Technological practices of university students and how they affect their personal autonomy

Prácticas tecnológicas de los jóvenes universitarios y cómo inciden en su autonomía personal

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ABSTRACT

This research addresses new questions about personal autonomy, linked to information and communication technologies (ICT) and university students, a country's educated generational relay. How young people use these technologies, and whether these uses help their personal autonomy to flourishing are two of the main questions that guided this project. From the human development approach and the theoretical proposal of technologies in practice, the data from a diachronic survey (2015-2020), applied to 621 students from two public universities in Mexico, from northeast and the central-west respectively, were analyzed. From the findings, a typology is derived according to the three student profiles identified, where the adoption of these technologies is considered, while at the same time the mediation that parents have in their development of educational capacities. Likewise, three variables related to the category of personal autonomy are proposed, according to the potentialities and contexts of these young people. It is concluded that although the use of ICT is strongly promulgated by the educational institutions –conditioned by the structures and digital tools they posses–, it does not contribute to a relevant flourishing of personal autonomy among university students.

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RESUMEN

Esta investigación plantea nuevas preguntas sobre la autonomía personal, vinculadas con las tecnologías de la información y la comunicación y los universitarios, relevo generacional educado de un país. Cómo los jóvenes usan estas tecnologías y si estos usos ayudan al florecimiento de su autonomía personal, son dos de las interrogantes principales que guiaron este proyecto. Desde el enfoque del desarrollo humano y la propuesta teórica de las tecnologías en la práctica, se analizaron los datos de una encuesta diacrónica (2015-2020), aplicada a 621 estudiantes de dos universidades públicas de México, del noreste y el centro-occidente, respectivamente. De los hallazgos, se desprende una tipología según los tres perfiles de estudiantes identificados, donde se considera la adopción de estas tecnologías, al mismo tiempo que se visibiliza la mediación que tienen los padres en su desarrollo de capacidades educativas. Asimismo, se proponen tres variables relativas a la categoría autonomía personal, según las potencialidades y contextos de estos jóvenes. Se concluye que si bien el uso de las TIC es fuertemente promulgado por las instituciones educativas –condicionado por las estructuras y herramientas digitales que posean–, este no contribuye a un florecimiento relevante de la autonomía personal de los universitarios.

Palabras clave
Desarrollo humano; autonomía personal; TIC; tecnoprácticas.

INTRODUCTION

Information and communication technologies (ICTs) have ceased to be isolated tools and have become the pillars that build the technological environments and mediate being in the world. Unless there is a global hecatomb that eliminates their use, or humanity decides to refrain from using them, it is fruitless to ask ourselves whether or not we accept their participation in human activities. As technology permeates life today, research energy should be channeled into investigating how we can harness it to generate real opportunities for the development of all, looking at the ways in which we agree on its limits and the actions that can be taken to ensure that these are not catalysts for old and new social divides.

The ICT environment comprises a range of possibilities for development (Bustamante, 2010), but it is necessary to know to the extent of and how to use the tools to achieve this (Walsham, 2017). One way to face this challenge is to differentiate its incidence in population groups: to particularize the conditions, practices and valuations of a segment, and to observe what changes occur over time. The present project, which has been studying young university students in Mexico for the last six years[1], is part of this line of research. As part of this work, it is assumed that by broadening the understanding of what happens with students and their contexts, it is possible to

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[1] The study derives from the Observatory on the uses of ICT, at the University of Colima (2015 to date), which annually monitors the evolution of ICT practices to identify processes associated with the development of people (https://observatoryousostic.wordpress.com/). This provides feedback to the FOSEC SEP-BASIC RESEARCH project: Impact of information and communication technologies on the quality of life of young university students (A1-S-8412).

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collaborate with their particular development and, subsequently, contribute to the advancement of society in general.

In the field of social sciences, studies on the relationship between young university students and ICTs are expanding. When reviewing works carried out between 2010 and 2018 worldwide, different aspects were identified, among which those linked to education and sociability stand out, while there is a low presence in those related to technopractices in the field of citizenship and social participation (Zermeño, Navarrete and Contreras, 2020). The research found from Mexico coincides with these trends.

Rodríguez, Cobarrubias, Arcadia and Santana (2018), in their project on the use of ICTs at the Autonomous University of Sinaloa, report a use focused on academics and socialization. In more specific explorations, such as the one conducted by Padilla (2014) on techno-political practices with students at the Autonomous University of Aguascalientes, the results indicate the predominance of socialization and entertainment practices, leaving those of a political nature far behind.

Data on internet penetration in Mexico is consistent with this line. The National Survey on Availability and Use of Information Technologies in Households (ENDUTIH) of the National Institute of Statistics and Geography (INEGI [by its acronym in Spanish], 2020a) states that, of the group of young people between 18 and 24 years of age, 91.2% are internet users. According to the data, users with higher education represent the best positioned group in terms of internet access (96.4%), which is an indication that the higher the education, the higher the internet use.

It also refers that the main uses which the general population gives to the web are for entertainment (91.5%), for information (90.7%) and communication (90.6%). The Asociación de Internet MX (2019), on its part, indicates that the activities that Mexican Internet users perform most on the internet are: accessing social networks (82%), sending and receiving instant messages (78%), and sending and receiving emails (77%).

Although these figures seemed encouraging, the SARS-CoV2 pandemic has forced a reassessment of effective access to ICTs. As a result of the health crisis, universities around the world have been forced to deploy distance learning modalities, a situation that has led to studies to understand their conditions and their capacity to respond to adaptation, since not all educational institutions were prepared for these changes (Marinoni, van't Land & Jensen, 2020).

In the report Education in times of the covid-19 pandemic (ECLAC and UNESCO, 2020) it is noted that among the countries of Latin America and the Caribbean access to the Internet is very unequal, and it is identified that Mexico and Panama have larger gaps due to their socioeconomic and cultural level. This is corroborated by data published by the EY-Parthenon consultancy: out of 1,100 young people in higher education in Mexico, 72% of students in public universities had a broadband internet

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connection and only 20% had their own computer or tablet[2], while university students in private institutions had greater access to these resources, with 94% and 55% respectively (EY Mexico, 2020).

Literature distinguishes that, generally, students are consistent users of the internet, to such an extent that they have progressively reduced the digital gaps related to technological capabilities and access to ICTs. Why, then, is their use still limited for their well-being? (Berrío-Zapata and Rojas-Hernández, 2014). To provide an answer, it is necessary to understand that digital divides are multidimensional and have different levels (Chen, 2013); they not only involve whether and to what extent people access the internet, but how they use it, for what purpose and what benefits they obtain. From this approach, it can be said that the third level gap –which relates to the use of ICTs (Chen, 2013) – continues to be a challenge for our university students.

