

# Ariadna

*cultura, educación y tecnología*

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**4<sup>th</sup> International Conference on  
the Elderly and New Technologies**

*IV Jornadas Internacionales de  
Mayores y Nuevas Tecnologías*



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# Tecnología en movimiento

SALVADOR CABEDO

En la actualidad, todos los ciudadanos somos conscientes de estar metidos de lleno en una nueva cultura que ha surgido a consecuencia de la ya reconocida y denominada revolución digital. Así como los progresos científicos de los siglos XVII y XVIII dieron lugar a la Revolución Industrial, el desarrollo y la implantación universal de las tecnologías de la información y la comunicación han dado lugar a la cibercultura o revolución digital, que incide de modo importante en la vida de las personas, y presagia incalculables consecuencias para la historia de la humanidad. Adquirir, manejar, comprender y difundir la información a través de los nuevos procesos tecnológicos constituye una dimensión muy importante en la vida del ser humano. El transistor, el circuito integrado, el ordenador personal, las redes de telecomunicaciones, internet, los móviles inteligentes, etc., han transformado radicalmente la manera en que los seres humanos se relacionan entre sí. Mediante el uso compartido de estos dispositivos tecnológicos se ha establecido una nueva modalidad de expansión de la información que enriquece la capacidad intelectual del ser humano y permite además una comunicación más universal.

Las tecnologías de la información y la comunicación se han impuesto socialmente y cada día están más presentes en la manera de aprender, comunicar y configurar las diversas relaciones sociales. Las personas hemos ido adquiriendo nuevos hábitos y maneras de comportarnos, hemos incorporado a nuestras vidas el ordenador y los teléfonos inteligentes para adquirir mejor información y poder transmitir ya sea de forma real o virtual nuestros conocimientos. Esta nueva cultura nos sitúa también ante un

novedoso panorama personal y social que va más allá de las herramientas tecnológicas que nos rodean y se nos presentan como las protagonistas de nuestro momento histórico. Pero si bien es verdad que no debemos ni podemos mantenernos anclados en una interpretación de la realidad humana que no incorpore las aportaciones de la ciencia y de la técnica, no hemos de confundir el progreso de la humanidad con el simple desarrollo de la investigación científica. Se trata no solo de incorporar y dominar los nuevos objetos simbólicos, mediante los cuales se configuran distintas maneras de vivir, sino de mantener al mismo tiempo una actitud crítica que nos mueva al convencimiento de que el desarrollo científico y tecnológico solo son positivos si redundan en beneficio de la dignidad humana y de la calidad de vida.

Internet se ha colado definitivamente en nuestras vidas y se ha integrado plenamente, con más o menos destreza, en las rutinas de la mayoría de los españoles. Vivimos en hogares que cada vez están más y mejor conectados informáticamente y organizamos nuestra vida sirviéndonos de la ayuda que proporcionan los recursos tecnológicos como los móviles inteligentes y las apps. En la sociedad del conocimiento, la digitalización se nos presenta como un proceso muy positivo e imparable, pues la información tecnológica y la dimensión humana se consideran convergentes y dialécticamente relacionadas. En la sociedad del conocimiento se acortan las distancias entre los pueblos y sus culturas, y se suprimen los siniestros aislamientos y las fronteras. Actualmente es mucho más fácil acceder a la información adecuada para responder a las urgencias ambientales y cumplir mejor nuestros deberes sociales.

La eficacia de los recursos tecnológicos facilita el desarrollo sostenible para todos los pueblos y posibilita la colaboración social entre ellos.

Según el Informe Sociedad de la Información en España 2014, editado por la Fundación Telefónica, nuestro país es de los más “conectados” de Europa: 8 de cada 10 móviles son *smartphones* y el 78 % de los internautas son usuarios intensivos. En 2014 se han consolidado e intensificado las tendencias que se presentaban en informes anteriores como proyectos de futuro, y se han producido avances muy significativos en la vida digital de los ciudadanos. Así, ya son 26,25 millones de españoles los que acceden regularmente a internet, 1,45 millones más que en 2013. De ellos, 20,6 millones se conectan diariamente, es decir, el 78 % del total viven conectados. Cabe recordar que solo hace dos años, eran 6 millones de españoles. Y por primera vez, el 50 % de las personas entre 55 y 64 años son usuarios intensivos que acceden diariamente a internet, de modo que conforman la franja de edad que más creció el pasado año (8,6 puntos porcentuales).

Los recursos tecnológicos disponibles en la actualidad no solo pueden servir de ayuda para que los ciudadanos adquieran más y mejores conocimientos, sino que además facilitan su inclusión y participación social. Gracias a la virtualidad de internet y con la ayuda de un ordenador o un dispositivo móvil, las personas nos podemos comunicar con otras personas desde cualquier lugar del planeta y en cualquier momento del día, así como gestionar en tiempo real documentación y servicios de manera cooperativa hasta cotas impensables hasta hace muy poco tiempo. Es importante mencionar que las personas que se conectan a la red acceden ciertamente a más información, pero mantienen al mismo tiempo la capacidad de difundir críticamente su asentimiento o descontento, con lo que pueden intervenir en el análisis crítico de los contenidos transmitidos por la red.

Las nuevas tecnologías están incidiendo firmemente en las formas de trabajar, de educar, de divertimos, de relacionarnos y de percibirnos a nosotros mismos. Los estudiosos pueden disfrutar de instrumentos y sistemas formativos que complementan la educación presencial, y amplían sus posibilidades mediante las llamadas aulas virtuales, que permiten la educación en línea a través de redes informáticas. Los sistemas asincrónicos de comunicación mediada por ordenador proporcionan a las personas con dificultades para asistir regularmente a la educación pre-

sencial establecida nuevas posibilidades y caminos para sustituirla por otra más flexible. Es, por lo tanto, muy lógico que el dominio de las nuevas tecnologías se haya convertido en indispensable no solo para la gente joven, que tiene ante sí un mundo muy abierto, sino también para todas las personas, que necesitan el reciclaje tecnológico para poder mantener el deber personal y social del aprendizaje permanente a lo largo de la vida.

Las personas mayores constituyen un colectivo especialmente significativo en la sociedad actual, pero también con sus riesgos y dificultades. Uno de los peligros anunciados consiste en la llamada brecha digital, que afecta a los grupos de ciudadanos más frágiles socialmente, entre los que se encuentran las personas mayores. Es responsabilidad de todos apoyar la alfabetización digital de los mayores, facilitando el acceso al uso inteligente y útil de las nuevas tecnologías. Este uso debe fomentarse a través de diferentes acciones multidisciplinares y en muy diferentes perspectivas: ámbitos educativos y formativos, políticas de integración social, proyectos de investigación, etc. Con ello se potenciará el capital social y humano de nuestra sociedad.

La realización de las IV Jornadas Internacionales de Mayores y Nuevas Tecnologías, cuyas actas podemos leer y disfrutar en esta publicación, constituye una prueba fehaciente del compromiso de la Universitat Jaume I en la formación de todos los segmentos sociales de su entorno, en especial de las personas mayores. Una vez más, se puede constatar con satisfacción cómo el Programa Sénior «Universitat per a majors» está cumpliendo con su objetivo de promocionar la formación permanente a lo largo de la vida.

Agradecemos la colaboración prestada por los ponentes, nacionales e internacionales, que no solo participaron en las Jornadas, sino que han aportado generosamente el contenido de sus ponencias y comunicaciones para que puedan ser publicadas. Valoramos con gran satisfacción la respuesta por parte de los alumnos, que, además de asistir y participar abundantemente en el desarrollo de los seminarios y ejercicios prácticos, enriquecieron con sus experiencias y matices el contenido de las lecciones magistrales. Apreciamos el importante apoyo que hemos recibido de autoridades académicas y políticas para poder llevar a cabo la realización de estas Jornadas. Queremos también reconocer la excelente colaboración prestada por las personas que trabajan en nuestro Servicio de Comunicación y Publicacio-

nes, cuya profesionalidad ha sido la mejor garantía para la cuidadosa edición de las actas. A todas las personas que directa o indirectamente han contribuido al éxito de las Jornadas y que además apoyan

los objetivos de nuestro Programa Sénior queremos, una vez más, decirles que les agradecemos su apoyo y seguimos confiando en su importante y generosa ayuda.

# Adult Brain: Game of Metaphors for Understanding the Internet

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## Abstract

With the increasing apogee of the digital world and Internet use by older people, one may wonder how adults understand these virtual spaces. The aim of this article is to see to what extent the Conceptual Theory of Metaphor and the Idealized Cognitive Models (Lakoff and Johnson, 1980) may help understand the meaning and structure of a website.

In our research we analyze several web pages from the point of view of Cognitive Linguistics in order to know if the virtual world makes sense from different types of metaphors and cognitive domains. As linguists, we get two questions. The first one is whether we are able to understand the Internet, something abstract with which we are not born, and the way we surf websites, transferring meaning through conceptual metaphors from the real world we do know to this new online world. Throughout our analysis we can see what types of metaphors are activated in our mind when visiting a website and in which moment they transfer meaning from the real world.

The second question is whether website domains (the addresses of web spaces) are conceptually comparable to the cognitive domains that are activated in our minds when we perceive any concept. This assumption can offer a great contribution to marketers and SEO experts since it offers a new vision on how to make a potential client think what companies want (what mental model must be activated) when reading the address of a website.

In short, our brief analysis, which is part of a more thorough and extensive research, provides a theory on how online readers configure the meaning of websites through conceptual metaphors, and it also provides a new framework of study which examines how web domains should be established so that the reader is able to know the theme of the web with just reading its address.

Keywords: Metaphor, Idealized Cognitive Models, digital literacy, Conceptual Theory of Metaphor, Mental-Model Activators, Mental Hypothesis of Website Domains.

## Resumen

Con el creciente apogeo del mundo digital y el uso de internet por la gente mayor, uno se pregunta cómo comprendemos los adultos estos espacios virtuales. El objetivo de este artículo es ver en qué medida la Teoría de la Metáfora Conceptual y los Modelos Cognitivos Idealizados (Lakoff and Johnson, 1980) pueden ayudar a entender el significado y estructura de una web.

En nuestra investigación analizamos varias páginas web desde el punto de vista de la Lingüística Cognitiva para saber si el mundo virtual toma sentido con metáforas y dominios cognitivos. Como lingüistas nos hacemos dos preguntas. La primera es si somos capaces de comprender internet, algo abstracto, y el modo en que navegamos por la red, transfiriendo significado del mundo real al mundo online a través de metáforas conceptuales. La segunda pregunta es si los dominios web (las direcciones de las páginas web) son conceptualmente comparables con los dominios cognitivos que se activan en nuestras mentes al percibir cualquier concepto.

