Beyond humanist appropriation: agency and co-construction of older adults and digital technology

Más allá de la apropiación humanista: agencia y co-construcción de los adultos mayores frente a las tecnologías digitales

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ABSTRACT

This essay seeks to contribute to the emerging discussion in Latin America on the relationship between aging and digital technologies, problematizing deterministic ideas about older people and their digital inclusion. Older adults' agency about use of technology is discussed, and then this humanistic position is contrasted with post-humanist approaches related to the so-called 'material turn'. These approaches have underlined the co-construction or mutual constitution of older people and technology, where aging is not only produced jointly with different devices, but also with discourses, policies, norms, etc. Thus, it is proposed that, rather than focusing solely on appropriation, the study of older people and digital technology should also focus on their co-construction.

Keywords
Information technology; Aging; Old age; Digital divide; Digitization; Internet

RESUMEN

Este ensayo crítico busca contribuir a la discusión emergente en América Latina sobre la relación entre el envejecimiento y las tecnologías digitales. Para ello, parte de la problematización de ideas deterministas sobre la apropiación de la tecnología por parte de los adultos mayores y su inclusión digital. Se discute la postura de este grupo frente a la tecnología y se contrasta esta posición humanista con enfoques posthumanistas del llamado "giro material", los cuales han considerado la co-construcción o constitución mutua entre adultos mayores y la tecnología, y argumentan en contra de ontologías esencialistas. Se sostiene que el envejecimiento es un proceso que sucede de manera conjunta a distintos artefactos, así como a discursos, políticas, normas, entre otros aspectos. De esta manera, se propone que el estudio sobre la relación entre adultos mayores y tecnologías digitales vaya más allá de la discusión sobre distintas formas de apropiación y se enfoque en su co-construcción.

Palabras clave
Tecnologías de la información; envejecimiento; vejez; brecha digital; digitalización; internet

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1

Introduction

There are several investigations both of quantitative and qualitative nature on the relationship between senior adults and digital technologies.[1] However, it has been underscored that there is a tendency for being empirically rich, however poor in their theoretical aspects (Sixsmith & Gutman, 2013). Ageing and digital technologies are each time subjected to further research; there are dedicated issues (in the English language) presenting a large variety of case studies or statistical analyses of use, skills or exclusion. These studies include older adults of several countries and under different contexts, from people who live alone to people who are under social vulnerability and fragility.

The purpose of this essay does not lie in making an extensive and thorough summary of literature on this topic;[2] what needs to be made clear is that, generally, it seems that there is optimism regarding the fact that older adults will be intrinsically benefited from the use of Internet and devices such as smartphones or tablets (Russell, 2011; Seifert, Kamin & Lang, 2020; Schlomann *et al*., 2020; Etzioni, 2020).

The relationship between technology and ageing in these studies is marked by a prevailing techno-optimism based on a sort of "technological solutionism" (Morozov, 2013) which proposes a growing technological intervention to see to the diverse social problems that arise with ageing societies.[3] Digital technologies seem to be a panacea with solutions for every problem in our lives and, specifically, the lives of older adults. In this respect, the philosopher Nolen Gertz maintains that:

> As we get used to ubiquity and the usefulness of technologies, we are also getting used to the fact that technologies configure the manner in which we see the world and perform therein […]. Because nowadays we define "progress" in technological terms, avoiding technology for fear is a risk to be seen to be afraid of progress, or as a Luddite that –taking the perils proposed by technology into consideration– the destination is worse than death (2018, paragraph 3-4).[4]

There also is a sign of age discrimination in this type of excessively techno-optimistic approaches to the extent that older adults seem to be passive objects of technological intervention (Östlund, 2004; Peine, Rollwagen & Neven, 2014). Critical comments against these attitudes suggest that we ought to understand this adult population as individuals with critical capability to use or reject technology in their own terms and to decide the role of technology within their lives, instead of seeing them as innocent victims in view of the lack of technological skills (or that they are classified as technologically lagging) (Selwyn, 2006; Selwyn *et al*., 2003; Knowles y Hanson, 2018; Quan-Haase, Martin & Schreurs, 2016; König & Seifert, 2020; Hakkarainen, 2012).