With this in consideration, the focus of this project is on how university students take advantage of technologies, how they use ICTs, and whether this could mean greater personal autonomy, as a dimension of human development. In order to investigate this, special attention was paid to internet access and the technological capabilities of these young people.

Human development and personal autonomy

Our work draws on Sen's (2000) capabilities[3] approach, which understands human development as the expansion of freedoms (reasons to choose) to live the life one has. For this author, it is important to take into account that the goods that are distributed in society do not have the same value for people, and that they are not in the same conditions and do not have the same expectations. Furthermore, it follows the idea that freedom is the road to freedom –it is the means and the end– and this is achieved by developing people's capabilities and functionings. Therefore, policies for human and sustainable development must place people at the center and expand their opportunities to exercise their freedoms.

However, it is not only the state that must provide these possibilities; people must also work on their empowerment and agency in order to gain freedom. In this sense, it is emphasized that education –not only formal education– is society's mechanism for training its members, both in knowledge and in the values that humanity has built and defined as relevant (among these, freedom, justice and solidarity stand out).

Education, then, is not reduced to the training of human resources according to what the market requires to produce economic goods and services, but, as Adela Cortina states (Rafael del Pino Foundation, 2020), its purpose is to shape people's character so that they are capable of telling reality and can decide for themselves. In other words,

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[2] When reviewing the studies, it was found that the personal (not shared) use of the computer is a necessary condition to face the challenge of distance education.

[3] Boltvinik explains in Expanding the gaze (2005) why Amartya Sen's terms capabilities and functionings should not be translated.

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education promotes the flourishing of autonomy so that human beings manage to articulate their personal freedom with the freedom of the community, in order to create democratic, just and prosperous societies.

This is consistent with the approach of Doyal and Gough (1994), who emphasize that autonomy is a basic need, and point out three influencing variables: a) cognitive and emotional capacity, which implies a minimum of reasoning to decide; b) cultural understanding, which implies the person's position in a given environment, his/her understanding of it, of him/herself and of what is expected of him/her; and c) a range of opportunities to exercise the decisions involved in living in a meaningful way in a social group. Based on these variables, the potentialities and contexts of young university students that contribute to their freedom were articulated (see Table 1).

Table 1. Variables of the personal autonomy of young university students

Cognitive and emotional capacity	Cultural comprehension	Range of opportunities
The fact that young people have reached the university level supposes sufficient reasoning capacities to make decisions for themselves, although these are not necessarily the most accurate ones.	As a person, you are expected to cultivate your spirit to recognize yourself free to think and act for yourself, and to assume responsibility for your actions As a student, you are expected to carry out learning practices related to your profession, seeking to strengthen your critical and reflective intellect, in addition to taking advantage of technology to obtain valuable information. As a citizen, your participation in public affairs is expected, and your understanding of what is happening in your local environment, in national life and in the world.	Real access to the educational system (enter and stay) and quality training Broad access to digital culture (artifacts, uses, knowledge and practices) Real access to public life, where they can express themselves and their voice is taken into account in the decisions that concern them.

Source: developed by the author, based on Doyal y Gough (1994).

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In order for young people to advance in their process of autonomy, they must take advantage of the resources available, such as ICTs, to learn about themselves, their cultural reality and the historical moment in which they live, as well as to understand what is expected of them as professionals and as citizens.

Freedom is a process –not an inalienable condition of human beings– that is achieved with the maturity of reason, when one is able to overcome instincts, feelings, emotions and heteronomous directives (Mazo, 2012). Freedom is relational, it takes into account others, who also have rights and freedoms, and considers that self-determination is built through dialogue and situational learning with them. This implies that the person conquers his/her freedom to think and act, while accepting the responsibility that comes with his/her decisions and omissions; which entails an axiological level of his/her practices, because evaluations are given through what the person thinks and does.

Likewise, for the expansion of personal autonomy, it is not enough to expand individual capabilities (knowledge about oneself, one's local and global environment, etc.) and overcome ignorance and naivety; it also requires environments that provide opportunities for people to participate and conquer their position in the world, to choose the life they value for themselves.

Young university students: the elite of generational renewal

From a development perspective, young university students have become strategic actors for social change and generational renewal. For the diversity and cultural relativism approach, this statement could be seen as a threat against the freedom of young people, as it seems to contravene their personal freedom. However, as Adela Cortina states, it is necessary to place the limits of individualism, since any right is linked to obligations, and belonging to a social group implies reciprocity (Fundación Rafael del Pino, 2020).

Freedom is elementary for every human being, but it is especially relevant for university students, because they are prepared –at least, in ideal terms– to reach critical, creative and socially committed capacities that help them to understand and propose solutions for themselves and their environment.

At this point it is relevant to state that this preparation should not be understood for their future participation, but for the here and now, their creative and responsible energy is also valuable in the present. This perspective profiles these young people as one of the mobilizing forces of social life in global and digitalized environments, where knowledge is a valuable resource.

The educational institution, despite the legitimacy crisis it is going through, continues to be the main mode that allows modern society to expand people's opportunities, by influencing their autonomy and emancipation (Hidalgo, 2017). For this reason, young university students are considered a strategic elite that embodies an educated sector with high generative potential.

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In Mexico, the 15-29 age group represents 25.7% of the population (INEGI, 2020b), while young people with higher education studies reach only 8.9% (calculated with data from the ANUIES Higher Education Statistical Yearbook for the 2018-2019 cycle, 2019). Despite the evident efforts in educational innovation, such as the integration of ICTs in classrooms (UNESCO, 2017), and that it seeks to prepare students to insert themselves productively and creatively in the informational society, research points out that digital exclusion remains in this population sector, which slows down the use of technological tools (Hargittai, 2010).

Technologies in practice

Social practices are an excellent category of analysis for understanding the social world. The structural model of technology, developed by Orlikowski (1992; 2000), offers a lens on the practices of technology use in organizations, which is feasible to apply in the field of ICT and young university students. This model comes from the theories of the social configuration of technology and from Giddens' notion of structure, who refers to the structural properties of the social system. In this model, the weight is on human action as a promoter of the transformation of technology and usage practices.

Orlikowski argues that through the practices of use of technology, different structures are interrelated that affect diverse uses and meanings; and it is in these practices that existing structural conditions are reproduced at the same time that new ones emerge. To understand this model, the author proposes to distinguish two components of technology: the materiality of artifacts, which is the result of human action (their design and production); and the role of technology, which implies a mutual interaction between human and technological agents (the practice of use).

To this he adds two premises: the duality of technology (technology is a product of human action, and has structural properties) and the interpretative flexibility of technology (technology is potentially modifiable by the practices of use, both in its design and in its use and interpretation). It is an iterative circle where the uses of technology enable it and, in turn, are constrained by it. In practice, this approach promotes that, instead of focusing on the embodied structures of technology, it is preferable to look at the emergent structures found in specific social contexts, which emerge during the practices of everyday use of technology. Here it is necessary to take into account that both embodied and emergent structures arise only in the action of users.