En resumen, nuestro breve análisis, que es parte de una investigación más extensa, aporta una teoría sobre cómo los lectores digitales configuran el significado de las páginas web a través de metáforas conceptuales, y también aporta un nuevo marco de estudio que examina cómo los dominios web deberían estar configurados para que el lector sepa cuál va a ser la temática de esa web.

Palabras clave: Teoría de la Metáfora Conceptual, lectura digital, Modelos Cognitivos Idealizados.

## 1. Theoretical Framework

With the growing usage of the Internet, much research has appeared about the knowledge and skills that the general public needs to engage with the media (Eshet, 2004; Lankshear and Knobel, 2008). These competencies encompass what is called digital literacy (Gilster, 1997). From a Cognitive Linguistic approach, the question we pose in this paper is: how do adults understand websites and configure their meaning and usage?

Children and young people approach the Internet in a natural way because they are born with the online world in their lives; adults, on the contrary, approach the Internet as a medium to perform an action such as sending an email or looking for certain information. Internet didn't exist when our generation was born, and the way we understand these online situations may constitute an interesting point of research. Thus, researchers such as Toms & Campbell (1999: 3) have remarked that our digital literacy has provoked research on how users interact with online genres. Others suggest that the patterns that users follow when navigating through the Internet could be directed by previous knowledge about spatial models such as site, house or journey (Navarro 2008; Navarro *et al.* 2008; Navarro, Aguado and Silvestre, 2008; Navarro & Silvestre 2009).

The aim of this paper is to spread some evidence on the metaphorical models that may help users understand the way websites and its addresses are structured, and identify and comprehend concepts that do not exist in the real world.

## 2. How do we understand websites?

Girón-García and Navarro (2014: 162) state that digital reading may be seen as a cognitive process through which users establish relationships between what they perceive in the screen and their previous knowledge configurations in order to associate meaning to a digital environment.

Readers may transfer their previous knowledge of other genres and their social and individual experience when approaching a website. This means that they are understanding one idea (e.g. a blog) in terms of another (e.g. a real newspaper), that is, readers may understand the virtual world through conceptual metaphors from the real world. This idea was first introduced by Lakoff and Johnson (1980: 5). They pointed out that «the essence of metaphor is understanding and experiencing one kind of thing in terms of another». For instance, we are understanding TIME in terms of MONEY, and so we have the conceptual metaphor TIME IS MONEY (e.g. You are wasting my time, this app will save you hours, etc.). In this example, we use a metaphor as a mapping from MONEY (source domain) to TIME (target domain); we use the concept of money (specific) to talk about the concept of time (abstract).

Thus, if we take the example of the metaphor READING A WEBSITE is VISITING A LOCATION, the Idealized Cognitive Model (henceforth ICM) (Lakoff, 1987) for our understanding of visiting a location offers us the information, concepts and relations we need in order to configure our knowledge about how to read a website (Girón-García and Navarro, 2014).

### 2.1. *Question one: a cognitive linguistic approach to metaphors*

In this paper we try to see how metaphorical models may «provide a conceptual guide for users to construct meaning through their trajectories across hypertexts» and websites (Girón-García and Navarro, 2014: 167). This means that when readers activate, mainly unconsciously, a certain metaphorical model, it gives them expectations about the text (the website), how to look at it and how to manage that information. We could even state that it is the reader, with the activation of those mental models, who constructs meaning, and thus the website (the set of texts, icons, images, page frames, etc.) is coherent and makes sense. (Navarro and Silvestre, 2009).

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## 2.2. *Question two: a cognitive linguistic approach to website addresses*

Taking into account the above mentioned ICMs, the same setting of the virtual world, which may configure its meaning through metaphors, could be transferred to the concept of web addresses (domains).

Every site on the Internet has a name, an address, called domain; our proposal in this paper is that these domains could be identified in terms of cognitive domains since they activate a whole mental model. This concept may be better understood with the following graph.

We perceive a concept (by reading or hearing it, e.g. «radio»), and if we know that concept, our knowledge about it helps in the comprehension of the concept, and then a mental model is activated. The same happens with website domains. When we read a website address, if that address contains keywords or metaphors from which we can deduce a meaning, our knowledge about those keywords or metaphors helps us understand what that website is about. On the contrary, when we read a website address which contains no keywords or metaphors that connect that address with the content of the website, then the reader does not activate any ICM, and thus cannot be able to know what the website is about until the reader visits the site and reads its content.

This new view could be an essential point for brand marketers because it would help companies to select the appropriate domain (address) for their websites, and thus lead to more clicks. What we state here could also be a cognitive linguistic explanation to the fact that Google better ranks those websites whose domains contain words that specify the content of the website (that is, keywords about the content of the website). Our analysis is

presented here as a Mental Hypothesis of Website Domains.

## 3. Methodology

For the analysis of question one, we select different types of websites according to the different genres they represent and the several ICMs they activate in the reader's mind:

www.wikipedia.com and www.facebook.com

Then we look for the most recurrent metaphorical linguistic expressions in order to analyze which conceptual metaphors they refer to, because according to Kövecses (1993), the existence of a conceptual metaphor is revealed by the occurrence of metaphorical linguistic expressions. Finally, we analyze the configuration of those cognitive models.

For the analysis of question two, as we come from the field of Linguistics, we search on the Internet the arbitrary term «learning languages». With the results obtained from that search, we chose the ones that better explain our Mental Hypothesis of Website Domains.

## 4. Analysis and results

### 4.1. *Question one (Do we understand a website through conceptual metaphors?)*

Online readers interact quite a lot with websites: they make decisions as they click on icons, they

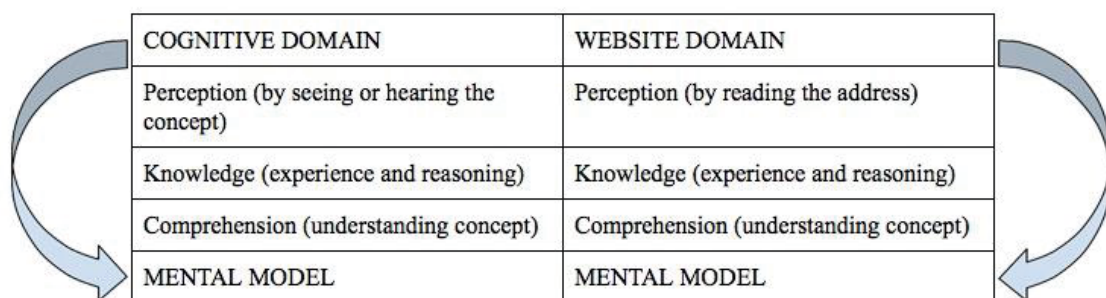


Figure 1. *Cognitive domains vs. website domains*

write opinions, share information, etc. According to the ICMs, they will understand this interaction with the screen by means of their previous knowledge or experience. Navarro & Silvestre (2009) have illustrated five source domains that map onto the «website» domain: house, site, journey, book and net. Let us explain what these domains entail:

*The House Model*

According to this model, we approach a website as if we were entering or visiting a house, where some activities or events are going to happen. When we enter the house we may give a password or sign in and then we get logged in. There may be a house master who welcomes visitors and invites us to come in. Once we are in the house, we may walk through the different rooms (go back and forth through different pages and links), and within each room we may search for some objects or info we need. There can even be some rooms destined to particular purposes such as a chat room, or we can even write a post on a message board.

*The Site Model*

This model contains a site master who welcomes and invites visitors to go around. Visitors may sign in and remain logged, or they may move back and forth a path (links, menu). Visitors may need a sitemap to move through the site and even directions with you-are-here indications. Some sites contain shops or an info desk where visitors can approach and get answers (FAQs).

*The Journey Model*

This model takes into account a location where a journey begins and ends. The house indicates the point of departure to any destination. Visitors (surfers) may use menus for navigation.

*The Book Model*

The Book Model reminds visitors of the conceptualization of the reading process in traditional formats. Pages, table of contents, next page, and even bookmark may appear in these websites.

*The Net Model*

This model is activated by the expression link. Links may refer to buttons and marked expressions that lead to other screens.

For our present inductive research, we analyze just the main page of each site to make it simple and clear. We select certain linguistic expressions and even symbols that match the metaphorical models previously mentioned. The analysis of the selected websites proceeds as follows:

Wikipedia:

HOUSE MODEL	SITE MODEL	JOURNEY MODEL	BOOK MODEL	NET MODEL
Sign in	Sign in	Search	Main page	
Logging	Logging	Explore	Contents	
Welcome	Welcome		Browse	
Rooms			Index	
			Print / Export	
			Create a book	

Figure 2. Table of mental models

What this table reveals is that Wikipedia website shows certain aspects of four domains: house, site, journey and book, where book is the most remarkable one. We can see some examples of these domains in the following extract:

Welcome to Wikipedia, Create account, Log in, Search, All Portals (rooms), Main Page, Contents, Featured Contents, etc.

Thus, the Book Model maps into aspects related getting information, like finding or classifying that information, which is the aim of Wikipedia.

Facebook:

HOUSE MODEL	SITE MODEL	JOURNEY MODEL	BOOK MODEL	NET MODEL
Sign in	Sign in			Net
Logging	Logging			Connect
Invitation				
Password				

Figure 3. Table of mental models

Facebook main page has little information but it is clearly a house model with a touch of the net model in the image that shows a world map with people connected by a net. The House Model makes visitors virtually interact with that house (that site)



and with its inhabitants (other users or web masters), which is the aim of Facebook.

#### 4.2. *Question two (Do we grasp the meaning of a website domain through ICMs?)*

For our analysis we search for the arbitrary term «learning languages» in an online browser and we find several interesting results:

www.learning-languages.com  
www.babbel.com  
https://www.duolingo.com  
www.learnalanguage.com  
www.livemocha.com  
www.busuu.com

According to our Mental Hypothesis of Website Domains, we divide these website domains in two types, which we call Mental-Model Activators and Mental-Model Inhibitors. Mental-Model Activators are those websites whose addresses (their domain names) contain keywords which may help readers deduce what the website is about, that is, what they can expect from it. On the contrary, Mental-Model Inhibitors are those websites whose domain names (addresses) do not contain any keywords or metaphors which allow readers to infer their content. Let us see some examples:

MENTAL-MODEL ACTIVATORS	MENTAL-MODEL INHIBITORS
www.learning-languages.com	www.duolingo.com
www.learnalanguage.com	www.livemocha.com
www.babbel.com	www.busuu.com

*Figure 4. Example of mental models*

Mental-Model Activators:

- learning-languages.com: it activates the ICM of learning a language, because its domain contains words that specify the content of the website;
- learnalanguage.com: this website also activates the ICM of learning a language, because its domain contains words that specify the content of the website;
- babbel.com: this is an interesting website domain because even though it doesn't contain specific

words that tell us what the website is about, we can infer its meaning through our knowledge of the word «babbel», which functions as a conceptual metaphor in this case.