In this sense, investigations criticizing the attitude of designers, researchers and makers of policies that seem to conceptualize age as a deficiency and older adults as incompetent, whose needs may be mapped and solved by means of technological

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2

interventions, are discussed in this essay (Peine & Neven, 2018); Peine, 2019). In contrast, it is shown that they actively negotiate with several devices comprising their world and lives, as well as the transformation by their doings (Lassen, 2017; Kuijer, Nicenboim & Giaccardi, 2017; Joyce & Loe, 2010). In this scenario, not using technological devices and evidencing rejection to some of them are possibly valid results of their negotiations (Kania-Lundholm, 2019).

Reflecting on these critical approaches, attention is proposed to new theoretical approximations influenced by social science and technology studies (STS) as well by post-humanistic authors like Barad (2007) or Haraway (1991) who have pointed out a materialistic turn regarding ageing and technologies, and make an emphasis on human-technology assemblies and their co-construction. These analyses have stated that humanistic position such as appropriation (Casamayou & Morales, 2017; Morales & Rivoir, 2018), as they consider only human agency, may be incomplete when studying the relationship between older adults and technology (Peine & Neven, 2018; Andrews & Duff, 2019a; Höppner & Urban, 2018). Therefore, technology appropriation limits assumed by a human being are to be defined (senior citizen) with the preexisting essence of their interaction with technology.

This work is developed as follows: first off, evolution of binary conceptions is presented –already old– based on the use/nonuse of technology towards other complex definitions that have considered the use/nonuse context; in addition, the humanistic notion of agency of older adults is presented. Then, in the next two sections we seek to directly defy these positions, which are humanistic, techno-optimistic, deterministic and patronizing in excess, which have seen that technology has an impact on their lives as an external factor, which turn out to be necessary; it is therefore essential to have technological interventions through public policies.

By means of a contrast exercise of these approaches, ideas are presented on the material and post-humanistic field to study ageing. A conclusion is reached in the sense that Ethnography, as a research technique, may be mostly proper to realize the manner in which ageing is co-constructed with diverse socio-technical elements.

Binary and complex concepts, and agency:
victims or decision makers?

Recent research aimed to technology appropriation has had to assume a patronizing and deterministic approach regarding the use and adoption of digital technologies by senior citizens. Generally, these surveys have been optimistic and point out that technology takes part or has an impact on their lives with the purpose of increasing their wellbeing (Peine & Neven, 2018).

Paakat: Revista de Tecnología y Sociedad, Year 10, no. 19 (2020) ● September 2020-February 2021
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3

An extensive definition of this appropriation is that of Morales: "the movement made by an individual person or a group to legitimately or illegitimately take hold of some resources which they have defined to be valuable to them, whether because of direct functionality possessed by said resources or because of the power obtained through said possession and use" (2018, p. 30).

These approaches arise because, as has been said, using information and communication technologies (ICTs) are reduce with age, which has been termed as the "grey digital divide" (Olsson, Samuelsson & Viscovi, 2019; Colombo, Aroldi & Carlo, 2015; Friemel, 2016; van Deursen & van Dijk, 2011; Millward, 2003); however, they maintain that using them helps senior citizens to be empowered, and their self-esteem reinforced (Hunsaker & Hargittai, 2018; Czaja, 2017; Weisman, 1983; Farris *et al*., 1995; Karavidas, Lim & Katsikas, 2005; Gagliardi *et al.*, 2007; Shapira, Barak & Gal, 2007; Abbey & Hyde, 2009).

Digital technologies have been pointed out as aiding factors for senior citizens aimed to reduce the levels of solitude, to be independent and to increase social contact and general wellbeing (Cotten, Anderson & McCullough, 2013; Winstead *et al.*, 2013; Czaja *et al*., 1993; White & Weatherall, 2000; Seifert & Schelling, 2016; González, Ramírez & Viadel, 2012; Sixsmith, 2013; Bosch & Currin, 2015; Seifert, Kamin & Lang, 2020; Etzioni, 2020). These investigations of a techno-optimistic nature have been centered by them in the use and nonuse determinants of technology (Schlomann *et al*., 2020; Marston *et al*., 2019; König y Seifert, 2020), and they face the problem of reducing their experience in the employment of concepts and variables that are then analyzed by means of statistical models.

