are included below so that you can indicate which ones are required in daily performance and which are the most used. In addition, how often they are identified or located, acquired or

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

captured, created and developed, shared and distributed, retained or preserved and used. Below it contains statements related to each strategic R&C management process and respondents evaluate them as efficient or effective. Seven qualities of the resources are then reflected to evaluate them on a scale of (unimportant, important and very important) and an assessment is also requested, depending on whether they add value to the organization's products and services and their productivity, efficiency and effectiveness. The last group of statements aims to know how I&C flows behave between different areas.

4. Determine the population and sample. It is recommended to take into account the criteria of the statistician who is part of the audit team or the selected consultant to choose the selection method.

5. Prepare the final documentation of the stage with the audit planning, the schedule by stages, the distribution of tasks among the team members and the techniques and instruments that will be used.

Stage 3. I+C management processes

Objective: Identify and evaluate the processes of creation, acquisition, retention, distribution, transfer and reuse of I&C in the organization.

Techniques: Group work, observation, interviews, documentary analysis, questionnaires and review of I+C services supported by information and communication technologies used in the organization.

Results: Partial report with the analysis of the strategic I+C processes.

Actions:

1. Evaluate the behavior of the I+C management processes. For the purposes of this research, the classification of knowledge processes from *Probs* et al. [26] was

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

taken and adapted to the processing of information, in order to relate and unify its analysis based on determining how R&C is identified, acquired, , records, retains and stores; how it is used, communicated or transferred; how people share and how R&C-related activities impact organizational performance.

2. Check whether the processes correspond to the standards and procedures instituted by the organization or by an external regulatory entity and determine if they are aligned with organizational objectives and goals.

3. Prepare the final documentation of the stage with the report on the analysis of the strategic I+C processes, which will serve as the basis for stages 4 and 6.

Stage 4. Inventory of R&C resources

Aim. Carry out an inventory of R&C resources internal and external to the organization and value them in relation to needs.

Techniques. Consultation with experts, interviews, questionnaires and direct observation. The support of a database management system will be useful to incorporate the identified and located resources with their description.

Results. Database with the inventory, the directory of experts and the partial report with the analysis of the inventory where unmet needs appear.

Actions:

1. Identify, characterize and inventory R&C resources, with knowledge of the current state and the methods used for their management. The definition of InfoMap information resource categories will be taken as a basis: sources, services and systems. [27] They will be considered as:

- *I+C Resources* : Those that facilitate the identification, acquisition, storage, treatment, use, transfer and reuse of I+C to improve key processes and individual,

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

group and organizational performance. They cover all types of I+C, whether explicit or not, that the organization manages, contained in various media and documents, networks, experts and consultants, software, services and technological equipment for its management. They can be at the same time sources (due to their content), services (due to their objective) and systems (due to their operation) or they can be classified independently into one of these categories. Define whether they are your own or internal or external. In many cases a duality occurs and they can be internal and external at the same time.

- *I+C sources:* A site, repository or person who fulfills the role of expert, advisor or consultant, who due to their knowledge, capabilities, attitudes, aptitudes and skills is identified as a fundamental source of I+Ca. Also the knowledge made explicit in magazines, books, web pages, CD-ROMs, videos, process or procedure manuals, standards and regulations, networks of experts, advisors, social networks in general, databases, among others (all sources internal or external, automated or not, documentary or non-documentary, to which members of the organization can access).

- I+C services. Activities established to identify, acquire, store and disseminate I&C that involve assistance in the search process or access to information. They can be manual or automated and generated inside or outside the organization. Information services will analyze the way information is used and distributed, the efficiency and effectiveness of the service, the relevance and accuracy of the information, its reliability, timeliness, etc. It will be investigated whether these satisfy the needs of internal and external customers.

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

- *I+C systems.* Technological tools to generate, encode and transfer I&C, computer networks, Intranet, Internet and computer applications. Learning and electronic commerce systems, systems to manage workflows, and online consultation. The systems, services and networks that support I+C management will be identified and assessed, in order to adequately support, process and transport I+C to the entire organization and those involved in decision making.