Mental-Model Inhibitors:

- duolingo.com: this website domain could be classified into the two types of domains, and its classification depends on the knowledge the visitor has. According to the company, duolingo comes from «duo» + «lingo», that is, «two languages». This can be inferred depending on the knowledge and skills of the visitor, so duolingo.com could be a Mental-Model Activator and a Mental-Model Inhibitor;
- livemocha.com: this website domain doesn't activate any mental model of the concept of learning languages. The name «Livemocha» is meant to evoke the relaxed atmosphere of a coffee shop, so it is up to the visitor to configure its meaning;
- busuu.com: the founders of this online website said that they wanted to do something about the extinction of the Busuu language, so they used that name for their company. This name, even though it activates the ICM of «languages» (just for those who know that that language exists), doesn't activate the specific ICM of «learning languages».

Our analysis leaves the door open to further research on the settings of website domains and how those names can lead visitors to click on one site or another, that is, choosing the proper website domain may lead to more visits and, consequently, to more online sales and increasing website analytics.

## 5. Conclusions and further research

The inferences that we can draw from our analysis can be well explained according to Navarro and Silvestre's ideas (2009: 288)

... each source ICM contributes to our understanding of websites as discursive organizations. Consequently, each model will prompt its own inferential patterns when the users give them preeminence in the process of reading a website. If the users prime the House Model, their first decisions might

focus on reading the text on the home page in order to become familiar with the webmaster's background and purpose. Probably signing in to become a member would be one of the user's interest.

The results of the present study try to guess how metaphorical ICMs may guide the reader's usage and understanding of a website, and how the activation of ICMs can play a major role in the selection of website domains, since the design of a certain address may prompt readers to click on it or not.

Further research is needed in order to find out to what extent these mental structures based on conceptual metaphors (or metaphorical ICMs) are the same for the website developer and for its users.

Further research is also needed in order to know to what extent these cognitive models guide the users' navigation.

Our analysis of metaphorical virtual spaces and our emergent theory about the conceptual equity between cognitive domains and website domains could be a point to consider for marketers and SEO experts, since when a website structure and keywords match with the mental model they are supposed to activate, what we obtain is a very powerful website which could be, additionally, ranked in the first places by Google, which may be one of the most important objectives for companies in the present days.

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# Competencias geoespaciales para la mejora de la calidad de vida de las personas mayores: el proyecto OUTDOOR ICT

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## Abstract

There are numerous tools in the field of digital mapping and geospatial skills nowadays. ICT learning and the development of e-competences on these issues could facilitate both the integration and also a higher standard of living to the elderly. By using web 2.0 mapping applications, users can create their own maps and share them with other people, what can mean a step forward in the empowerment of the citizens. The main objective of the OUTDOOR ICT project was to provide opportunities for exploring ways of applying knowledge gained in the field of ICT to the promotion of active lifestyle by using GPS devices in cultural routes.

Two aspects that we consider to be essential for people over fifty in present-day society converge on this experience, namely digital competence stimulation and promotion of active methodologies for learning such as field work through an awareness of heritage and environmental issues, and a more active and healthier lifestyle. To that end, we have developed a learning activity in the area of geocaching by means of common mobile GPS (mobile phones or tablets) with free software (as Google Maps or Goggles), using Malaga and Antequera historic city-centres as operation fields. The research methodology of the results has been extensively based on questionnaires, and a very positive feedback has been obtained from the participants.

Keywords: geospatial skills, Web 2.0 mapping, geocaching, GPS devices, citizenship empowerment.

## Resumen

Existen numerosas herramientas en el ámbito de la cartografía digital y las competencias geoespaciales en nuestros días. El aprendizaje de nuevas tecnologías y el desarrollo de competencias digitales sobre estas cuestiones podrían facilitar tanto la integración como la mejora de la calidad de vida de las personas mayores. Mediante el uso de la cartografía web 2.0, los usuarios pueden crear sus propios mapas y compartirlos con otras personas, lo que puede significar un paso adelante en el empoderamiento ciudadano.

El principal objetivo del proyecto OUTDOOR ICT fue la creación de oportunidades para explorar formas de aplicar conocimiento adquirido en el campo de las TIC para la promoción de un estilo de vida activo mediante el uso de dispositivos GPS en rutas culturales.

Dos aspectos que consideramos esenciales para las personas de más de 50 años en la sociedad actual convergen en esta experiencia: el estímulo de las competencias digitales y el uso de metodologías activas de aprendizaje como el trabajo de campo mediante la sensibilización sobre cuestiones patrimoniales y medioambientales y el estímulo de un modo de vida más activo y saludable. Para tal fin, se ha desarrollado una actividad de aprendizaje en el área del *geocaching* mediante el uso de dispositivos GPS comunes (smartphones y tablets) con software libre (como Google Maps o Goggles), utilizando los centros históricos de las ciudades de Málaga y Antequera como campos de operaciones. La metodología de investigación de los resultados se basó fundamentalmente en cuestionarios, y se obtuvo una respuesta muy positiva por parte de los participantes.

Palabras clave: competencias geoespaciales, cartografía 2.0, *geocaching*, dispositivos GPS, empoderamiento ciudadano.

## 1. Introducción

La creciente importancia de la geolocalización en la sociedad actual refuerza el uso del GPS. Un gran número de personas ya lo utilizan, aunque aún queda el reto de su empleo en la enseñanza y aprendizaje de la educación de adultos, y más concretamente del adulto mayor. El trabajo de campo cobra una nueva dimensión con el uso del GPS, al integrar la información procedente de este en otras informaciones de índole geográfica, de modo que aporta nuevas formas de enseñanza en lo referente a las TIC en el ámbito de la geografía.

En los últimos años, se ha generalizado la visión de la tierra representada en tres dimensiones multirresolución, posibilitada por una serie de acontecimientos, como son la mejora de la potencia de los ordenadores y de los programas; la expansión y mejora de internet; la creación de globos virtuales, como por ejemplo, Google Earth; las infraestructuras de datos espaciales (IDE) en el marco de la directiva europea INSPIRE; el incremento de sensores remotos y terrestres, y más recientemente, las tecnologías emergentes que vienen de la mano de los dispositivos móviles (apps). Todo esto ha supuesto una revolución en la información geográfica, consistente en el incremento de la cantidad de geoinformación y la multiplicidad de formatos y posibilidades de acceso a esta (De Lázaro y Delgado, 2013).

A estas mejoras tecnológicas, hay que añadir la enorme proliferación de las aplicaciones y recursos existentes en la Web 2.0, que posibilita la creación colaborativa de contenidos de diferente naturaleza, destacando la cartografía digital, entre otros. Es, por tanto, necesario un esfuerzo para mejorar el aprendizaje de competencias geoespaciales en la población adulta mayor con el fin de aminorar los efectos de la brecha digital tanto como sea posible, así como ofrecerles conocimientos y destrezas en pos de una mejora de su calidad de vida.

Todo esto puede enmarcarse en la línea de la Agenda Digital 2020 de la Unión Europea, que pretende impulsar este campo científico-tecnológico, y en el programa recientemente creado por la ONU denominado «Global Geospatial Information Management» (UN-GGIM, 2014), que está relacionado con el manejo de la información geoespacial.

La utilidad del GPS se deriva del aprendizaje, comprensión y aprovechamiento de los datos toma-

dos en el territorio que visitamos a partir de los dispositivos móviles y su integración en aplicaciones informáticas que nos permitan ver las imágenes de dicho lugar. Esto es hoy posible mediante las citadas WebSIG (Milson, 2012).

Vamos a exponer algunas sugerencias para su empleo, pensando especialmente en el adulto mayor y desde el enfoque ya señalado de la Web 2.0, en la cual la persona adopta un papel activo con respecto a los contenidos y aplicaciones existentes en internet, y puede participar activamente en la incorporación de nuevos contenidos, muchos de ellos con un significado o soporte geoespacial, y con diferentes propósitos.

El análisis territorial desde la perspectiva de divulgar realidades espaciales del entorno que habitamos es un aspecto de aplicación fundamental. Se deriva del trabajo de campo, siendo fundamental el uso del GPS para la obtención de datos y su georreferenciación. Algunos ejemplos de análisis territorial, en función de distintos objetivos, serían los siguientes (De Lázaro y Delgado, 2013):

- Detección de barreras para la movilidad. Para ello sería necesario rastrear el barrio y tomar con el GPS el punto exacto de aquellos lugares de difícil acceso para personas mayores o impedidas, bien porque no exista un paso de peatones, bien porque el pavimento esté deteriorado, bien porque los coches aparquen donde no deben, etc. Una vez recogidos los puntos, se pueden localizar en Google Earth o en ArcGIS Online y elaborar la cartografía pertinente. Podría aportar un valor añadido al estudio el enviarlo a las autoridades locales para que tomaran las medidas oportunas. La localización exacta de los puntos siempre ayudará a una resolución del problema más rápida.
- Detección de vertederos incontrolados. De manera similar al caso anterior, sería necesario rastrear el entorno y tomar con el GPS el punto exacto de aquellos lugares utilizados como vertederos incontrolados.
- Detección de puntos negros de contaminación acústica. Para ello sería necesario rastrear el barrio y tomar con el GPS el punto exacto de aquellos lugares conflictivos respecto a la contaminación acústica. En ese sentido, existen aplicaciones sencillas disponibles que nos pueden ayu-



dar a medir los niveles de ruido del lugar donde nos encontremos en ese momento.

- Organización de una ruta o itinerario para presentar los principales monumentos o hitos de interés del lugar que habitamos o que nos gustaría destacar. Podemos acompañar estas rutas con imágenes y textos, y tener esta información completamente accesible desde internet.
- Búsqueda de aplicaciones o páginas web que nos permitan participar con informaciones georeferenciadas de interés. Un ejemplo de ello sería Google Goggles, aplicación que nos permite, haciendo una foto desde nuestro dispositivo móvil de un monumento u obra de arte, obtener otras imágenes de dicho elemento, así como información relativa a este. Es una herramienta de construcción social del conocimiento, por lo que cualquier usuario, además de consultar la información e imágenes existentes, puede añadir nuevas entradas.