These approaches are useful to get a general descriptive perspective on the impact of technology on the lives of senior citizens; however, they pose a problem to suppress the intrinsic complexity of life, that is, the experience of human society as something that cannot be easily dissected or outlined. Reality shows that social life is disorganized and chaotic (Law, 2004), where variables interact with each other in the activities of people, and information on this subject cannot be simply dissected (Johnson y Kotarba, 2002; Kotarba y Fontana, 1987).

A qualitative analysis on the appropriation has also been performed from the principle which maintains that using technology is a sort of moral imperative, and that not using it is a serious social problem that is to be seen to by means of public policies (see, for example, Casamayou, 2016). In contrast, researchers such as Dickinson & Gregor (2006) have made an argument that there is no clear evidence that using a computer is beneficial to senior citizens and that there furthermore are unfounded theoretical items in literature on this topic. The authors maintain that the surveys cannot determine who is comprising the group in this population; groups of people partaking in the investigations vary: they see older persons with an independent life, as well as fragile

Paakat: Revista de Tecnología y Sociedad, Year 10, no. 19 (2020) ● September 2020-February 2021
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4

persons staying in nursing facilities. Similarly, wellbeing as a concept is not defined and it is measured in different manners in a number of studies (Hunsaker & Hargittai, 2018).

Dickinson & Gregor (2006) criticize the nature of many studies based on interventions, where the results may be bogus in view of the fact that improvements on the wellbeing of older adults may be attributed to social interactions when they partake in interventions (whether through training on information technologies or because of their interaction with the researchers). In accordance with these authors, there could also be an erroneous attribution of causality: Is the use of a computer or connectivity to Internet a factor to increase wellbeing? Or is the lack of wellbeing a factor that reduces connectivity to Internet? Furthermore, researchers say that the results have been inappropriately generalized, which tends to ignore the heterogeneity of this segment of the population (Fernández-Ardèvol, Sawchuk & Grenier, 2017; Rosales & Fernández-Ardèvol, 2019).

The difficulty is evident which implies separating structural and individual circumstances of the lives of older adults; in this sense, Mead & Neves (2018) have made an emphasis on the recursions between the social context and the use of technology whereby it is not possible to separate cause and effect. Likewise, Peek (2017) highlighted the complex relationship between the dynamic, physical and technological social context where they develop; and, in a more specific manner, Crow & Sawchuk (2014) criticized the added statistical models, because by measuring their skills this way makes the patterns of use to be statistically insignificant and, therefore, socially irrelevant. In accordance with this, it is better to describe the use of technology in terms of an ecology, a continuum or a spectrum of uses, and to make emphasis on the history, dynamism and fluidity of people's lives. These approaches

> provide a relational and sensible analysis to the context of the conditions, practice and motivations to use technology in terms that would discontinue and displace binaries that tend to represent younger users as "digital natives" and older users as "Luddites". This approach considers users of all ages as subjects in the process who are located in space and temporality, whose lives change, who are born in historical periods, and in different generations with specific means of communication, that are extraordinarily diverse, but which, at the same time, are part of a wider set of material, social and personal conditions with an impact on the use of the media at a specific moment. Therefore, it is crucial to place the use of any device within a broader set of communication possibilities, as well as within the framework of a historical time that takes experience with previous media into consideration and that would prevent the temptation to making easy predictions on our technological future based on a single variable (Crow & Sawchuk, 2014, p. 2080).

The foregoing implies conceiving that older adults are agents in the use of digital means instead of being defined by structures, which allows them to be understood as people capable of making decisions, assets on the role of technology in their lives (Selwyn, 2006).

Paakat: Revista de Tecnología y Sociedad, Year 10, no. 19 (2020) ● September 2020-February 2021
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5

Using technologies is a complex problem with a number of variables; this is understood if we consider that the life of adults is dynamic and that they are capable of making decision as a function of their circumstances. This has been a conclusion reached by Peek, in the Netherlands:

> Ageing is complex, dynamic and personal, and this is also reflected on the use of technologies by older adults. Periods of stability and periods of change happen naturally […]. A number of factors may have potential influence on why older adults would continue with or change the use of technologies in the household. These include the occurrence of life events, age-related decline, changes in setting personal goals, and diverse types of social influence (2017, p. 161).