Orlikowski's proposal makes it possible to observe technopractices related to the capacity for self-management and decision-making; for example, learning, citizen participation, work, prosumerism, interaction with the government and the market. These practices make the basic human capacity to think visible for oneself and to perform in the world, where the productive processes of social life are transversalized by informationalism and ICTs are preponderant.

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Methodology

A quantitative and diachronic strategy was used for the project by means of a survey applied annually since 2015, whose last execution was in 2020, results from which this study starts. A total of 485 students from the University of Colima (UdeC, by its acronym in Spanish), in western Mexico, and 136 from the Autonomous University of Coahuila (UAdeC, by its acronym in Spanish), in the north of the country, were selected as informants. In both cases, the university students belong to the first semesters of the Communication, Economics and International Business degrees, with the intention of identifying the digital culture of students at the beginning of their studies.

Since personal autonomy can only be exercised through capabilities, effective access and the use of resources and context, a decision was made to find out who these students are, what the family mediation comprising them is, what the technological environments to which they have access and how they use ICTs are. This was integrated into the instrument in six sections: a) sociodemographic data of the young people, b) sociodemographic data of their parents or guardians, c) technological repertoire, d) uses of ICTs, e) participation in social life and f) opinions on the role of ICTs in school, professional and current society, on the Internet and social networks. The questionnaire consisted of 48 multiple choice items, Likert scale and open-ended questions.

One of the statistical methods used to process the data included frequency, simple correspondence and cluster analysis, techniques which, as part of an exploratory analysis, do not require testing pre-established hypotheses (Lévy & Varela, 2008), nor do they require the data to present any probability distribution –in particular, Gaussian normality– (Doey & Kurta, 2011).

Another technique employed was the simple correspondence technique (ACS) to explore the relationships between the categories of two nominal or ordinal variables –such as those employed in this study: perceptions about ICT, the creation of applications or content, etc.– (De Leeuw, 2005; Hoffman & Franke, 1986). Confidence in the ACS is based on: a) a chi-squared test ($\chi2$), which contrasts the null hypothesis that the variables involved are not related, and b) total inertia, which measures the dispersion of the point cloud of the projections on the two-axis graph, where greater inertia indicates more dependence of the variables and better identification of the categories close to each other (Rodriguez and Mora, 2001).

Similarly, a cluster analysis was performed, which explores the natural groupings of a data set (Rubio-Hurtado and Vilà, 2016). This method, based on the likelihood distance measure, implies the fulfillment of certain assumptions: such as the independence of the variables involved, Gaussian normality of continuous variables and multinomial distribution for categorical variables. Since both continuous and categorical variables are involved, the use of the two-stage technique was recommended for this research.

Previously, principal component analysis with Varimax rotation was applied to the set of metric scale variables (number of accessories, number of applications, etc.) and to the Likert-type variables to obtain a smaller set of intrinsic, continuous and

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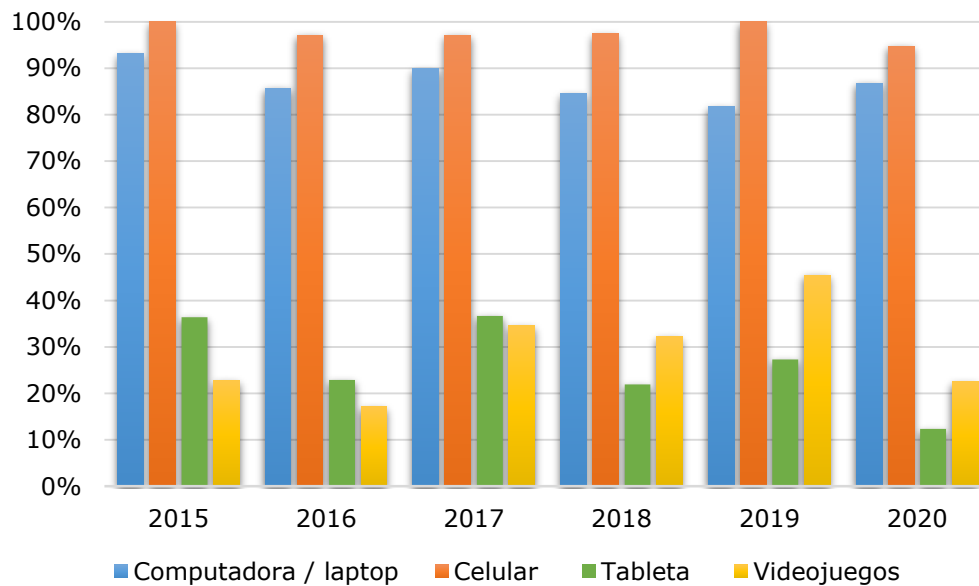eISSN 2007-3607 ● Universidad de Guadalajara

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uncorrelated variables. These, as well as some categorical socioeconomic variables, were used in the cluster analysis. The consistency of the groupings was performed by comparing the medians of the variables, using non-parametric methods such as Kruskall-Wallis, which is applied when the variables used are not close to normal (Gaussian) and there is no homogeneity of variances (Ho, 2006).

Results

Technological materiality and ICT in practice

Initially, the evolution of students' access to and use of ICTs is described, from which the statistical analysis of frequencies was derived. A diachronic look at the uses of ICTs by young university students confirms that there have been no significant changes over the last six years (see Graphics 1 and 2). On average, the ICTs most used by students at this level continue to be the cell phone (with a disposition of 98%) and the computer or laptop (with 87%); in terms of internet access, the use of home connection (91%) and mobile devices such as cell phones and tablets (78%) is maintained.

Graphic 1. Evolution of ICT equipment of university students

Source: developed by the author with the 2015-2020 surveys data.