2. Classify or categorize R&C resources. To organize the set of resources that can be detected, which can vary and increase depending on the type of organization and its characteristics, Table 1 proposes a general classification, taking into account the purpose for which they are designed, starting from the classification of type of documentation from Artiles Visbal, [28] adapting it to the purposes of this investigation. In this way, a categorization of R&C resources is proposed into four fundamental types: I) Normative or regulatory, II) On processes and procedures, III) Strategic and managerial and IV) Support for production and R&D+ i (box).

3. Inventory tacit knowledge, determining quantity, categories, academic training, personal qualification and location; *know how* , skills and abilities to perform daily tasks, level of experience and key competencies, training, learning and future development. This information will be organized and coded in a medium for dissemination. A staff directory will be prepared with their academic titles; skills, level of experience and key competencies; training and learning opportunities.

4. Inventory explicit knowledge, establishing number, types and categories of documented knowledge (patents, procedure manuals, processes, etc.). Locate them within the organization and in the systems that contain them, determining how they

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

are accessed, how they are organized, who currently uses them and how often they do so. Check the purpose, relevance and quality of knowledge.

5. Analyze I+C needs. Contrast them with existing inventory levels. Investigate the users of I+C services and how they are segmented according to the functions or processes in which they participate, as well as evaluate the degree of user satisfaction with respect to the I+C they receive. It is recommended to list a group of topics, to determine the most necessary for daily performance and to inquire about the courses or training that are required.

6. Prepare the final documentation of the stage with the results of the inventory analysis, the inventory database and the directory of experts.

Stage 5. Valuation and costs of R&C resources

Objective: Evaluate the impact of R&C resources on the organization according to their qualitative and quantitative assessment.

Techniques: Consultations with experts, interviews, application of questionnaires, direct observation and review of economic documentation.

Results: Partial report with the qualitative and quantitative assessment of the resources.

Actions:

1. Assess internal and external R&C resources considering how they impact the productivity, effectiveness and financial position of the organization. Furthermore, in adding value to processes, products, services and results related to development, research and innovation. The value of the information will be assumed, understood as that attributed to the production or acquisition of information by organizations, people or entities and that delivered in the form of products or services. [27]

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

2. Approximate analysis of the value of R&C in relation to the cost of its management. It is important to know how much is invested in each internal and external R&C management process, from its selection and acquisition, processing, storage, to its dissemination and use. This can affect the allocation of financial resources for each process, which increases the efficiency and effectiveness of R&C management.

3. Analysis of R&C costs. This is complex, except in organizations dedicated only to managing I&C, or in which the audited areas constitute a cost center within the general accounting. But most organizations do not give a commercial character to the creation of I&C, especially when their clients are exclusively internal; They do not assign the value it has, nor the costs associated with its creation. From this perspective it is difficult to evaluate the operational efficiency of R&C management. However, for-profit organizations have updated accounting records for any of their operations, projects or processes, since cost analysis is essential for their profitability and competitiveness.

4. If the R&C activity in the organization is not self-financed, it is advisable that the audit team carry out economic analyzes to achieve the proposed objectives. Once carried out, they will be able to issue criteria on the difficulties encountered that influence the decrease in the qualitative and quantitative value of R&C resources.

5. Prepare the final documentation of the stage with the qualitative and quantitative assessment of the I+C resources.

Stage 6. I+C flows and maps

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

Objective: Represent and analyze the flows and maps of internal and external R&C and the networks of core producers of knowledge and expertise.

Techniques: Interviews, observation of daily performance, review of archival documents and use of computer applications for the graphic representation of flows, maps and networks.

Results: Tables, maps and graphs with the representation of the flows, social and knowledge networks of the audited area, and partial report with the results of their analysis.