These conclusions confirm that the life of senior citizens change, which has an impact on the way they relate with digital technologies. This highlights the fact that the use of digital technologies is a changing spectrum in accordance with natural changes in the circumstances of an individual's life, which could take them to adopt, change the use of or discontinue the use of a technology (König & Seifert, 2020). Thus, older adults, as human beings who have lived longer, instead of being considered as a victim excluded from the society of information against their will, show that they have the necessary vital experience to assume proper value of technology in their lives, where they may find significance and use, or they may consciously elect to reject them.

It has been frequently assumed that the relationship of older adults and digital technologies is more complex than use/nonuse; therefore, several researchers have devised different typologies to describe the interaction older person-digital technology (Kania-Lundholm, 2019; Neves & Amaro, 2012; Casamayou, 2016; Gil & Rodríguez-Porrero, 2015). Therefore, technological inclusion ought to be more of an option than a moral imperative (Joyce *et al*., 2017; Neven & Peine, 2017), and nonuse as a perfectly valid decision which does not mean, automatically, that he/she is incapacitated by external forces such as the digital divide (Wyatt, 2014).

Agency, technology and nonuse

Using digital technologies, a decision rather than an exclusion, ought to be understood by considering the agency of older adults in the face of their circumstances. Sallinen, Hentonen & Kärki suggest that little attention has been given to this topic, and they wonder: "Are the decisions on the use of technologies made *by* older adults or *for* them?[5] (2015, p. 28) The concept of *agency* is key and fully discussed in social sciences, with diverse conceptualizations (Emirbayer & Mische, 1998).

The Finnish Jyrki Jyrkämä (2008) has proposed a theoretical model he calls *agency modes*: in this scenario older adults ought to be thought of by means of

Paakat: Revista de Tecnología y Sociedad, Year 10, no. 19 (2020) ● September 2020-February 2021
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6

considering several interrelated elements: 1) how the individual decides whether to use or to not use a specific social function; 2) knowing how and a person's own skills; 3) being physically and mentally prepared; 4) motivations and personal goals; 5) options within the reach of the individual; and 6) his duties, values and sentiments. The author sustains: "agency is something that comes into origin, takes form and is renewed within the interwoven and dynamic process of these modes" (Jyrkämä, 2008, p. 195, quoted in Rasi & Kilpeläinen, 2015, p. 152).

This way of understanding agency considers both structural and individual limitations, and in turn underscores the intention of a person to act in a specific manner, which includes the capacity to decide as an aspect to be considered on the use of digital technologies by older adults. On the other hand, Lipponen (2007) has defined that agency, in the face of the media, also considers resistance against and challenge to prevailing technological structures (in Rasi & Kilpeläinen, 2015, p. 156).

Selwyn (2006) stated that the relevance of technology in the lives of people is a crucial factor, and underscored that the role in selecting the use of ICTs should be in accordance with the personal needs of each person. As previously mentioned, Jyrkämä (2008) also proposed that the agency of persons in the face of technology implies the likelihood of not using it.

Not using technologies is related to individual decisions about the role of technology in life, such as the existence of "subtle nuances regarding different ways of using technology" (Baumer *et al.*, paragraph 2). Recognizing this is related to the focus on capabilities developed by Nussbaim & Sen (1993), for technology ought to be a way to empower people to lead a better life and to develop their capacity of agency with his/her circumstances. Thus, individuals are capable of rejecting technology, and this is something that should be assumed and respected (Hakkarainen, 2012). As stated by Fernández-Ardèvol *et al.*: "not using a specific technology is a way an older adult articulates his/her expertise about his/her own like in the same manner he/she gives new meanings to technologies he/she decides to use. This is how older adults express their agency and autonomy through the use or nonuse of technology" (2019, p. 48).

These positions describe that the usefulness of different devices included in the world of life, should not be taken for granted, but they ought to be "qualified in terms of relevant uses and contexts, sometimes aligned with the recognition that technological situations are not necessary" (Richardson *et al.*, 2011, p. 132). In this regard, it is important to consider what the actual needs are of people and the ways they are negotiated by technology, as well as to pay attention to nuances related to the adoption thereof with the purpose of effectively understanding the use of digital technologies as they depend both to structural factors and individual vital circumstances. A factor to be considered is the role of the household and the so-called *warm experts* (Bakardjieva,

Paakat: Revista de Tecnología y Sociedad, Year 10, no. 19 (2020) ● September 2020-February 2021
eISSN 2007-3607 ● Universidad de Guadalajara

7

2005), who can transform an older adult into a proxy user (Toczyski, Kowalski & Biele, 2019: Castleton, 2019).