En definitiva, el uso del GPS en combinación con las aplicaciones WebSIG fomenta una metodología activa, participativa, global e integradora, de modo que potencia el aprendizaje interdisciplinar y transdisciplinar y abarca el saber, saber hacer y saber ser, que el informe Delors (1996) formula. Favorece el análisis territorial y capacita al adulto mayor para comprender la multicausalidad de los procesos espaciales. Además, el fomento de las competencias digitales en esta población es crucial, pues la actual sociedad de la información, en un mundo globalizado, representa un verdadero reto que afrontar para las personas mayores. Esta sociedad es producto de la informatización generalizada de la información y de la revolución digital, y brinda un enorme abanico de posibilidades en lo que respecta a la información, la comunicación y la gestión de actividades en el día a día. Las personas mayores valoran el aprendizaje de aspectos relacionados con la informática desde una triple perspectiva: como un medio de comunicación con sus familiares y amigos, de manera que se reducen los efectos del aislamiento; como una vía de relación social, con lo que se mantienen informados en un entorno en continuo cambio, y como un recurso de ejercicio mental, de mantenerse activos (Delgado Peña *et al.*, 2009: 133-136). La presente experiencia parte de todas estas premisas.

## 2. El proyecto OUTDOOR ICT

### 2.1. *Objetivos y actividades*

El principal objetivo del proyecto OUTDOOR ICT (ref. 2011-1-HU1-GRU06-03650-2), proyecto financiado dentro del Programa de Aprendizaje Permanente de la Unión Europea, fue la creación de oportunidades para explorar formas de aplicación del conocimiento adquirido en el campo de las TIC para la promoción de un estilo de vida más activo y saludable. Para ello, hemos desarrollado una experiencia de aprendizaje en el ámbito del *geocaching* mediante el uso de dispositivos GPS móviles de uso frecuente (móviles o tablets) con software de uso libre (como Google Maps o Goggles), utilizando como terreno de actuación el casco histórico de las ciudades de Málaga y Antequera.

El *geocaching* se presenta como una actividad ampliamente extendida y cuya aplicación en el adulto mayor conlleva numerosos beneficios: mejora de las competencias espaciales y digitales, estímulo de la actividad física, sensibilización con respecto al patrimonio natural o cultural, etc. Es una actividad integradora de ejercicio físico, mental y dominio de la tecnología (aplicaciones web, telefonía móvil, etc.) en la que la edad no es un impedimento para su realización, ya que puede ser adaptada a todas las edades y niveles (Tejedor Lorenzo, 2006). Dicha actividad, que vio la luz por primera vez en mayo de 2000, consiste, generalmente, en esconder objetos en el campo o en la ciudad, apuntar sus coordenadas y hacerlas públicas para que otras personas puedan efectuar su búsqueda mediante un dispositivo de localización GPS (Cameron, 2004; Dyer, 2004; Sherman, 2004; Gillin y Gillin, 2010). En este sentido, elegimos algunos monumentos clave y establecimos un itinerario de uno a otro siguiendo una lista de coordenadas que introducíamos en dichos dispositivos, de modo que la pantalla nos mostraba la ruta más adecuada.

En lugar de encontrar un «tesoro», algo físico concreto, el tesoro lo conformaba el propio monumento, y se establecían en cada una de las paradas dos pruebas: una de observación y otra de búsqueda de información en internet (figura 1). De esta forma, se estimulaba simultáneamente el desarrollo de competencias geográficas de vital importancia como son la orientación, la interpretación de la cartografía

(plano de la ciudad) y la observación del entorno, junto a las competencias digitales al hacer uso de un software de geolocalización (Google Maps y Google Street View) en dispositivos cotidianos. Como la actividad se llevaba a cabo en equipos, también se estimulaba la interrelación y el desarrollo de competencias sociales. Hay que señalar, no obstante, que de manera previa a la salida de campo, se desarrolló una sesión en el aula de informática con el fin de

introducir al alumnado en todas estas aplicaciones informáticas, bastante desconocidas, en general, para el grupo objeto de dicha experiencia.

Habría que puntualizar una serie de aspectos importantes a la hora del diseño de una ruta en este ámbito (Delgado y Fernández, 2013): en primer lugar, es necesario establecer correctamente la longitud de esta, adaptándola al tiempo disponible y al número de paradas, no olvidando además que, debido a la naturaleza del público objetivo, no debe entrañar dificultades físicas excesivas. En el caso de Antequera, por ejemplo, hemos establecido una ruta que cubre unos 1950 metros en seis paradas. Puede verse la ruta en detalle mediante el enlace: <http://adventures.garmin.com/en-US/by/ruta-por-sevilla-este/geocaching-in-the-old-town-of-antequera/#overview>.

En segundo lugar, es crucial establecer un hilo conductor o argumento en el itinerario, algún aspecto histórico, ideológico o algún personaje que pueda aparecer en diferentes paradas de la ruta, de modo que se complete la información de manera progresiva. Para Antequera, el hecho histórico que enhebra nuestra ruta es la conquista de la ciudad mediante dos personajes fundamentales: el infante D. Fernando, el conquistador, y Santa Eufemia, una de las patronas, que aparecen de manera recurrente de alguna u otra forma en diversas paradas. Así, a lo largo del itinerario, se suceden datos complementarios, y se configura al final una historia coherente y perfectamente argumentada con las pruebas de observación y de búsqueda de internet de las diversas paradas. Desde el punto de vista patrimonial, este tipo de actividades de conocimiento y sensibilización puede

Abra Google Maps y ponga las coordenadas de la siguiente parada: 37.01623,-4.55790

### Parada 1

**Hemos llegado a...** \_\_\_\_\_

Esta es una de las principales plazas de la Antequera del Siglo XVIII con magníficos edificios a un lado y otro, como son el Convento de Santa Catalina y el Palacio de Najera (actual Museo Municipal). El centro lo domina la estatua ecuestre del Infante Fernando, conquistador de la ciudad en 1410.

**Prueba visual**

Entre ambos edificios existe una fuente. ¿Qué representan las figuras de los caños? ¿Qué animal está también presente? ¿En qué año fue construida? \_\_\_\_\_

**Búsqueda en Internet**

¿Qué dos famosas esculturas masculinas se pueden ver en el Museo Municipal, una del S. I y otra del S. XVII? \_\_\_\_\_



Figura 1. Actividades de la parada 1 de Antequera



Figura 2. Grupo de participantes europeos en el itinerario de Málaga

conllevar efectos muy positivos, más aún si hacemos uso de anécdotas o leyendas que enriquezcan el recorrido, y despierten el interés y la motivación de los participantes. Hay que subrayar la importancia del componente experiencial de lo aprendido, de tal modo que ligando los contenidos del itinerario a sentimientos de bienestar, de júbilo, al descubrir un detalle curioso o interesante, o al escuchar una anécdota divertida, por ejemplo, el proceso de aprendizaje pueda verse profundamente reafirmado.

## 2.2. Resultados y conclusiones

Para evaluar dicha actividad se llevó a cabo un estudio exploratorio mediante una metodología cuantitativa basada en cuestionarios de valoración completados por los participantes al final de la experiencia. Tras las dos actividades realizadas se obtuvieron 27 encuestas válidas completadas por alumnos/as del Aula de Mayores de la Universidad de Málaga y por participantes del proyecto pertenecientes a otras entidades socias. La muestra no es representativa de la población total, si bien sirve como estudio exploratorio previo (tabla 1). La elección de los participantes se basa en los criterios siguientes: *a*) edad a partir de 55 años (y hasta 84 años en nuestro caso); *b*) representación variada de las principales características (género, nivel educativo, nivel socio-económico, etc.), y *c*) como ya hemos señalado, relacionados de antemano con el proyecto.

Tabla 1. Ficha técnica de la investigación cuantitativa

Ámbito de estudio	Aula de Mayores (Universidad de Málaga)
Metodología	Cuestionario anónimo a cumplimentar en papel
Población objeto de estudio	Más de 100.000 habitantes
Tamaño de la respuesta	25 participantes
Error muestral	20 %
Nivel de confianza	95 %; $Z = 1,96$ ; $p = q = 0,50$

Fuente: J. García Mestanza.

En la encuesta valorativa efectuada, se valoraron una amplia variedad de aspectos, y se marcó una de las cinco posibilidades para las afirmaciones propuestas (Escala Likert, donde 1 = completamente en desacuerdo; 2 = desacuerdo; 3 = ni de acuerdo ni en desacuerdo; 4 = de acuerdo; 5 = totalmente de acuerdo). Los resultados de las cuestiones planteadas se reflejan en las figura 3. Como se aprecia en esta gráfica resumen sobre los diferentes aspectos planteados en la cuarta pregunta referentes a la actividad formativa llevada a cabo, prácticamente todos los ítems analizados presentan las máximas puntuaciones (al menos el 96 % de los participantes han contestado a los ítems con 4 y 5), señal de su satisfacción general, tanto por los aspectos aprendidos como por la metodología y recursos llevados a cabo.

Si hacemos una especial reflexión sobre aquellos ítems con una valoración inferior, vemos que no coinciden con los referentes al desarrollo de la actividad, a su satisfacción personal o a la metodología práctica utilizada, cuyos resultados son óptimos. Algo inferiores fueron los resultados sobre la posibilidad de uso y utilidad de lo aprendido de manera posterior al curso, lo que muestra la necesidad de reforzar la aplicabilidad de lo aprendido tras la actividad formativa, mediante, por ejemplo, la aplicación más patente de los dispositivos de geolocalización en el día a día, para encontrar, por ejemplo, alguna dirección necesaria, o utilizar aplicaciones Web 2.0 de interés, entre otras. Por los resultados vemos que se valora muy positivamente el trabajo en equipo y la posibilidad de compartir lo aprendido con otros. Finalmente, y como cabía de esperar, el trabajo de campo está mejor valorado que la sesión teórica en el aula. El componente experiencial y más íntimamente ligado con la realidad cercana aporta, sin duda alguna, un matiz de motivación difícil de emular en el aula.

En definitiva, la vivencia de los participantes, la planificación, el desarrollo de la actividad, así como sus futuras aplicaciones, muestran una excelente acogida por parte de los participantes.

La última cuestión está integrada por cuatro valoraciones que van desde el 0 (nada) al 10 (absolutamente) a las siguientes cuestiones: uso del GPS, realización de rutas GPS, utilización de programas para crear rutas y utilización de Google Maps u otros programas similares (figura 4). Aunque los resultados se muestran positivos, es patente la necesidad de profundizar en estos temas mediante actividades



y metodologías que puedan ayudar al adulto mayor a conocer más y mejor las potencialidades del uso de las tecnologías referentes a la geolocalización (GPS, *geocaching*, aplicaciones WebSIG, etc.).