Actions:

1. Prepare the I+C flows of the organization, area, function or audited process with the subprocesses that make it up, considering who delivers the information, where, what it is used for, who is responsible for its registration, where it is stored or It records, how frequently, what output it generates and to whom the information received is delivered.

2. Take as a basis Itami [29] 's classification of information flows into: environmental (coming from the environment); internal (that which transits within the organization) and corporate (that which is sent abroad). To represent them, the data flow diagram technique can be applied. It is suggested to use software, although they can be represented through tables and later this data is taken to a graph. The level of detail of the flows will depend on the size of the audited area and the complexity of its activities and processes.

3. Analyze the behavior of I+C flows, identifying and pointing out internal distribution and exchange channels. It is important to evaluate the corporate culture

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

in relation to the communication and transfer of I&C, automated systems and computer applications that support it, use and management of technologies for key processes; whether measures exist and are applied to protect the information.

4. Represent and analyze social networks, detecting important groups and experts in the organization, those who work in isolation, where there is greater exchange of I&C and where there are difficulties. Mapping tools such as Ucinet, Netdraw or Pajek, among others, can be used. These networks will be included in the annexes of the final report.

5. Prepare I+C maps according to the characteristics of the resources identified in the inventory. They can be about skills, processes, information, knowledge, relationships, documentary and technological. It is useful to make tables that help in the subsequent preparation of maps. Knowledge topographies can also be made.

6. Evaluate R&C gaps and duplications.

7. Prepare the final documentation of the stage, with the results of the analysis of flows, maps and networks. In addition, a group of tables, maps and graphs with the representation of the flows, social and knowledge networks of the audited area.

Stage 7. Final report and recurring audit

Objective: Analyze and interpret the results of each stage and prepare and present the final audit report.

Techniques: Team meetings to seek consensus on the aspects evaluated.

Result: Final report with the results of the audit.

Actions:

1. Analyze quantitatively and qualitatively interpret the results in stages by comparing the data and information resulting from the surveys, the application of

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

the instrument and what was verified in the individual interviews, observation and research carried out in the areas.

2. Prepare the final report using simple language in a clear and concise manner, including graphs, tables and maps for better understanding. It will contain an index with the internal structure and will begin with an Executive Abstract (1-5 pages) with the type of audit, methodology used, objectives, execution time, team that performed it and main results with their recommendations. Next, and following the order that appears in the index, the Final Report will be detailed in full with the following structure:

Introduction: With the characterization of the organization or audited area, objectives, scope of the audit, fulfillment of planned tasks, planned schedule, name of each stage, description of the team, balance of resources assigned at the beginning of the process and those that are actually used, causes that motivated the audit and where the request to apply it comes from.

Results: With the main results obtained through a quantitative and qualitative assessment of the positive aspects and the problems, deficiencies or difficulties detected, which can be represented through tables, graphs and maps.

Conclusions: With the main deficiencies, difficulties or barriers detected in relation to R&C management.

Recommendations: In correspondence with each problem detected.

Annexes: With graphs and tables, the final inventory of resources, and maps that were not included in other sections of the report. This report is the conclusive synthesis of the partial results of each stage and will contain the aspects that negatively affect the diagnosed situation and will recommend possible solutions.

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

3. Present the final report to senior management for approval and after approval, report the results of the audit to the members of the organization through an oral presentation, a seminar, a workshop or through the corporate Intranet.

4. The I&C audit will be carried out with a frequency between two and five years and senior management will determine when and where it will be applied, regardless of the time period recommended in this methodology.

5. It is suggested to carry out recurring audits within a period of one year after the previous one, and verify compliance with the recommendations made in the previous audit.

FINAL CONSIDERATIONS

In the bibliographic review carried out to carry out this research, it was possible to verify the diversity of methodologies, models and approaches developed to audit information (13 proposals) and to audit knowledge (14 proposals) led by Great Britain and the United States. However, research on these two scientific domains is also carried out by authors mainly from China, Spain, Bulgaria and Australia.