Furthermore, if a person is happy and satisfied with his/her life, and has not considered that adopting technologies is useful, why use a computer or get access to Internet? (Rasi & Kilpeläinen, 2015; Hakkarainen, 2012). Not using technologies is not a source of being marginalized, excluded and, therefore, an ethical imperative of inclusion –as it is usually assumed– but nuances of use, decisions and needs of people are to be considered, where public policies ought to respond in ways that are not solely technological.

In this sense, Wyatt (2003) has written, in his survey, about people who do not use Internet that "non-users also are important". In his survey he describes how, generally, public policies assume that people want to become users of technology, which is a premise that has led most of these policies in respect getting access to Internet. In order to remedy such exclusion from getting access to the network, governments resort to provide services, education and instruction, but what Wyatt (2003) sustains is that there may be a decision that not getting access to Internet does not pose an intrinsic problem of inequality or disadvantage.

Instead of being passive receivers whose lives are improving by technology in a positive manner, older adults, in many cases, are agents who understand it in different ways and negotiate their meaning within their contexts (Richardson *et al*., 2011); even so, there are people who use Internet in accordance with their own needs and others who do not do it voluntarily (Selwyn *et al*., 2003).

Likewise, by paying attention to the manners in which people use technologies in a creative way, assuming that older adults are technologically ignorant is challenged (Joyce, Loe & Diamond-Brown, 2015; Giaccardi, Kuijer & Neven, 2016). There is the need to be sufficiently careful in order to distinguish between Internet rejection, altogether, and to choose not to use some aspects thereof, as there are people who adopt certain elements in their routines and reject others (Kania-Lundholm, 2019). Generally, the notion of the non-user also shows the need to include them as a category in the design process because, as Wyatt wonders: "would mobile phones make such irritating noises if non-users had been involved in their design?" (2014, p. 78).

In order to study the impact of technology in the lives of older adults, a complex approach is to be considered that would include interaction between the social context and the responsible individual choice of people, nonuse included. As use and nonuse is synthesized to a problem of agency, other elements are excluded that define ageing and what being an older adult is implied. The following may be mentioned within these elements: norms, discourse, political frameworks, technology designers, and used technologies. Below is a description of the literature using the tools of social science and

Paakat: Revista de Tecnología y Sociedad, Year 10, no. 19 (2020) ● September 2020-February 2021
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8

technology studies (STS) that describe ageing as a social, discursive, political and regulatory problem, in addition to being substantial.

Towards a socio-material perspective about ageing and technology beyond determinism and paternalism

Gerontology has criticized and underscored that narratives on ageing mix market, politics and stereotype interests (Gilleard & Higgs, 1998; Higgs & Gilleard, 2014; Baars, 1997). Influenced by these critical approximations, scholars who do not employ STS perspectives have repeatedly criticized the simplistic inclusion and exclusion dynamics related to access to digital technologies that are oftentimes described by literature, as well as the concept thereof as an external and independent solution to the problems of ageing (Peine *et al*., 2014; Joyce *et al*., 2017).

These studies have been focused on criticisms and visions about the fact that technologies are key tools in the promotion of solutions of change in demography, such as active ageing (Peine, *et al*., 2015; Lassen & Moreira, 2014). To the contrary, an emphasis has been made on the social configuration of technology by older adults (Peine, 2019; Peine & Neven, 2018; Östlund, 2004), to understand that technology has an impact in the social scenario internally, in combination with non-technological factors (Aibar, 1996).

Furthermore, criticism has emphasized that people have ignored that old age, seen as a social idea, is coproduced by different technological devices (Peine, 2019; Peine & Neven, 2018; Joyce *et al*., 2017; Joyce *et al*., 2015; Wanka & Gallistl, 2018; Höppner & Urban, 2018; Neven, 2015).