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Graphic 2. Evolution of Internet use by university students
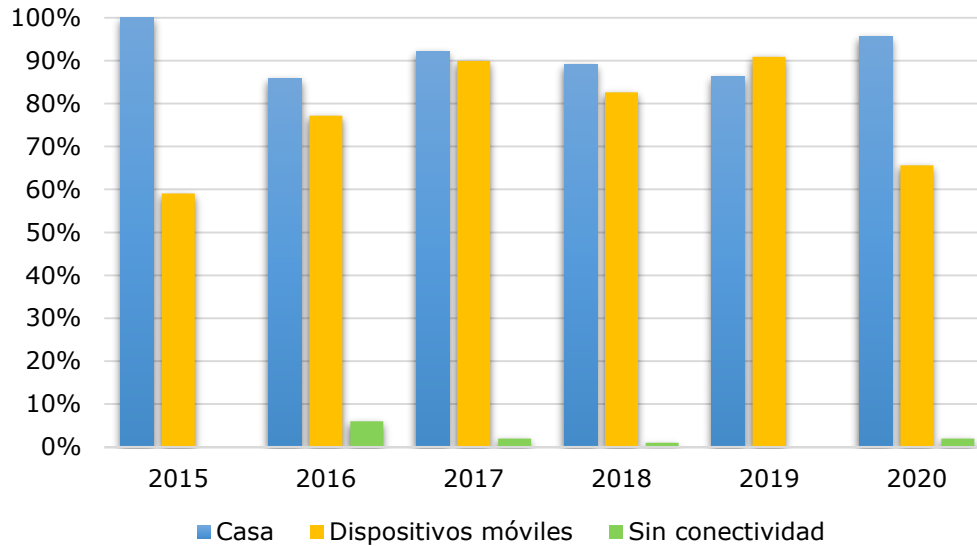
Source: developed by the author with the 2015-2020 surveys data.

In contrast to access to technological devices, the technopractices of young university students do show some important changes (see Graphic 3); when comparing them, a rise over time in diversity and frequency was identified. In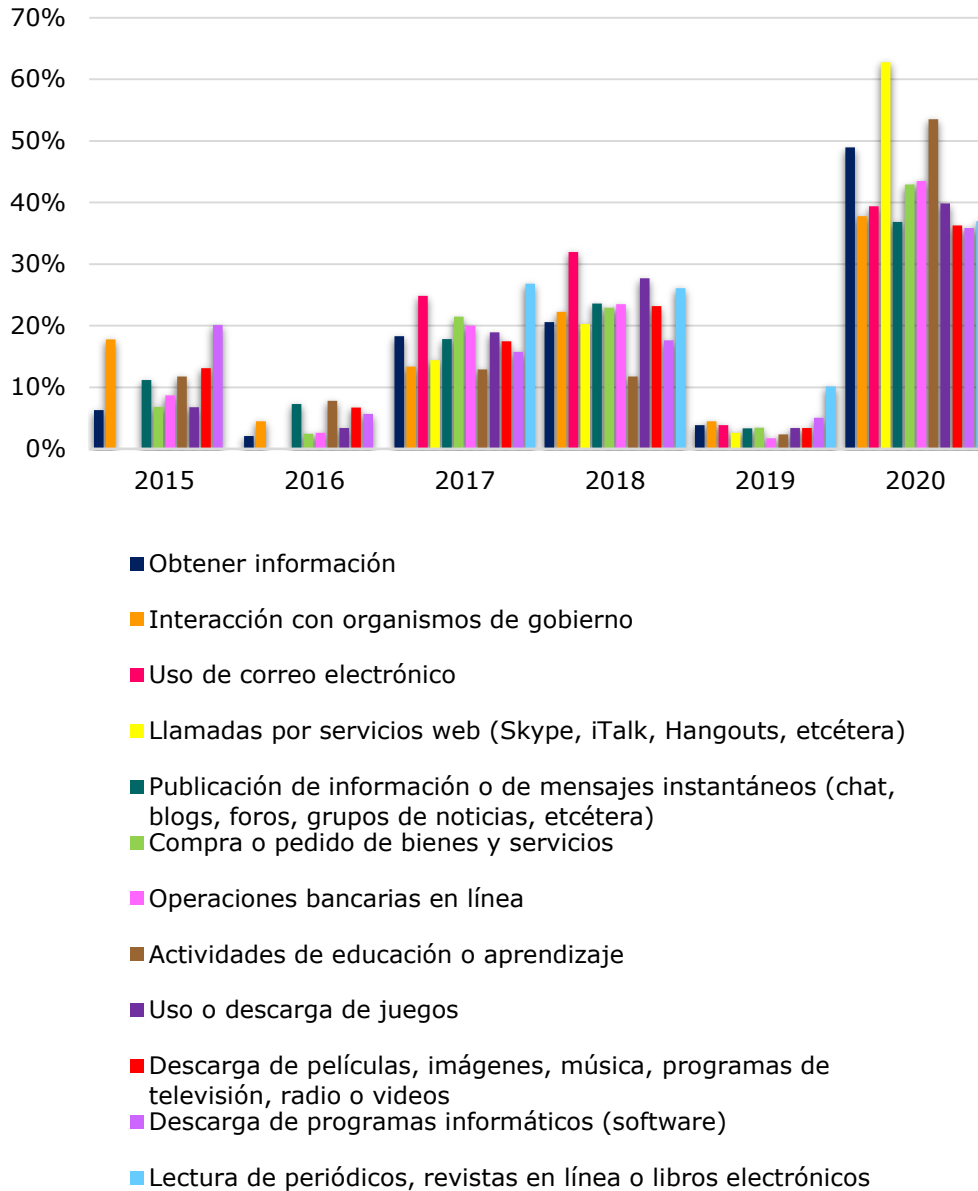 2015, no practices were recorded with email, calls through web services (Skype, iTalk, Hangouts, etc.), or reading newspapers, online magazines or e-books; items that gained activity by 2020, with an average of 39.4%, 62.7% and 37%, respectively.

Similarly, the increase in online practices is relevant, such as interaction with governmental organizations (which in 2015 was 17.8%, and by 2020 it rose to 37.8%), the purchase or order of goods and services (from 6.8% in 2015, increased to 42.9% in 2020), and banking operations (which in 2015 recorded 8.7% and by 2020 reached 43.5%). There is also a growth in technopractices linked to education and learning: in 2020 they reached 53.5%, when in 2015 they represented only 11.7%.

Despite this increase in education, its weight remains minor compared to leisure and sociability practices. The results indicate a consistency in the use of applications for social networks (87%, on average) much higher than the use of applications for education (23.2%) (see Graphic 4).

Delving into the data on social networking applications, within the practices, a preference for WhatsApp is observed, followed by Facebook, Instagram, YouTube, Messenger and Twitter. A decline in Facebook preference among university students stands out: in 2015 it had a presence of 68.2%, a figure that dropped to 35.2% in 2020. This trend is contrary to the use of Instagram, which registered 15.9% in 2015 and rose to 28.2% in 2020 (see Graphic 5).

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Graphic 3. Evolution of Internet use by university students

Legend:
- ■ Obtener información
- ■ Interacción con organismos de gobierno
- ■ Uso de correo electrónico
- ■ Llamadas por servicios web (Skype, iTalk, Hangouts, etcétera)
- ■ Publicación de información o de mensajes instantáneos (chat, blogs, foros, grupos de noticias, etcétera)
- ■ Compra o pedido de bienes y servicios
- ■ Operaciones bancarias en línea
- ■ Actividades de educación o aprendizaje
- ■ Uso o descarga de juegos
- ■ Descarga de películas, imágenes, música, programas de televisión, radio o videos
- ■ Descarga de programas informáticos (software)
- ■ Lectura de periódicos, revistas en línea o libros electrónicos

Source: developed by the author with the 2015-2020 surveys data.