The methodology presented integrates the diagnosis and evaluation of information and knowledge management together, and offers a more comprehensive, comprehensive and systemic vision of the management, generation, use and conservation of R&C resources and their impact on the results to be achieved by the organization. It is planned and executed with a lower expenditure of resources and brings additional benefits for the auditor teams and their methodological preparation prior to the execution of the audits, by having a methodology and a

unique and flexible instrument, which can be adapted to the specific characteristics of any organization.

This methodology was applied in an organization dedicated to research and scientific, technological and environmental services in the province of Holguín, belonging to the Ministry of Science, Technology and Environment of Cuba. The results obtained were favorably recognized by its senior management and by the experts who carry out the investigative processes. The proposal remains a group of recommendations that will contribute to improving the productive and scientific results of this center. These results make up an article that will continue this work.

Thanks

We appreciate the collaboration provided by the Universities of Havana and Granada, in Spain, which contributed to the doctoral training of the first author of the work, as well as the AUIP for the scholarship awarded for a research stay and defense of the thesis. doctorate.

Authors' contribution

All authors contributed to the conception and design of the study, data analysis and final writing.

Conflict of interests

The authors declare that there is no conflict of interest in this article.

REFERENCES

1. González Guitián MV, Ponjuán Dante G. Methodologies and models to audit information. Reflective analysis. Rev Gen Inform Document. 2014 cited March 23,

2015];24(2):233-53. Available at: http://dx.doi.org/10.5209/rev_RGID.2014.v24.n2.47402

2. Pantry S, Griffiths P. Managing outsourcing in library and information services. London: Facet; 2004.

3. Ponjuán Dante G. Information management: dimensions and implementation for organizational success. Rosario: New Paradigm; 2004.

4. Reißland B. Informations kompetenz oder wahrheitsfilter? Mitteilungen der Vereinigung Osterreichischer Bibliothekarinnen & Bibliothekare. 2013 cited March 27, 2015]66(1):11-9. Available at: http://search.proquest.com/docview/1437331245/FBAFF01338FF45C8PQ/4?accountid=14542

5. Li S, Huang S, Yen DC, Sun J. Semantic-based transaction model for web service. Information Syst Front. 2013 cited 2015 Mar 10];15(2):249-68. Available at: http://dx.doi.org/10.1007/s10796-013-9409-x

6. Kankanala KC. Business value from intellectual property. J Intellect Prop Righ. 2012 cited 2015 Mar 10];17(5):369-73. Available at: http://nopr.niscair.res.in/handle/123456789/14759

7. Jackson T, Hinde C, Parboteeah P, Timms R, Washington R. The barriers to knowledge sharing within a third sector sport organization. Paper presented at the 510-XXVI; 2012 cited March 10, 2015]. Available at: http://search.proquest.com/docview/1326757116?accountid=14542

8. González Guitián MV, de Zayas Pérez MR, López Porra J. Information audit and knowledge audit: approach to their visualization as scientific domains . Rev

Cubana Inform Cienc Sal. 2015 cited April 21, 2015];26(1):48-52. Available at: http://www.acimed.sld.cu/index.php/acimed/issue/view/22

9. González Guitián MV. Audit of information and knowledge in organizations. Design and application of an integrative methodology Doctoral Thesis]. Granada: University of Granada. University of Havana; 2015.

10. Orna E. Information auditing: from initial analysis to doing the audit. In: Practical Information Policies. London: ASLIB/Gower; 1999. p. 68-91.

11. Villardefrancos Álvarez MC. Proposal for a comprehensive model to audit information organizations in Cuba Doctoral thesis]. Havana: University of Havana: Faculty of Communication; 2005 cited May 28, 2009]. Available at: http://www.bibliociencias.cu/gsdl/collect/tesis/index/assoc/HASH01e0.dir/doc.pdf

12. I am Iaumatell C. Information audit: analysis of the information generated in the company. Barcelona: UOC Publishing; 2003.