Ageing has been understood as part of the course of life dominated by physical and cognitive deterioration, where technology may take part and analyze it as a social problem, to which a "threefold victory" is provided to the extent that it alleviates the social consequences of ageing, it provides older adults with a better life and fosters economic growth due to the development and innovation of technologies for older adults (Neven & Peine, 2017; Neven, 2015).

Understood in this way, science and technology would be separated from the experience of ageing, for this reason Peine *et al.* (2014, p. 199) suggested that older adults should be understood rather as "active co-creators", as they have been and are, in many cases, active consumers and ingenious users, rather than inept receivers (Kuijer, Nicenboim y Giaccardi, 2017). Therefore, they are "well prepared" to use technology as a resource, that is, to select, change and actively use technology for meaning and identity for their lives (Peine *et al*., 2015, p. 203).

Paakat: Revista de Tecnología y Sociedad, Year 10, no. 19 (2020) ● September 2020-February 2021
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9

On the other hand, if older adults are understood otherwise, Peine *et al*. suggest that this implies a patronizing perspective minimizing "the capacity of older adults to be in charge of their technical environs" (2015, p. 204), with the risk that the notions and ideologies of designers prevail (Oudshoorn, Neven & Stienstra, 2016). In addition, since active consumerism has been a relevant area of a large segment of this population currently, it is necessary to consider how they give meaning to material things.

Larsson (2009), for example, described the manner in which older adults actively organize and reorganize their belongings, and how they decide about things under their possession. This often means getting rid of things or refusing to consciously and deliberately adopt them, instead of being a problem attributable to their lack of capacity. Therefore, the focus of this analysis ought to be centered in *co-constructing* technology and of older adults, to the extent that they introduce or reject artifacts to their daily life, or in the manner they use them for unforeseen purposes (Kuijer, Nicenboim y Giaccardi, 2017; Giaccardi *et al*., 2016).

Outlining the relationship between technology and ageing is more effective and innovating from a socio-material perspective that would include co-construction between technological objects and social order (Peine *et al*., 2015; Östlund *et al*., 2015). Thus, there is a better position to understand how material culture has shaped the constitution of ageing, how ideas are built on ageing along with technological devices, how the agency developed by older adults in their daily life takes place in a co-productive manner with technology, and how is identity and meaning created amidst the growing constellation of artifacts comprising their lives (Peine *et al*., 2015; Twigg, 2013).

Materiality, which is part of the world in the life of people, and of the ways they interact with it, are paramount for a deeper understanding of the ageing process. An example for this is provided by Loe (2010), who describes, in his survey, that older adults in the northern area of the State of New York (nonagenarian women in his survey, who are dubbed as "technogenarian") develop creative uses of daily technologies in their lives. Loe noted that participants in his research are mutually formed by technology to the extent that they negotiate with different devices to achieve self-efficacy, wellbeing and to establish social connections; both "[are] comprised and [older adults] give meaning to social worlds where they each perform reciprocally and have an influence on the other" (2010, p. 321).

Another example is provided by Louyce & Loe (2010), who have pointed at the creativity of older adults when they related with technology: "older people are not passive consumers of technology like devices that help them to walk or get medication, but who creatively use technological artifacts to make them more suitable to their needs" (p. 172). Thus, rather than being victims of technological interventions, the authors make an emphasis on the agency and on the strategies they have to stress on their autonomy

Paakat: Revista de Tecnología y Sociedad, Year 10, no. 19 (2020) ● September 2020-February 2021
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10

by using a wide set of artifacts. In this sense, Joyce *et al.* (2017, p. 163) have also stated that negotiation of older adults with technology highlights their agency as they decide how these tools are to be used or not; also, as they re-appropriate and resist to technology, they give shape to the ageing culture defined by technologies.

These examples defy the tendency of giving older adults the role as objects instead of subjects capable of making decisions (Östlund, 2004, pp. 46-47). This is a requirement to distance themselves from "technical research" where the researchers are driven to apply technical knowledge to solve problems and focuses on the practical behavior and on the context where social relationships occur between older adults and technology.