Tras el análisis de las principales valoraciones de las encuestas, algunas conclusiones generales podrían ser las siguientes:

- La mayoría de los participantes muestran gran interés en los temas relacionados con el uso de nuevas tecnologías aplicadas a aspectos geográficos como la orientación o la sensibilización hacia el entorno más cercano desde una perspectiva del análisis territorial.
- Se muestran, además, motivados para continuar participando en actividades de aprendizaje en esta dirección, preferiblemente mediante metodologías de enseñanza activa, como las salidas de campo, en nuestro caso.
- En relación con la metodología de enseñanza, se ha visto claramente la necesidad de vincular los conocimientos adquiridos con las experiencias y vivencias del adulto mayor, acercándoles las

potencialidades de aplicación de lo aprendido a su rutina diaria y a favor de una mejora de la calidad de vida.

La experiencia llevada a cabo aporta información acerca de un tema de mucha actualidad y relevancia, como es el de la adquisición de competencias geográficas mediante la utilización de las TIC por parte del adulto mayor, que es consciente de que estas pueden favorecer el aprendizaje de competencias útiles e interesantes para su vida diaria. Prácticamente la totalidad afirman tener previsto continuar realizando actividades en esta dirección, por lo que sería necesario ofrecer un mayor número de programas, cursos o actividades que satisfagan dichas necesidades emergentes. Parece necesario desarrollar los servicios adecuados que exige esta demanda, cuyo porcentaje de población interesada es cada vez más elevado, tanto mediante la creación de cursos específicos y de las infraestructuras y equipamientos necesarios, como a través de la formación de personal especializado para este perfil de alumnado.

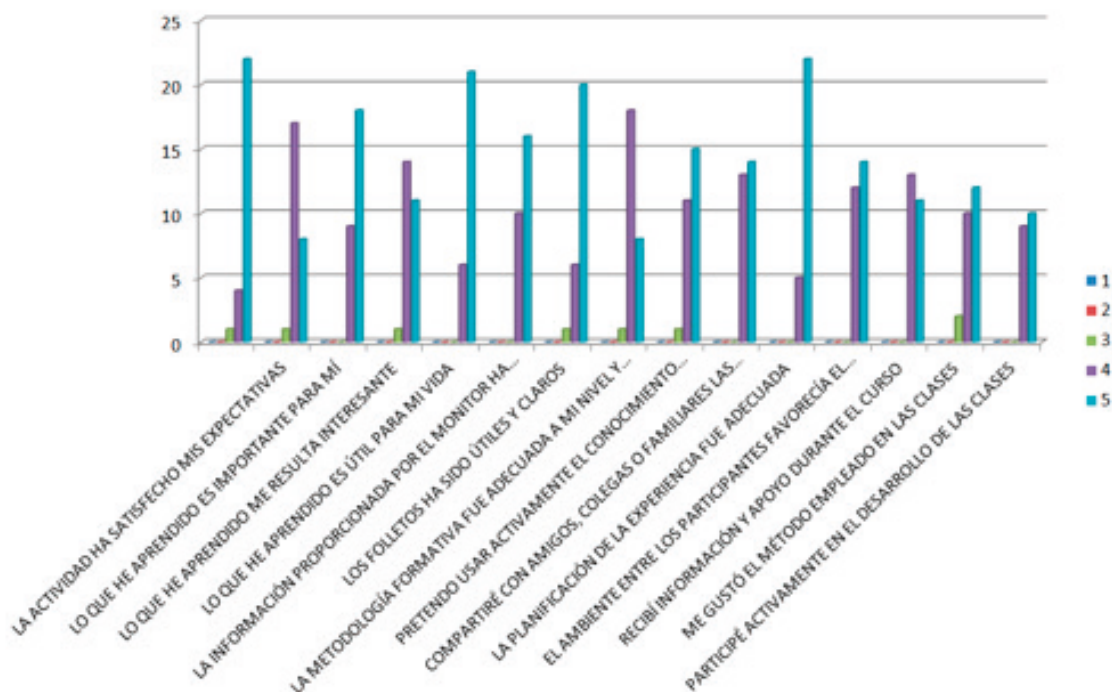


Figura 3. Respuestas de algunas de las cuestiones fundamentales del cuestionario de valoración



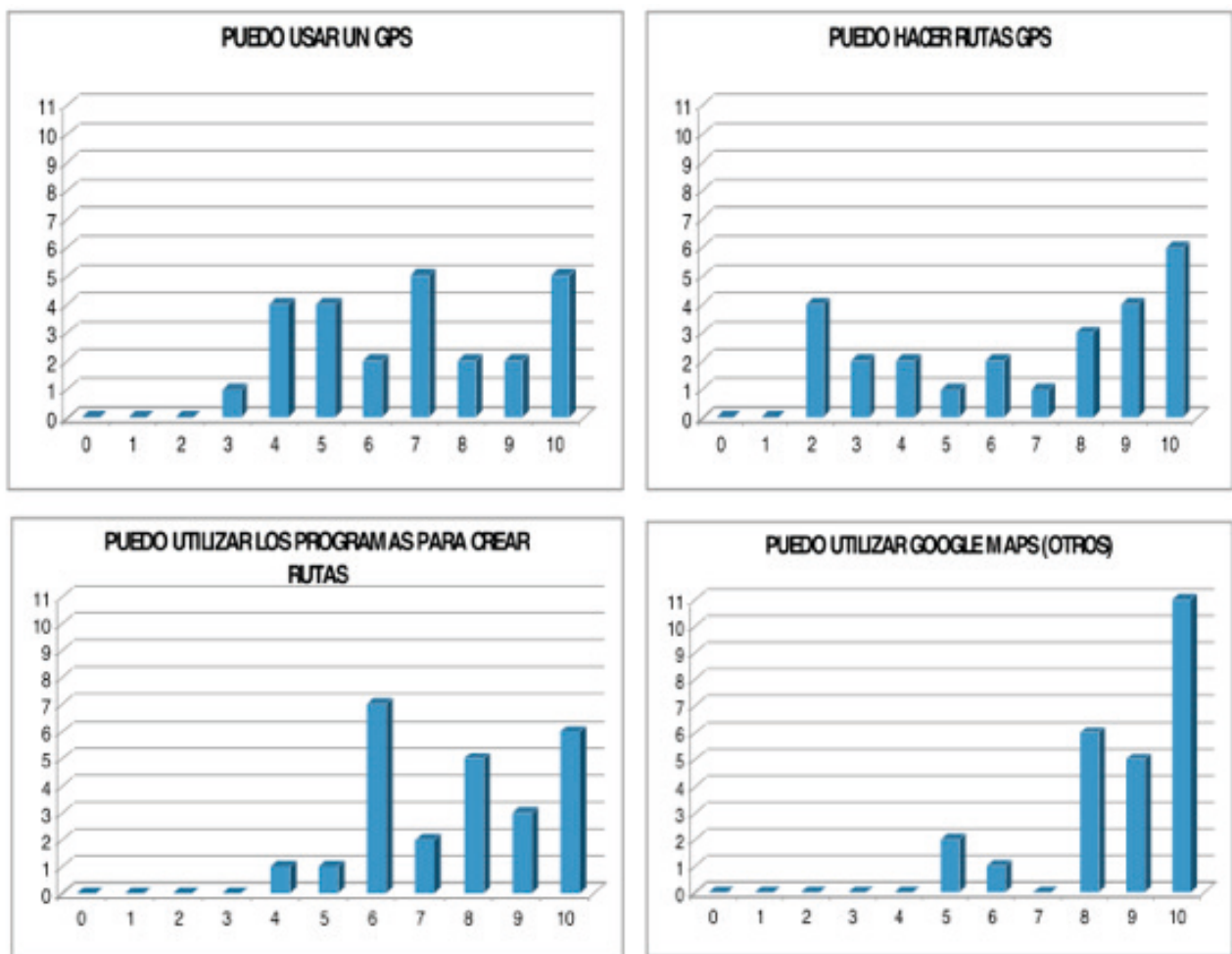


Figura 4. Distribución de la población encuestada con relación al uso del GPS, a la posibilidad de hacer rutas GPS, a la posibilidad de utilizar programas para crear rutas y al uso de Google Maps

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# éBRICKhouse de équipe VIA-UJI y el concepto DIY

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## Abstract

The repair and rehabilitation of our house rely heavily on the particular interest of owners/users and climatic zones or regions. They also depend on the skills and tools available to facilitate this work.

Nowadays, Europe wants to reduce CO<sub>2</sub> emissions generated by buildings up to 20 %. Then, it is necessary to consider a new production model able to act on most of the properties. Therefore équipe VIA-UJI studies the model DIY (do it yourself) in the city of Castellon, as representation of a Mediterranean region, in order to conclude that the tools and the interest in DIY are evident. It would be necessary to streamline the model by means of a proper coordination and technical advice, which help distinguishing between more and less efficient solutions in the presence of an energetic rehabilitation. This action may be broadly deployed throughout the national territory and in particular through out the Mediterranean area.

Keywords: DIY (Do it yourself), sustainability, auto-construction, industrialisation, architectural design, applications and tools.

## Resumen

Los trabajos de reparación y rehabilitación en nuestras casas dependen en gran medida del interés particular de los propietarios/usuarios y de las zonas climáticas o regiones, pero también dependen de los conocimientos y herramientas disponibles que facilitan esta labor.

Actualmente Europa quiere reducir la emisión de CO<sub>2</sub> que generan los edificios hasta un 20 %. Esto hace necesario plantear un nuevo modelo productivo para poder actuar en la mayoría de los inmuebles. Por esta razón équipe VIA-UJI estudia el modelo DIY (*do it yourself*) en la ciudad de Castellón, como representación de una región mediterránea, para poder concluir diciendo que las herramientas y el interés por el DIY son evidentes, pero faltaría dinamizar el modelo a partir de una correcta coordinación y asesoramiento técnicos que ayuden a distinguir entre las soluciones más o menos eficientes ante una rehabilitación energética. Dicha acción que podría desplegarse ampliamente en todo el territorio nacional y en especial, en la zona mediterránea.

Palabras clave: DIY (*do it yourself*), sostenibilidad, autoconstrucción, prefabricación, diseño arquitectónico, aplicaciones diseño, herramientas.

## 1. Concepto DIY (*do it yourself*)

La abreviación DIY (*do-it-yourself*) es la actividad de decorar y reparar elementos de nuestra casa: hacer las cosas nosotros mismos en vez de pagar a alguien que nos lo haga.