13. Buchanan S, Gibb F. The information audit: an integrated strategic approach. Internat J Inform Manag. 1998;18(1):29-47.

14. Henczel S. The information audit: A practical guide. London: KG Saur Munche; 2001.

15. González Guitián MV. Procedure for auditing information in hotel facilities: flexible and easy-to-apply methodology. Spanish Academic Publishing House: Germany; 2011.

16. Burnett S, Illingworth L, Webster L. Knowledge auditing and mapping: a pragmatic approach. Knowl Proc Manag. 2004;11(1):25-37.

GARDEN JOURNALS
Journal of Qualitative Research in Business Law, Eco-Fin, Accounting, and Statistics
ISSN : 1533-1520

17. Cheung CF. A systematic approach for knowledge auditing: a case study in transportation sector. Kempston: J Knowl Manag. 2007;11(4):140-58.

18. Pérez Soltero A. Design of an ontology for the reuse of knowledge in knowledge audit processes. In. Proceedings of the VII Ibero-American Conference on Systems, Cybernetics and Informatics (CISCI 2008). Florida: June 29 to July 2, 2008 cited March 26, 2015];III. p. 164-9. Available at: http://www.academia.edu/11412413/Dise%C3%B1o_de_una_Ontolog%C3%ADa_para_la_Reutilizaci%C3%B3n_del_Conocimiento_en_los_Procesos_de_Auditor%C3%ADa_del_Conocimiento

19. Jurinjak I, Klicek B. Designing a method for knowledge audit in small and medium information technology firms. Varazdin, Croatia: Paper presented at the Central European Conference on Information and Intelligent Systems (CECIIS); 2008 cited March 25, 2015]. Available at: http://www.ceciis.foi.hr/app/index.php/ceciis/2008/paper/view/104/47

20. Hylton A. Measuring & assessing knowledge-value & the pivotal role of the knowledge audit. London: Hylton Associates; 2002 cited March 10, 2015]. Available at: http://www.providersedge.com/docs/km_articles/Measuring_&_Assessing_K-Value_&_Pivotal_Role_of_K-Audit.pdf

21. Ganasan AB, Dominic DDP. Knowledge Audit Made Comprehensive thru 6 Stages. In: International Conference on Research and Innovation in Information Systems (ICRIIS). Kuala, Lumpur: 23–24 November 2011 cited 25 March 2015]. Available at: http://www.ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=6125730

22. Armas Nodas G, Artiles Visbal S. Proposal of a diagnostic tool to evaluate the understanding of information and knowledge management in the company in improvement. Cienc Inform. 2009 cited March 19, 2015];40(3):13-22. Available at: http://www.redalyc.org/articulo.oa?id=181421561002

23. Griffiths P. Information Audit: Towards common standards and methodology. Bus Informat Rev 2012;29(1):39–51.

24. Gourova E, Antonova A. Knowledge management challenges for small and medium organizations: Proceedings of the 9th WSEAS International Conference on Applied Computer Science. Genoa: Conference; 2009 cited: March 25, 2015]. Available at: http://www.wseas.us/e-library/conferences/2009/genova/ACS/ACS-33.pdf

25. Choy SY, Lee WB, Cheung CF. A Systematic Approach for Knowledge Audit Analysis: Integration of Knowledge Inventory, Mapping and Knowledge Flow Analysis. J Univer Comp Sci. 2004:10(6):674-82.

26. Probst G, Raub S, Romhardt K. Managing Knowledge: Building Blocks for Success. John Wiley & Sons: Ltd Chichester; 2000.

27. Burk CF, Horton FW. Info-Map: a complete guide to discovering corporate information resources. New Jersey: Englewood Cliffs Prentice-Hall; 1988.

28. Artiles Visbal S. Information and knowledge management model for the Cuban company in improvement Master's Thesis]. Havana: Higher Institute of Technologies and Applied Sciences; 2006.