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Graphic 4. Comparative evolution of the use of apps for social networks and for education by young university students
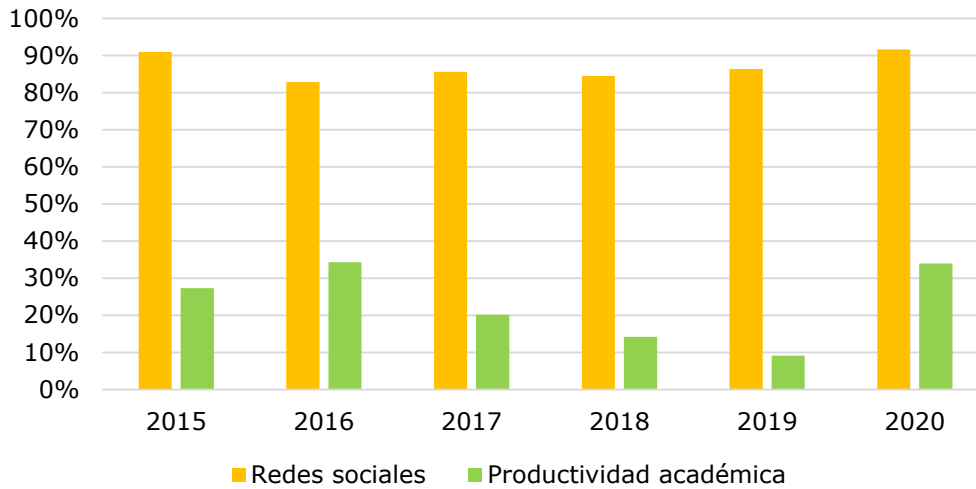
Source: developed by the author with the 2015-2020 surveys data.

Graphic 5. Evolution of the use of sociodigital networks by young university students

Source: developed by the author with the 2015-2020 surveys data.

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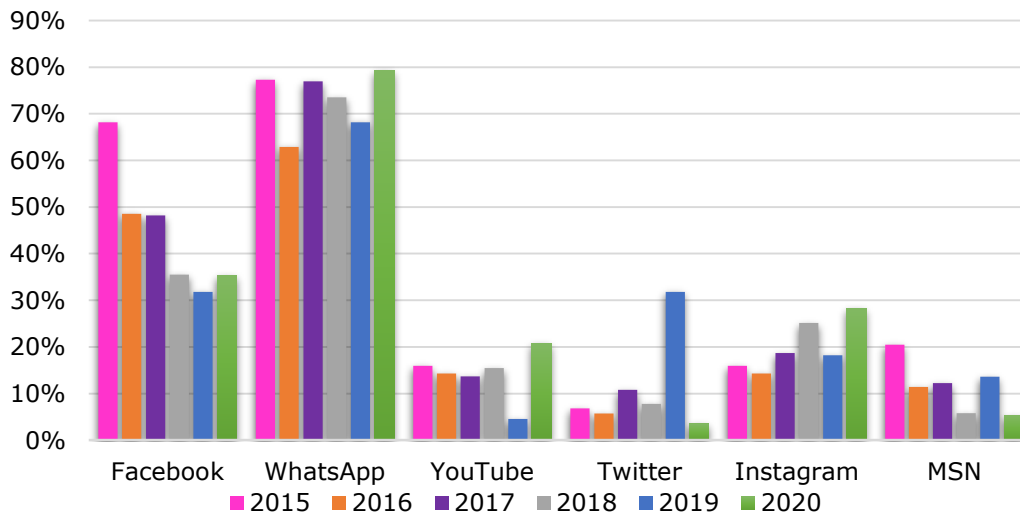
Type of students

As a result of the cluster analysis, the profile of three groups of students was defined (see Table 2):

• Alpha group. This group mainly integrates the high economic level. This profile includes young people who study at UdeC and their families, whose length of residence is stable (more than five years living in Colima). Within this group, it stands out that the parents' degree of studies is higher (bachelor's degree) and that their employment consists of operational or technical activities. As for university students, it was found that they perform community or paid work as an extra-university activity and that they rarely participate in social movements or use social networks to promote social activism (even so, they are more involved than the other groups). The content that alpha students develop the most is audiovisual and the media they use to share them are Drive and educational platforms. They represent the highest numbers in quantitative variables (number of devices, places where they connect to the internet, time of use, number and type of applications installed on the cell phone).

• Beta group. This group is formed by UdeC students who have spent all their lives in Colima, this group is made up of students from working families. Their parents' education is basic, elementary or secondary level, although some have not attended school; the fathers have jobs of an operational nature and the mothers are housewives. Beta university students hold a paid job as part of their additional occupations and never (or almost never) participate in social movements or use social networks for these activities. Like the alpha group, the content they develop most is visual and graphic, and they use educational platforms and Drive to share it. As for the quantitative variables, it can be said that they are in an intermediate position in most of these, below the alpha but above the gamma.

• Gamma group. This group includes UAdeC students who have spent all their lives in Coahuila. Their families are lower middle class, since their parents' education is mostly high school and they work in technical (fathers) and operational (mothers) activities. They share attributes with the alpha and beta groups, such as a salaried job within their occupations and they never (or rarely) participate in social movements or employ social networks to promote social activism; in addition, they mostly develop visual and graphic content which they share through social networks. In almost all quantitative variables they present the lowest numbers of the three groups (Table 2).

Analysis of clusters confirms the weight of social environments upon shaping students' capabilities and motivations for using technology, as well as in their scope of ICT practices (particularly the educational levels of their parents, which affect the type of employment they perform).

In Bourdian terms, family niches structure the habitus and limit access to resources. This explains why the personal autonomy of the alphas is more evident in their social participation than that of the betas and gammas, even when this is concentrated in a virtual modality. They not only invest in better cell phones to install

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more applications (their purchasing power allows them to do so), but also experiment more with them (they show greater curiosity and confidence in exploring these tools).