## 2. Concepto DIY para éBRICKhouse

«The ethic style of life» es el lema que incluye todos los valores y principios con los que equipo VIA-UJI se ha querido identificar al presentar su proyecto a la competición de casas solares: Solar Decathlon Europe 2014, proyecto que se ha materializado con el prototipo éBRICKhouse. éBRICKhouse es un prototipo modular, prefabricado y autosuficiente energéticamente hablando. Pretende ser funcional para sus usuarios, práctico y fácil de construir y, tanto por sí mismo como durante su proceso constructivo, promueve el respeto a la cultura medioambiental. El respeto se traduce en los siguientes principios: el uso de materiales 100 % reciclables o bien certificados C2C, con un sistema de colocación llamado DIY («Hazlo tú mismo», traducción de las siglas en español) que favorece la socialización de sus usuarios y la integración de un entramado profesional de pequeña empresa. Además, considera que la agricultura debe ser parte de nuestras vidas, por ello, con la tendencia de permacultura, introduce la naturaleza en el propio edificio o bien en el entorno urbano próximo.

## 3. DIY como objeto de estudio en edificación

El objeto de estudio en esta comunicación es conocer cómo DIY se refleja en el sector de la edificación y cómo este se relaciona con la sociedad y concretamente con las personas mayores. Para ello, se han realizado entrevistas a personas de diferentes edades de Castellón, para conocer el grado de interés por la autoconstrucción.

El sector de la construcción, y concretamente la construcción y rehabilitación de edificios en España, se caracteriza por la gran inclusión de profesionales autónomos, expertos o no, que realizan la mayoría de los cambios y reformas en obras privadas. Esta práctica se ha incrementado aún más durante el periodo de crisis. En la figura 1 podemos ver el alto número de empresas registradas en la Seguridad Social de pequeño tamaño.

Es habitual en el sector de la construcción que pequeñas empresas y los propios usuarios desarrollen las tareas de reforma y rehabilitación. Bajo el concepto DIY en éBRICKhouse se pretende promocionar una autoconstrucción dirigida y controlada, cuya finalidad es conseguir edificios más eficientes y de consumos de energía casi cero.

La construcción incontrolada y sin razón de ser no se corresponde con las tendencias por el respeto medioambiental. La necesidad de una vivienda digna es un derecho de todo ciudadano, por lo que partiendo de otros sistemas económicos, podemos pensar que el DIY podría ser una solución adecuada, por varias razones:

1. Porque si se hace de manera individual, favorece y desarrolla las habilidades personales.
2. Porque si se hace de manera colectiva, es una forma de socializarse entre personas.

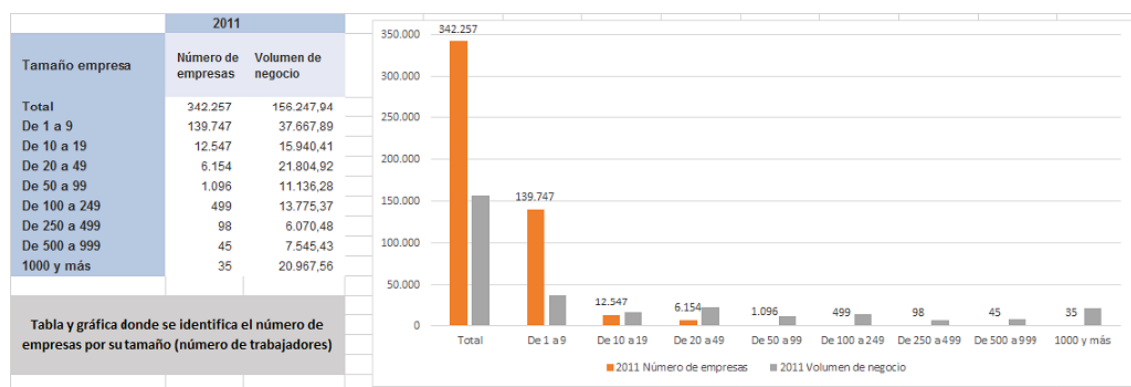


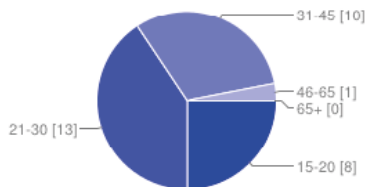
Figura 1. Número de empresas de la construcción según número de trabajadores

3. Porque genera redes para el intercambio de conocimientos.

En definitiva, su aplicación desarrolla de manera sociocultural al ciudadano. Con esta situación, lo

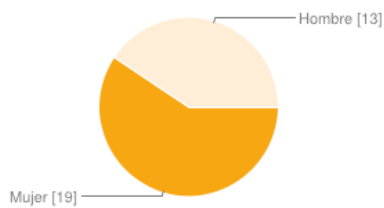
primero que debemos conocer es el interés que existe entre los ciudadanos más jóvenes de Castellón por realizar las reformas o trabajos por ellos mismos en sus casas (figura 2).

**1. ¿Qué edad tiene?**



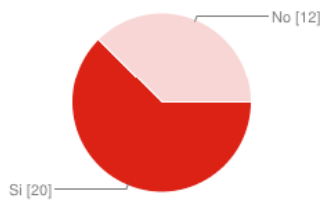
15-20	8	25%
21-30	13	40.6%
31-45	10	31.3%
46-65	1	3.1%
65+	0	0%

**2. Seleccione su sexo.**



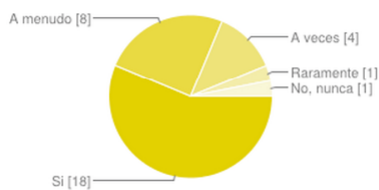
Mujer	19	59.4%
Hombre	13	40.6%

**3. ¿Había escuchado hablar antes sobre "Do it yourself"?**



Si	20	62.5%
No	12	37.5%

**4. ¿Le gusta preparar o reparar las cosas por usted mismo/a (comida, ropa, muebles)?**



Si	18	56.3%
A menudo	8	25%
A veces	4	12.5%
Raramente	1	3.1%
No, nunca	1	3.1%

**5. Si usted no está o no está muy interesado en hacer cosas por sí mismo/a, que afirmación le convencería más el "Do it yourself"?**

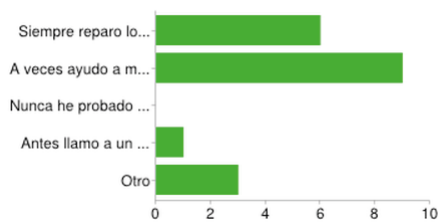


Figura 2. Resultados de la encuesta del interés por DIY en Castellón

#### 4. DIY como solución a problemas en rehabilitación

El concepto éBRICKhouse se creó desde su origen como una solución para resolver problemas actuales de nuestras ciudades. El problema de la rehabilitación energética de edificios es uno de ellos, que debido a la crisis económica y del sector se está viendo muy afectado. DIY podría dar una solución que de manera particular podría ayudar a potenciar «la regeneración urbana». Intervenciones que técnicamente dirigidas podrían ayudar a mejorar la rehabilitación energética de los edificios.

Además, la regeneración urbana implica otros muchos factores, en los que DIY podría intervenir, como la socialización e integración entre los ciudadanos, con la creación de redes sociales para el intercambio de experiencias, para integración social, integración y cooperación económica.

éBRICKhouse es un prototipo que por sí mismo puede ser un espacio arquitectónico como vivienda prediseñada eficiente, modelo de referencia para todo técnico competente que deba pensar en una solución económica, adaptada a las necesidades de sus usuarios y rentable desde el punto de vista de la eficiencia energética. Pero en sí mismo éBRICKhouse representa también un conjunto de sistemas constructivos adaptables y exportables como elementos independientes que se pueden aprovechar como solución para rehabilitar de manera puntual o integral cualquier edificio de nuestro parque edificatorio, con la seguridad anticipada de que los elementos han sido testados y que tendrá un buen nivel de eficiencia tras su rehabilitación, ya sea una vivienda o todo un edificio. Aseguramos no solo la solución constructiva, sino que la unión entre los propios elementos proporciona los máximos niveles de aislamiento acústico y térmico necesarios para reducir la demanda energética.

El éBRICKhouse-DIY pretende proporcionar medios para reconstruir o adaptar nuestras casas y, en definitiva, los edificios, bien de manera puntual (sistema constructivo), bien de manera comunitaria (elementos comunitarios de edificios), de modo que se pueda contribuir al ahorro energético y a la socialización de las zonas más deprimidas de las ciudades, pero también a la recuperación de estructuras abandonadas que ayuden a mejorar el aspecto de nuestras ciudades.

#### 5. éBRICKhouse-DIY implantación

El concepto éBRICKhouse, junto con el de DIY, plantea una forma de reinventar la construcción y en definitiva el proceso constructivo actual, un proceso que desde el diseño introduce al usuario como el agente principal, por ello piensa en las necesidades de socialización, para evitar las exclusiones sociales, bien por edad, bien por estatus. Pero también piensa en una mejora del proceso constructivo en sí mismo, definiendo nuevos modelos organizativos que, además de asegurar la participación del usuario en la toma de decisiones, asegura un proceso constructivo cuya gestión del tiempo es lo primordial, así como asegurar la calidad del resultado. Resultados orientados a conseguir una mejor eficiencia energética de nuestros edificios para reducir la demanda de energía y así minimizar los costes de uso y mantenimiento, por lo que todo ello asegura a nuestros futuros edificios un mejor y más duradero ciclo de vida.

Está demostrado que, en la actualidad, la construcción no necesita materiales de mayor calidad y más innovadores, lo que realmente necesita la construcción es mejorar los procesos de colocación de

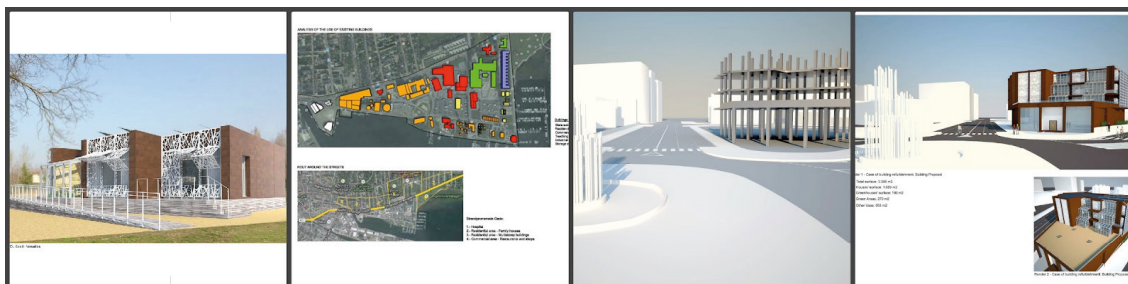


Figura 3. Propuestas de rehabilitación de estructuras abandonadas



estos, dado que algunos estudios reflejan que el 35 % de los defectos en un edificio son causados por la colocación o ejecución.