The foregoing implies that it should be considered that the use of artifacts ought not to be taken as a moral imperative when performing an empirical research, but rather that researchers ought to center themselves on the nuances of relationships between the structure of daily life and on the modes in which technology manages whether or not they become part of the daily routines of the population under consideration (Östlund, 2004, p. 50). Therefore, understanding the relationship of this complexity is achieved in a more fairly manner, by establishing additional distance from the essentialist points of view, which enables us to understand how older adults make significant decision about the role of digital technologies in their lives.

These ways of understanding the older adult-technology relationship have been deepened in different surveys where a post-human perspective has been adopted (Andrews & Duff, 2019a) and focus on the "material turn". As material components are included as key actors, attention has been given to the manners in which ageing is co-produced through interactions, discourse and technical artifacts.

Moreover, a symmetry has been established between human and non-human actors when defining the ageing process (Andrews & Duff, 2019b; Peine & Neven 2018; Neven, 2015). In this sense, Höppner & Urban have described age coproduction: "technologies, discourse and spaces are to be understood as potential co-producers in the analysis of ageing as potential agents among other agents" (2018, p. 5).

This implies a radical ontological change, as explained by Suopajärvi (2015), who carried out a survey on older adults and daily life in Oulu, Finland, by employing the Barad's concept of intra-action. Intra-action refers to the material elements of social life, and their meaning do not pre-exist to their relation, but that they are mutually formed. The author notes that "the world is not a place of stable relationships or of clear limits among agents, but a constant state of emergence" (Suopajärvi, 2015, p. 114), and emphasizes on the role of discourse in the determination of their identity:

Paakat: Revista de Tecnología y Sociedad, Year 10, no. 19 (2020) ● September 2020-February 2021
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11

The society of information and its discourse about older persons as being "techno-phobic" or as "grey browsers" affect the manner in which they experience their own relationship with ICTs and themselves as members of the society of information. When the standard consists in being capable of using and willing to use new technologies, people have to devise strategies to adhere to the current definition of being a good citizen (Suopajärvi, 2015, p. 113).

An interesting proposal to consider the co-production of older adults and technologies in this framework lies in the material praxeology of ageing with technology, developed by Wanka & Gallistl (2018) who have included the Bordieu's (1977) notion of *habitus* and suggest that "age is the result of a combination of polities, wisdoms, bodies, scientists, technologies, designers, spaces and many more" (Wanka y Gallistl, 2018, p. 7). Therefore, they have proposed that it is necessary to consider the relationships of power in the different social fields, the agency both of human and non-human actors, and social practices that arise as a result of the interactions among the different agents.

These post-humanistic analyses are a novelty to the extent that they distribute the agency between people and technology, and focus on their assemblies (Haraway, 1991), therefore, they avoid assuming that predominance of one over the other. This is what Bruno Latour (2005) has proposed in his actor-network theory, by means of which he criticizes the traditional "sociology of social" which considers 'social' as a determining phenomenon or as an independent variable; from this, the author has promoted a "sociology of associations", where 'social' is the result of the association of human and non-human entities. To this author, non-human entities have the same agency and capacity to perform as us and, therefore, they are key elements to understand the social world, in spite that they have been "the forsaken masses" of the sociological theory (Latour, 1992).

The actor-network theory has also proposed that the identities of different entities –human and non-human– who perform socially, are mutually defined in accordance with the networks they are inserted in (Callon, 1986); that is, there is both an agential and ontological symmetry between humans and non-humans, where there are no preexisting essences, but that emerge as interactions (Barad, 2007; Haraway, 1991).

Thus, these approaches may attract the relationship between older adults and digital technologies in a more complex manner than mere appropriation. Analyses based on the post-humanistic material turn consider interaction among policies, standards and discourse, institutions, materiality, and science and research (Wanka & Gallsitl, 2018), with the purpose of understanding the emergence of and mutual constitution both of an individual and technology.

Paakat: Revista de Tecnología y Sociedad, Year 10, no. 19 (2020) ● September 2020-February 2021
eISSN 2007-3607 ● Universidad de Guadalajara

12

Conclusions

This critical essay proposes, on the one hand, that the appropriation of technology should include older adults as decision makers on the role played by their daily life. This means that a close look is to be given to factors that depend on the individual in relation with his/her social circumstance. The role of structural circumstances is to determine the choice of some persons to not use technology; however, at times, nonuse could imply conscious "tactics of resistance" whereby they confirm control over their lives (Selwyn *et al.,* 2003, p. 111).