Table 2. Characteristics of alpha, beta and gamma groups

Variables	Alpha (256)	Beta (229)	Gamma (136)	ji^2(2gl)	Sig. A.
University of affiliation	UdeC		UAdeC	620.0	0.00
Career	International Business		Comunication	133.9	0.00
Year of application	2017	2020	2018	45.0	0.00
State of residence	Colima		Coahuila	538.1	0.00
Residence time	More than 5 years	Lifetime		29.8	0.00
Other occupation or activity	Community or paid work	Remunerated job		27.2	0.00
Leisure activity number	5	4	6	11.9	0.00
Outstanding leisure activities	Passive, watch TV or listen to music			1.6	0.46
Father's studies	Degree	Basic / no studies	High school	195.0	0.00
Mother's studies	Degree	Basic / no studies	High school	210.6	0.00
Father's occupation	Technical	Operational	Technical	121.2	0.00

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Variables	Alpha (256)	Beta (229)	Gamma (136)	ji^2(2gl)	Sig. A.
Mother's occupation	Operational and technical	Housewife	Operational	68.5	0.00
Devices number*	3	2	2	73.7	0.00
Number of places where they connect to the internet*	3	2	2	14.7	0.00
Number of times you used the internet for different activities*	6	6	5	45.4	0.00
Average hours per day used internet*	8	8	6	13.7	0.00
Number of apps on the cellphone*	32.5	29	18.5	45.4	0.00
Number of entertainment apps*	5	5	4	13.0	0.00
Number of social apps*	5	5	4	40.8	0.00
Number of utility and productivity apps*	5	4	3	16.3	0.00
Number of educational and	2	2	1	36.9	0.00

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Variables	Alpha (256)	Beta (229)	Gamma (136)	ji^2(2gl)	Sig. A.
informational apps*					
Number of service apps*	3	2	1	21.1	0.00
Number of apps for creation*	3	2	2	11.1	0.00
Number of primary apps on mobile*	3	3	2	28.7	0.00
Number of favorite mobile apps*	4	3	3	17.8	0.00
Number of apps installed in the last 3 months*	3	3	2	22.1	0.00
Reasons to install the apps**	Study or work			4.0	0.13
Frequency of use of apps**	Frequently			0.9	0.64
Face-to-face participation in social movements**	Rarely	Never	Rarely	9.7	0.01
Use social media to promote social activism**	Rarely	Never or rarely		5.1	0.08

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Variables	Alpha (256)	Beta (229)	Gamma (136)	ji^2(2gl)	Sig. A.
Production of digital content**	Rarely or frequently			3.0	0.23
Type of content developed**	Audiovisual	Audiovisual and graphic		6.1	0.05
Reason for creating content**	School activities			0.9	0.63
Medium in which you share content**	Educational platforms and Drive		Social networks	29.4	0.00
Opinion on ICT in education**	Relevant			0.1	0.94
Opinion on ICT in professional life**	Efficient			0.4	0.80
Opinion on ICT in today's society**	Potentially risky			0.6	0.72
Internet opinion**	Potentially risky			2.6	0.28
Opinion on social networks**	Potentially risky			0.7	0.71

* The number indicates the median for each group.
** Variables used in the simple correspondence analysis.

Source: developed by the author with the 2020 survey data.

Axiological level of ICT practices

Finally, patterns were identified in the ICT use practices and in the students' opinions. The assessment of the role of technology is obtained through the

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interaction analysis of five categorical variables of opinion and eight of ICT use (marked with two asterisks in Table 2). When these variables are crossed by pairs, we have a total of 40 possible bivariate relationships of interest; as shown in Table 3, only fifteen were significant (37.5%).

It is also identified that the opinions on ICT are consistent, since all these variables are related to each other, and coincidental, as the similar categories are close. For example, it was considered that social networks are useful, but are potentially risky. On the other hand, opinions on the role of ICTs in education is consistent with opinions on ICTs in professional life or in today's society, and with those related to the internet.

When crossing the variables of opinions about ICTs with those of activities involving the creation, use and dissemination of applications, a limited existence of significant relationships is observed (see Table 3). That is, there is a low consistency between what young university students think about ICTs and what they actually do with them. Nevertheless, these few relationships yield relevant information about the variables, such as that the frequency of use of apps is associated with their judgment of ICTs in professional life, in the sense that, if the former is frequent or very frequent, they are considered more useful and relevant.

The reason for creating content (for school activities or for knowledge and social awareness) is directly related to the views of ICT in education (linked to relevant and useful). Similarly, the creation of multimedia content is associated with the acceptance of how useful ICTs are in today's society, and audiovisual content with the idea of the potential risk that permeates technology.

Discussion

From the questions used in this study: how young university students use ICTs and whether these uses could mean greater autonomy for them, it is deduced that, in practice, in order to understand the relationship between the personal autonomy of young university students and ICTs, it is convenient to take into account that "someone is not only known by what they think but also by what they consider valuable and by what they do" (Mazo, 2012, p. 121).

Likewise, as proposed by Orlikowski (2000), it has been found that the interpretative structures associated with ICTs influence the autonomy of these young people because their structural conditions construct meaning schemes to interpret the world and, for this reason, prescribe ways of using technologies. For example, the interpretative structures inherent to social networks facilitate the creation and expeditious distribution of simple content (such as gifs or memes), which generates an exchange that feeds back into the same type and meaning of content that young people take advantage of to a large extent to socialize and distract themselves (Vizcaíno-Laorga, Catalina-García and López de Ayala-López, 2019). That is, the technology of these networks is not designed to promote social participation or militancy, but for entertainment (Van Dijck, 2019).

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Table 3. Association between student opinion variables

Variable	ICT in education		ICT in professional life		ICT in today's society		About the internet		About the social networks	
	P(ji^2) =	Inertia	P(ji^2) =	Inertia	P(ji^2) =	Inertia	P(ji^2) =	Inertia	P(ji^2) =	Inertia
ICT in education			***	301	***	243	**	45	***	243
				Relevant, useful, efficient, potential risk					Useful, potential risk	
ICT in professional life					***	161	***	52	***	76
					Relevant, useful, efficient, potential risk		Useful, relevant		Useful, efficient	
ICT in today's society							***	79	***	88
							Relevant, useful, potential risk		Useful, potential risk	
									***	133

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Variable	ICT in education		ICT in professional life		ICT in today's society		About the internet		About the social networks	
	P(ji^2) =	Inertia	P(ji^2) =	Inertia	P(ji^2) =	Inertia	P(ji^2) =	Inertia	P(ji^2) =	Inertia
About the internet									Useful, potential risk	
Use of apps frequency			*	19						
			Frequent – Useful / very frequent – relevant							
Digital content production									***	42
									Rarely - potential risk / frequent - useful	
					**	51				

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Variable	ICT in education		ICT in professional life		ICT in today's society		About the internet		About the social networks	
	P(ji^2) =	Inertia	P(ji^2) =	Inertia	P(ji^2) =	Inertia	P(ji^2) =	Inertia	P(ji^2) =	Inertia
Type of content developed					Multimedia - useful, / audiovisual - potential risk					
Reason for creating content	* School activities and knowledge and awareness - relevant and useful	33							** School activities and entertainment - useful / knowledge or awareness - relevant	0.04

Source: developed by the author with the 2020 survey data.