En definitiva, con nuestro prototipo y su proceso constructivo pretendemos dinamizar el sector de la construcción, pensando en desarrollar un proceso más social, pero siempre legal, con un técnico competente que llevará la dirección de la ejecución material y que, desde la modelación del proyecto o actuación en la oficina y su premontaje en fábrica, se asegure la calidad y el control de los residuos. En la fase de colocación y emplazamiento de los sistemas constructivos necesitamos soluciones sencillas y que, desde el montaje, aseguren su correcta instalación, por lo que se precisa de soluciones económicas y a su vez altamente tecnificadas y/o robotizadas. Esta propuesta necesita un proyecto de investigación que lo desarrolle y lo pruebe previamente.

Con este método se reduciría el número de agentes, para así evitar las posibles interferencias entre ellos, lo que suele provocar, generalmente, cambios y falta de control de los riesgos. Además, si el objetivo es generar obras con pocas emisiones, se deberá pensar en la reducción de medios y equipos que funcionan con energías fósiles. Si pensamos que el control del tiempo no es el principal criterio de sus promotores, en el caso de lograr monitorizar

la colocación de sistemas constructivos nos aseguramos de que en un tiempo razonable se finaliza un edificio de elevada calidad, altamente eficiente y autosuficiente.

## 6. Medios para la autoformación en construcción y rehabilitación




Lo que no podremos evitar en el proceso de autoconstrucción es la preparación y formación previas, por ello hasta que pudiesen ser desarrollados todos los medios necesarios para hacer un seguimiento en 3D, es de interés conocer los medios libres que podemos encontrar en la web. Por ese motivo se realizará un análisis de las posibilidades que ofrece, desde el aspecto técnico o social, cada una de las páginas encontradas:

- Formación en los siguientes aspectos: gráficos, bricolaje, decoración, instalaciones, materiales, puesta en obra.
- Socialización: para el intercambio de experiencias y/o intercambio de servicios.




*Figura 4. Medios audiovisuales en desarrollo (gafas 3D)*

Tabla 1. Colección de herramientas accesibles desde internet

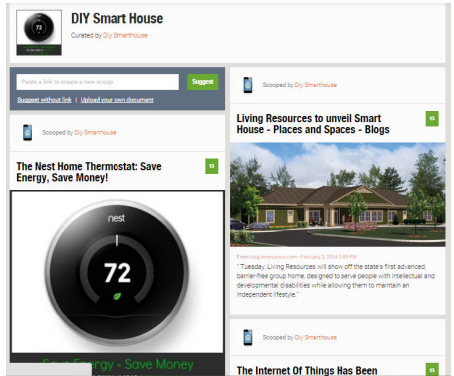
<i>Herramientas para grafismo</i>	
 <p>The screenshot shows the HomeByMe website interface. At the top, there are navigation links for 'Características', 'Galería', and 'Conectarse', along with a 'DESCARGAR' button. The main heading is 'DISEÑO DE CASA EN 3D' with a 'DESCARGAR GRATIS' button. Below this, there are three sections: 'MANIPULACIÓN DE OBJETOS EN 3D', 'MANIPULACIÓN DE PUNTO DE VISTA', and 'SIMULACRO DE LUZ SOLAR'. Each section includes a brief description and a small image illustrating the feature.</p>	<p><b>Nombre:</b> HomeByMe  <b>Descripción:</b> Programa de diseño gratuito para el grafiado de planos de una casa.  <b>Intercambio:</b> No necesita descargarse el programa.  <b>URL:</b> link</p>
 <p>The screenshot shows the Grapholite Floor Plans app interface. It features a blue house icon with the text 'Grapholite Floor Plans' and 'Aplicación'. Below the icon, there are statistics: '100 M' downloads, '3,6' rating, '1.895 A' reviews, and 'Productividad' and 'Similar' categories. A green 'INSTALAR' button is present. The text below the statistics reads 'Crear planos de planta, planos de casas, planos de la casa y los diseños de oficina'. There is also a 'MÁS INFORMACIÓN' section with a small image of a floor plan.</p>	<p><b>Nombre:</b> Grapholite planos  <b>Descripción:</b> Grapholite es una herramienta para el desarrollo de planos de manera <i>on-line</i>. Permite representar planos con aspecto profesional. Dispone de plantillas de elementos como:</p> <ul style="list-style-type: none"> <li>• Walls, windows, doors, room templates.</li> <li>• Furniture, appliances, accessories for all types of Premises.</li> <li>• Dimensioning tools.</li> </ul> <p><b>URL:</b> link</p>
<i>Herramienta para bricolaje</i>	
 <p>The screenshot shows the SKIL Power Tools app interface. It features a red house icon with a smiley face and the text 'SKIL POWER TOOLS'. Below the icon, it says 'Bricolaje para principiantes' and 'Cognito Concepts'. There are statistics: '10 M' downloads, '3,7' rating, '221 A' reviews, and 'Productividad' and 'Similar' categories. The text below the statistics reads 'Esta plataforma le ofrece planes de trabajo y recomendaciones de herramientas!'. There is also a 'MÁS INFORMACIÓN' section with a small image of a person working on a project.</p>	<p><b>Nombre:</b> SKIL  <b>Descripción:</b> Aplicación de bricolaje para principiantes.  <b>URL:</b> Cognito Concepts</p>

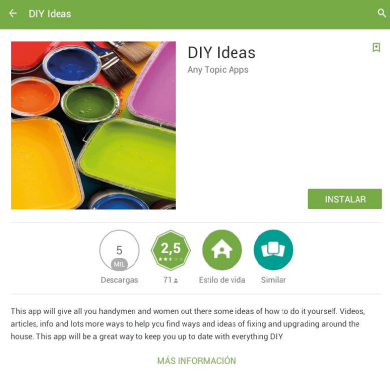


	<p><b>Nombre:</b> BRICOR  <b>Descripción:</b> Vídeos explicativos de bricolaje para reparaciones y reposiciones en casa.  <b>URL:</b> <a href="http://www.bricor.es/">www.bricor.es/</a></p>
	<p><b>Nombre:</b> LEROY MERLIN  <b>Descripción:</b> Vídeos explicativos de bricolaje para reparaciones y reposiciones en casa.  <b>URL:</b> <a href="http://www.leroymerlin.es/">http://www.leroymerlin.es/</a></p>
	<p><b>Nombre:</b> BAUHAUS  <b>Descripción:</b> Vídeos explicativos de bricolaje para reparaciones y reposiciones en casa.  <b>URL:</b> <a href="http://www.bauhaus.es/es/instalaciones-reformas">http://www.bauhaus.es/es/instalaciones-reformas</a></p>
	<p><b>Nombre:</b> Do it yourself  <b>Descripción:</b> Aplicación que describe procesos sencillos de bricolaje en casa y se comparte a través de una red social.  <b>URL:</b> <a href="http://www.doityourself.com/scat/interiorimprovement">link</a>  <a href="http://www.doityourself.com/scat/interiorimprovement">http://www.doityourself.com/scat/interiorimprovement</a></p>
	<p><b>Nombre:</b> DIY HOUSE BUILDING  <b>Descripción:</b> Aplicación que describe procesos sencillos de bricolaje en casa.</p>

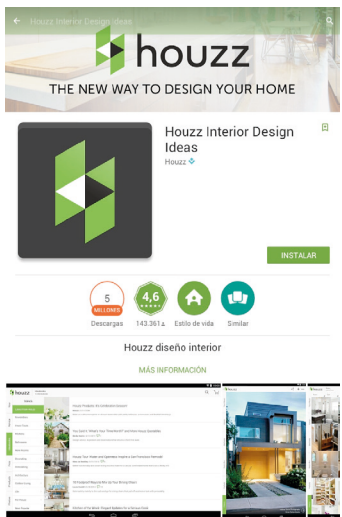
	<p><b>Nombre:</b> BRICOLAGE FACILÍSIMO  <b>Descripción:</b> Red con reportajes y foros sobre ideas y formas de realizar las reformas de la casa.  <b>URL:</b> <a href="http://bricolaje.facilissimo.com/">http://bricolaje.facilissimo.com/</a></p>
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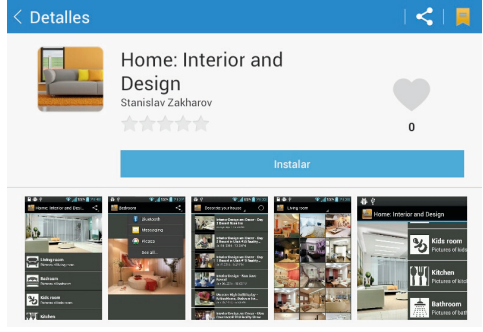

Domótica

	<p><b>Nombre:</b> DIY Smart House  <b>Descripción:</b> Blog con artículos para introducir elementos de domótica en nuestras casas.  <b>URL:</b> <a href="http://Scoop.it">Scoop it</a></p>
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	<p><b>Nombre:</b> DIY IDEAS CREATIVAS  <b>Descripción:</b> Aplicación que describe procesos sencillos de bricolaje en casa.</p>
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Redes sociales sobre decoración

	<p><b>Nombre:</b> Houzz  <b>Descripción:</b> Red social que dispone de más de 6.245.020 fotos de detalles de decoración de casas.  <b>Intercambio:</b> Soluciones de decoración.  <b>URL:</b> <a href="http://www.houzz.com/">http://www.houzz.com/</a></p>
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	<p><i>Nombre:</i> Revista de decoración Westwing  <i>Descripción:</i> Magazin de inspiración y consejos de decoración.  <i>URL:</i> <a href="http://www.westwing.es/customer/welcometour/">http://www.westwing.es/customer/welcometour/</a></p>
	<p><i>Nombre:</i> Home designer software  <i>Descripción:</i> Varios productos para soluciones arquitectónicas, interiores.  <i>URL:</i> Link</p>
<p><i>Herramienta para facilitar la subcontratación</i></p>	
	<p><i>Nombre:</i> PLAN REFORMA  <i>Descripción:</i> Planifica y haz realidad tu obra. Más de 4.000 arquitectos y decoradores para gestionar integralmente tus obras.  <i>URL:</i> <a href="http://planreforma.com/">http://planreforma.com/</a></p>
<p><i>Herramientas para una formación reglada</i></p>	
	<p><i>Nombre:</i> INSTITUTO DIY  <i>Descripción:</i> Espacio de trabajo colaborativo a través de la práctica y el trabajo compartido.  <i>URL:</i> <a href="http://www.institutodoityourself.org/http">http://www.institutodoityourself.org/http</a></p>

## 7. Conclusiones

Con toda esta información se puede afirmar que existen en la red muchas herramientas de acceso libre para formarse y estar al día de cómo rehabilitar los edificios o nuestras casas. Ello puede favorecer la autoconstrucción. Ahora bien, faltaría mejor coordinación y asesoramiento respecto a las ventajas y

desventajas de una solución respecto de otras para así asegurar que la rehabilitación energética se haga efectiva.