It is therefore necessary to take the relationship of older adults with technology into consideration to be flowing and dynamic, as they could find different useful artifacts at one time in their lives and not in another time (König & Seifert, 2020; Kania-Lundholm, 2019; Peek, 2017). In this respect, Selwyn *et al*. (2003) state:

> commentators on technology and society topics should avoid the temptation of assuming that technology shall always be available, and this is a "good" thing […]. There is a danger that researchers operate in an imaginary "society of information" which does not exist beyond their occupational and domestic surroundings, reified and rich in technology. Middle class commentators often forget the fact that technology is not so ubiquitous in society as it could be in their lives (p. 112).

On the other hand, this comment highlights on the post-humanistic perspective as it suggests that socio-material practices supply a useful starting point to understand the mutual constitution among ageing, older adults and digital technologies, as it assumes that technology contributes to the definition of being an older adult (Peine *et al*., 2015; Peine, 2019). Likewise, this perspective allows us to consider intra-actions of various agents and to examine how human and material identities are established in the negotiations this population and technologies establish in their daily assemblies (Castleton, 2019; Gómez, 2015). In this sense, it is interesting to pay attention to the manners in which the artifacts work on people; for example, when they have to change their practices because of the agency thereof (Suopajärvi, 2015; Castleton, 2019).

The post-human approach allows us to understand the ways ageing is formed socially, discursively and technologically; therefore, qualitative analyses are crucial. Ethnography, paying attention to "concealed domestication efforts" (Peine, 2019, p. 60) of the elderly, is presented as a key methodological strategy to challenge the idea that older adults are passive receivers "impacted" by technology (Östlund, *et al*. 2015; Neven, 2010).

Furthermore, a detailed analysis of the older adult-technology assemblies could be analyzed through detailed ethnographic inspections in their normative, discursive, cultural and political contexts, as key tools are provided to study their intra-actions.

Paakat: Revista de Tecnología y Sociedad, Year 10, no. 19 (2020) ● September 2020-February 2021
eISSN 2007-3607 ● Universidad de Guadalajara

13

STS, specifically the actor-network theory (Latour, 2005), have reiterated that we never face objects or social relations in an isolated manner, but that we are facing chains of associations between human and non-human agents, and suggest a symmetrical treatment of human and non-human entities with the purpose of following the actors under analysis through the field in an ethnographical manner (as discursive beings, standards, technologies, humans, et cetera), and to describe the modes in which they are co-formed (Callon, 1986).

This could be a sign that this is a good time for researchers to go beyond the appropriation and that we focus on the co-construction of older adults and on the digital technologies they use or do not use, with –or through– others, or that they discontinue the use thereof. Therefore, we would be aware of how ageing is co-formed by different elements and thus get a clearer view of what it means to be an older adult in an increasingly digitally mediated world.

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14

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21

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eISSN 2007-3607 ● Universidad de Guadalajara

22

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[1] Digital technologies are understood as information and communication technologies (ITCs).

[2] Other researchers provide excellent reviews on this topic, for example: Battersby *et al*., 2016; Richardson *et al*., 2011; Frankel and Bisson, 2008; Blaschke, Freddolino and Mullen, 2009; Kim, 2008; White *et al*., 1999; Hunsaker and Hargittai, 2018 and Casamayou and Morales, 2017.

[3] An example of this is the development of *chatbots* at the University of Alberta in Canada, to tackle the problem of solitude of older adults (CBC News, 2019). This is also shown by means

Paakat: Revista de Tecnología y Sociedad, Year 10, no. 19 (2020) ● September 2020-February 2021
eISSN 2007-3607 ● Universidad de Guadalajara

23

of presentations in the media, for example, an advertising campaign of an American company to look for a job or to recruit *Indeed* personnel, shows a young woman who gets a job through the platform by designing virtual reality devices for older adults in a nursing home; it shows a group of vulnerable persons with devices on their heads, covering their eyes and enjoying the experience of virtual reality.

[4] The English translations were made by the author of this document.

[5] Emphasis in the original.

Paakat: Revista de Tecnología y Sociedad, Year 10, no. 19 (2020) ● September 2020-February 2021
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24