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At the same time, the evolution of cell phones favors this type of creations, and increases the creative potential and immediacy, characteristics linked to gaming, personal and social use (Katherine-Chen & Ryan-Wen, 2019). This is confirmed by the data obtained: social networks are the kind of technology that almost all university students have, and the type of content they produce the most is the one they disseminate through them (AMIPCI, 2019).

Returning to the structural differences, it follows that not all young university students have sufficient conditions to expand their framework of freedoms through the use of ICTs. It is clear that students who do not have a computer for exclusive use or do not have access to the Internet are still at a disadvantage, since both tools are essential to continue their education –as the pandemic has shown– (ECLAC and UNESCO, 2020).

It is, therefore, inferred that another evident interpretative structure among the technopractices of these young people is the educational institutional one, which promotes a type of digital production in students, who assimilate languages, meanings and skills for the generation of digital teaching-learning products (Ruiz, 2021).

Regardless of the possible academic and equipment deficiencies of universities, it is considered that the infrastructure available to educational institutions (Wi-Fi, computer equipment, laboratories, etc.) is an option to overcome the lack of information and communication technologies in the homes of their students. It is of particular importance that educational environments provide this opportunity, as it contributes to leveling dgital access (Rodríguez et al., 2018).

It is argued that the autonomy of young university students can also be traced in the coherence between their evaluations and their actions. The findings in the concordance analysis show discrepancy between opinions and practices; for example, while young people consider ICTs to be very relevant for their education and professional life, the effective uses of these technologies are more associated with leisure than with their training (Berrío-Zapata and Rojas, 2014). In this sense, as proposed by Orlikowski's model (2000), it is preferable to study the uses of ICTs through technologies in practice and not through opinions, since, although these can be considered as a prelude to action, they are not sufficient to materialize practices.

Conclusions

Findings in this project disclose that technopractices that have been maintained among university students over the years are linked to entertainment and sociability, to the detriment of those that cultivate capabilities for human development. However, there is not enough evidence to affirm that this tendency is exclusive to young people; in order to sustain this argument, intergenerational comparative studies are required.

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Likewise, changes in the period which is the object of the study in the uses of ICTs are found in the diversification of practices and artifacts, i.e., the greater the technological innovation, the more new interpretative structures and new appropriations emerge. This change implies a migration of young people between different social networks, which should be taken into account to disseminate content especially aimed at them (scientific dissemination, civic participation, health issues, among others), which strategically helps to strengthen their independence.

It is concluded that, although the educational institution is a factor that levels the capabilities and opportunities of young people, it is not enough to compensate for the structural differences in family environments (as evidenced in the alpha, beta and gamma classification). Therefore, when studying university students, these inequalities in access to and use of ICTs, as well as in their forms of social, face-to-face and digital participation, should be considered and addressed.

Likewise, with the purpose of contributing to the critical and reflective capacity of young people, the option is to make an influence on their environment, which implies, among other things, expanding and improving the forms of formal and informal education; the latter can benefit the capacities of the parents of these young people, and help to cultivate environments in general, since being better informed enables citizens to make assertive and socially committed decisions.

There were three limitations identified in the study, and possible solutions were speculated for each. The first one is the prevalence of audiovisual production identified, an incidence that may be due to the fact that the students consulted belong to the area of communication; in order to test it, a proposal was made to expand the sample to other disciplines. Secondly, it was detected that the questionnaire included information on access to a personal computer, but did not ask whether it was shared; in order to know the real availability of technology, it is recommended that the questions on this item be rephrased. The third limitation found is that the survey did not collect explicit information on the variable range of opportunities for freedom; to complete the data, it is suggested that the students' environment be analyzed to better define the opportunities to which they have access.

Likewise, possible lines of research are identified: monitoring technopractices and confronting them with opinions on ICT, since the predominance of these can generate a bias of automatic responses, particularly in topics that give rise to common sense discourses. Likewise, a study on the updating of technopractices in learning evidence would be desirable; for example, to investigate how works with more written arguments (reports, essays, summaries or reviews) are being replaced -particularly in the areas of social sciences and humanities- by multimedia products (infographics, short videos, etc.), which are more synthetic and visually attractive resources. On the other hand, although this study explored the relationship between university structure and technopractices, more data are needed to better understand how the educational institution structures not only the mindsets of its students, but also their practices.

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If freedom is the path to freedom - as the means and end of development - then resources of all kinds are required to be invested to strengthen the independence of these young people. Digital culture has increased around the world, and although there is still work to be done, the gaps in access and capabilities are decreasing thanks to the actions of governments and the logic of the market (inherent to technological innovations).

In this context, the greatest challenges lie in the opportunities for university students to participate in public life. It is not enough for them to express their opinion in social movements or through social networks; it is also urgent to ensure, through public policy, mechanisms that guarantee that the voice of young people is taken into account in the actions and issues that involve them.

Finally, the survey data confirm that neither access to the technological repertoire nor digital skills are sufficient conditions to move these university students towards an expansion of their freedom to improve their quality of life. For this reason, in order to advance in the maturity of their self-determination, it is necessary to enrich their environments and nurture their reflective capacities, so that young people carry out the practices they desire in their individuality, in line with those that are socially desirable to improve their quality of life and influence their development and that of their environment.

REFERENCES

Asociación de Internet MX (AMIPCI). (2019). 15° Estudio sobre los Hábitos de los Usuarios de Internet en México 2018. Movilidad en el Usuario de Internet Mexicano. https://www.asociaciondeinternet.mx/estudios/habitos-de-internet

Asociación Nacional de Universidades e Instituciones de Educación Superior (ANUIES). (2019). Anuario Estadístico de Educación Superior del ciclo 2018-2019. http://www.anuies.mx/informacion-y-servicios/informacion-estadistica-de-educacion-superior/anuario-estadistico-de-educacion-superior

Berrío-Zapata, C. y Rojas-Hernández, H. (2014). La brecha digital universitaria: la apropiación de las TIC en estudiantes de educación superior en Bogotá (Colombia). *Comunicar*, *22*(43), 133-142. https://doi.org/10.3916/C43-2014-13

Boltvinik, J. (2005). Ampliar la mirada: un nuevo enfoque de la pobreza y el florecimiento humano. *Papeles de población*, *11*(44), 9-42.

Bustamante, J. (2010). La cuarta generación de derechos humanos en las redes digitales. *Telos*, *Revista de Pensamiento, Sociedad y Tecnología*, (85).

Paakat, Revista de Tecnología y Sociedad, Year 12, no. 22 (2022) ● March 2022-August 2022
eISSN 2007-3607 ● Universidad de Guadalajara

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https://telos.fundaciontelefonica.com/archivo/numero085/la-cuarta-generacion-de-derechos-humanos-en-las-redes-digitales/

Comisión Económica para América Latina y el Caribe (CEPAL) y Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura (UNESCO). (2020). Informe COVID-19, CEPAL-UNESCO. La educación en tiempos de la pandemia de COVID-19. https://repositorio.cepal.org/bitstream/handle/11362/45904/1/S2000510_es.pdf

Chen, W. (2013). The Implications of Social Capital for the Digital Divides in America. *The Information Society*, *29*(1), 13-25. https://doi.org/10.1080/01972243.2012.739265

De Leeuw, J. (2005). Correspondence Analysis and Data Coding with Java and R. *Journal of Statistical Software Book Reviews*, *14*(5), 230-232. https://doi.org/10.18637/jss.v014.b05

Doey, L. & Kurta, J. (2011). Correspondence Analysis applied to psychological research. *Tutorials in Quantitative Methods for Psychology, 7*(1), 5-14. https://doi.org/10.20982/tqmp.07.1.p005

Doyal, L. y Gough, I. (1994). *Teoría de las necesidades humanas*. Madrid: FUHEM.

EY México. (21 de julio de 2020). Perspectivas de educación superior durante el período de confinamiento en México. EY México. https://www.ey.com/es_mx/covid-19/perspectivas-de-educacion-superiorb

Fundación Rafael del Pino. (8 de mayo de 2020). Diálogo entre Adela Cortina, Carlos Rodríguez Braun y Pedro Schwartz [video]. YouTube. https://www.youtube.com/watch?v=YT_XF5IKZWw

Hargittai, E. (2010). Digital na(t)ives? Variation in internet skills and uses among members of the "net generation". *Sociological inquiry*, *80*(1), 92-113. http://doi.org/10.1111/j.1475-682X.2009.00317.x

Hidalgo, L. (2017). Imaginario universitario: ¿Qué significa la universidad para los jóvenes estudiantes en Guadalajara? *Revista pueblos y fronteras digital, 12*(23), 175-202. https://doi.org/10.22201/cimsur.18704115e.2017.23.292

Ho, R. (2006). *Handbook of univariate and multivariate data analysis and interpretation with SPSS*. Los Angeles: Chapman & Hal.

Hoffman, D. & Franke, G. (1986). Correspondence Analysis: Graphical Representation of Categorical Data in Marketing Research. *Journal of Marketing Research, 23*(3), 213-227. https://doi.org/10.2307/3151480

Paakat, Revista de Tecnología y Sociedad, Year 12, no. 22 (2022) ● March 2022-August 2022
eISSN 2007-3607 ● Universidad de Guadalajara

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Instituto Nacional de Estadística y Geografía (INEGI). (2020a). *Comunicado de prensa No. 103/20.* https://www.inegi.org.mx/contenidos/saladeprensa/boletines/2020/OtrTemEcon/ENDUTIH_2019.pdf

Instituto Nacional de Estadística y Geografía (INEGI). (2020b). Encuesta Intercensal 2015. https://www.inegi.org.mx/programas/intercensal/2015/

Katherine-Chen, Y.-N. & Ryan-Wen, C.-H. (2019). Taiwanese university students' smartphone use and the privacy paradox. *Comunicar, 27*(60), 61-70. https://doi.org/10.3916/C60-2019-06

Lévy J. y Varela J. (2008). *Análisis multivariable para las ciencias sociales*. Madrid: Pearson Educación.

Marinoni, G.; van't Land, H. & Jensen, T. (2020). *The Impact of Covid-19 on Higher Education Around the World. IAU Global Survey Report*. Francia: International Association of Universities. https://www.iau-aiu.net/IMG/pdf/iau_covid19_and_he_survey_report_final_may_2020.pdf

Mazo, H. (2012). La autonomía: principio ético contemporáneo. *Revista Colombiana de Ciencias Sociales, 3*(1), 115-132. https://www.funlam.edu.co/revistas/index.php/RCCS/article/view/880

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura (UNESCO). (2017). Las TIC y las sociedades del conocimiento. https://es.unesco.org/indigenous-peoples/icts

Orlikowski, W. (1992). The duality of technology: Rethinking the concept of technology in organizations. *Organization Science, 3*(3), 398-427. https://www.jstor.org/stable/2635280

Orlikowski, W. (2000). Using technology and constituting structures: A practice lens for studying technology in organizations. *Organization Science, 11*(4), 404-428. https://doi.org/10.1287/orsc.11.4.404.14600

Padilla, R. (2014). Ciudadanía política en la red. Análisis de las prácticas políticas entre jóvenes universitarios. *Comunicación y Sociedad*, (21), 71-100. https://doi.org/10.32870/cys.v0i21.572

Rodríguez, H.; Cobarrubias, N.; Arcadia, J. y Santana, J. (2018). El uso de las TIC y los estudiantes universitarios. *Revista Digital de Tecnologías Informáticas y Sistemas, 2*(2). https://www.redtis.org/index.php/Redtis/article/view/15/13

Paakat, Revista de Tecnología y Sociedad, Year 12, no. 22 (2022) ● March 2022-August 2022
eISSN 2007-3607 ● Universidad de Guadalajara

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Rodríguez, M. y Mora, R. (2001). *Estadística informática. Casos y ejemplos con el SPSS*. España: Universitat d´Alacant / Universidad de Alicante, Servicio de Publicaciones.https://doi.org/10.4185/RLCS-2019-1345

Rubio-Hurtado, M. y Vilà, R. (2016). El análisis de conglomerados bietápico o en dos fases con SPSS. *REIRE. Revista d'Innovació i Recerca en Educació, 10*(1), 118-126. http://doi.org/10.1344/reire2017.10.11017

Ruiz, F. J. (2021). Análisis de las videoguías con anotaciones multimedia. *Campus Virtualis*, *10*(2), 97-109.

Sen, A. (2000). *Desarrollo y libertad*. Buenos Aires: Planeta.

Van Dijck, J. (2019). *La cultura de la conectividad: Una historia crítica de las redes sociales*. Argentina: Siglo XXI.

Vizcaíno-Laorga, R.; Catalina-García, B. y López de Ayala-López, M. (2019). Participación y compromiso de los jóvenes en el entorno digital. Usos de las redes sociales y percepción de sus consecuencias. *Revista Latina de Comunicación Social*, *74*, 554-572. https://doi.org/10.4185/RLCS-2019-1345

Walsham, G. (2017). ICT4D research: Reflections on history and future agenda. *Information Technology for Development, 23*(1), 18-41. https://doi.org/10.1080/02681102.2016.1246406

Zermeño, A.; Navarrete, M. y Contreras, I. (2020). En busca de los usos productivos de las TIC para el desarrollo humano de los jóvenes universitarios. *Paakat: Revista de Tecnología y Sociedad, 10*(18), 1-23. https://doi.org/10.32870/Pk.a10n18.425

Paakat, Revista de Tecnología y Sociedad, Year 12, no. 22 (2022) ● March 2022-August 2022
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