En definitiva, el sistema eBRICKhouse «Do it yourself» podría ser bien acogido por la sociedad mediterránea, al igual que otras regiones del norte de Europa.

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# Innovative and Technology-Enhanced Learning Approaches for Older Adults

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## Abstract

As adult learners, and especially learners older than sixty years of age, are a very heterogenic group, it is challenging to create learning concepts which suit the entire group and respect particular needs. E-learning can be a solution, as it is possible to learn very individually but still as part of a learning community when participating in an e-learning course. E-learning courses for older adults about ICT learning have revealed that this can be a very successful way of learning as long as some didactical principles are fulfilled, and communication and support is offered to the learner. This article describes some basic guidelines for successful ICT courses for older adults and offers a solution for older adults who still have negative feelings towards using ICT. With the possibilities of mobile learning, ICT literacy acquisition becomes even easier as tablet use requires less technology skills than the use of a standard computer. As first results of mobile learning for older adults are very promising, a new European project offers learning material for unexperienced users in four European countries. This project is also introduced in this article.

Keywords: e-learning, mobile learning, adult learners, older learners, tablets.

## Resumen

Dado que los alumnos adultos (y especialmente los alumnos mayores de sesenta años) son un grupo muy heterogéneo, es un reto crear conceptos de aprendizaje que se acoplen a la totalidad del grupo y respeten las necesidades particulares. El aprendizaje en línea puede ser una solución, pues posibilita un método de aprendizaje muy individualizado pero sin dejar de formar parte de la comunidad de alumnos que participan en un curso de estas características. Los cursos en línea para el aprendizaje de las TIC destinados a la tercera edad han revelado que este puede ser un modo muy adecuado de aprendizaje, siempre que se cumplan ciertos principios didácticos y que se ofrezca comunicación y apoyo al alumno. Este artículo describe algunas directrices básicas para la idoneidad de cursos sobre las TIC destinados a las personas mayores, y ofrece una solución para esa parte de la tercera edad que mantiene todavía ideas negativas hacia el uso de dichas TIC. Con las posibilidades de aprendizaje que brindan los dispositivos móviles, la adquisición de conocimientos sobre las TIC se facilita aún más, pues el uso de una tableta requiere menos destrezas tecnológicas que el uso de un ordenador estándar. Dado que los primeros resultados del aprendizaje a través de dispositivos móviles para la tercera edad son muy prometedores, un nuevo proyecto europeo ofrece material de aprendizaje para usuarios sin experiencia previa en cuatro países europeos. El presente artículo da a conocer también ese proyecto.

Palabras clave: aprendizaje en línea, aprendizaje mediante dispositivos móviles, alumnos adultos, alumnos de la tercera edad, tabletas.



## 1. Adult learners: a very heterogenic group

Creating learning approaches and offers for adults is a challenging task for researchers and trainers. Adults are a very heterogenic group, especially when we are talking about older adults. They differ not only in learning speed, the adequate use of learning strategies and memory performance, but they also have very different previous learning experiences and histories and, based on this, different attitudes against or in favor of learning. For example, people who do not engage in learning frequently, see learning activities more negative and exhausting than people who consider themselves as active learners (Kolland & Ahmadi, 2010). This has of course an impact on motivation for learning, which is a very important part of learning in adult life, as learning is very often a voluntary activity.

Motivation for learning is different for adults compared with children and there are also differences between younger and older adults, e.g. the intrinsic and personal growth components increase with age (Grube & Hertel, 2008; Leen & Lang, 2013). This means, when adults get older, intrinsic motives like the urge to learn because of own interests and individual fulfillment become more and more important compared to motives from outside which are important for younger persons, like good grades, a good job perspective or reputation and prestige earned by learning (Heckhausen & Heckhausen, 2006). Also comparisons and competition become less attractive with older age (Mayr, Wozniak, Davidson, Kuhns & Harbaugh, 2011).

Besides the motivation to learn voluntarily, it is important to take the principles of andragogy (Knowles, Holton & Swanson, 1998) into account when the learning system and material is designed. These are: relevance of the learning material to real world experiences, the need to know what to learn and why, the learning goals need to be in line with goals of the learner and individual differences need to be respected. Furthermore, the learning situation should trigger intrinsic motivation, foster self-directed learning and help the learner to set their own learning path and agenda in the background of their own learning experience.

All these aspects are important for all adult learners, but when we are talking about older adults above 60 years of age, additional learning differences can occur: some have impairments like sensory, audition

and vision problems. Memory differences in this age group are bigger and also simple motor coordination for the use of a computer mouse can be a big challenge. Nevertheless, learning can also benefit those older adults, who already show some declines, as even in older age neuronal plasticity still exists (Lindenberg & Kray, 2005).

When we keep all these differences between learners in our mind, we have to ask ourselves: How can we design useful learning material which takes these many degrees of freedom into account?

## 2. Innovative e-learning solutions for older adults

The answer is very simple. By using innovative technologies, people can learn self-directed, in their own speed and time, but can also benefit from various support functions that guarantee some guidance, support and communication. This means, e-learning or blended learning formats can contribute to all these challenges and can help to teach heterogeneous groups of adults when some basic principles are fulfilled.

One of the most important aspects is that mentoring and tutoring should always be a key element in all e-learning courses, but especially for older adults as some need more guidance. Well-educated tutors who can support and motivate individually are very important for the success of learning and for completing courses (Hetzner & Leen, 2013). Other studies with online courses for older adults show that it is important to have free timeslots and the possibility to choose the own learning speed, but also some structure and the feeling of learning together in a group or learning community (social learning) (Hetzner & Held, 2009). E-learning should always come to the people and not vice-versa; the courses should be adapted to the daily living circumstances of the target group so that the learner can easily recognize the added value of learning (Friebe, 2009). Furthermore, many rehearsal possibilities should be given to the learner and new material should be connected with prior life experiences (Nuissl, 2009). Aside of the communication with tutors with different media (e-mail, forum, skype, chat), the learners should also communicate with and support each other. Con-

cepts with peer-to-peer teaching and tutoring are also promising, as long as the tutors are specially trained (Karl, 2009; Hetzner & Leen, 2013). Additionally, for the group of older learners, it is important not to overload them with information and technology. The technology should be as easy as possible, but of course it should train them to find their ways in the «real ICT world». To reach this goal, it can help to let them practice on their own devices and rehearse very often and to offer different media approaches with the same content (audio and text for example) to fulfill the needs of different learning types and give them many exercises to work with different multimedia-enriched didactical elements. As already stated above, motivation is also a key element for learning success. To enhance learning motivation, motivating examples of other learners, informal learning methods and problem-based learning should also be integrated.

That these concepts are very successful to teach ICT basics to older adults was shown in previous European and national projects, like the eLSe project, eLSe academy and Learn@Haus (Hetzner & Held, 2009; Coroian, Held & Schüring, 2012). Started in 2004 during these projects, basic and advanced e-learning courses for older adults were developed and taught them how to take their first steps on the Internet and on a computer. In a basic course, participants learned, for example, how to write e-mails, find basic information online, write letters and organize documents on a computer. In the advanced course, people learned e.g. how to communicate with skype and forums, how to process some images and create simple presentations. All learning activities took place online, except for a first face-to-face session to learn the very first steps e.g. how to switch on a computer. In the last ten years, ca. 900 older adults in Germany, Italy, Spain, Sweden and Lithuania successfully finished online courses based on the eLSe and Learn@Haus concepts.

Additionally, based on the described pedagogical and didactical principles, two European projects which facilitate intergenerational learning and online exchange between different target groups and go beyond ICT competencies were developed and were also very successful. Both projects facilitated the active participation of older adults as part of the information and knowledge society. One project (HiStory) offered information about Web 2.0 techniques to older adults and taught them how to blog about

historical events as eye witnesses so that younger interested persons can learn from these experiences ([www.history-project.eu](http://www.history-project.eu)). The other initiative, e-Vita (Hetzner and Pannese, 2009) developed an innovative and unique approach for the development of Serious Games starting from Storytelling techniques to promote knowledge sharing and intergenerational learning. Younger generations are supported to directly «live» some experiences that older adults have lived before the European Union was established. Thus, the complexity of the past can be directly experienced and understood through a game that shows how life was at that time.

### **3. The next step: Older adults learn with mobile devices**

Although these course concepts were very successful, there are still many older adults who are afraid of using a computer or are not motivated to invest time and effort into learning some basic ICT competences. For this group, mobile learning with tablet computers can be an attractive solution. In 2012, Werner and Oberzaucher showed in their research, that tablet computers reach high acceptance and satisfaction rates for new, unexperienced users. Also the eLSe and Learn@Haus concepts were transferred to a small course for mobile learning in 2013 and in a comparison study with two groups of older adults, the group who used tablet computers instead of laptops showed a faster learning curve and gained the same competences as the laptop group but in a much shorter time period (Hetzner, Tenckhoff-Eckhardt, Held & Slysach, 2014; Hetzner, Tenckhoff-Eckhardt & Held, 2013). The tablet group was very motivated and the touch concept has advantages compared to the more complex use of mouse and keyboard.

Based on these promising findings, a new European Erasmus plus project, SenApp, started 2014 in four countries ([www.senapp.eu](http://www.senapp.eu)). In Spain, France, Romania and Germany, learning units for tablet computers are designed as small applications and will be tested in autumn 2015 in four languages. First research results have already shown that this concept has many benefits for older adults. They are very simple to use and the mobile devices are easy

to take with you wherever you want. They are fast to use due to low starting times, they are also usable with a low level of e-skills and, with the app concept, the different tasks are very fast to reach and the touch screen is very easy to understand. With the help of mobile learning, ICT literacy of older adults will hopefully increase in the next years.

#### 4. Discussion

During the last years, the numbers of active ICT users are growing, also in the older age groups. However, in the age group above 70 years of age, there are still many non-users. For example, in Germany, only 29.4 % use the Internet on a regular basis (Initiative D21, 2014). The main reason for non-users is that they see no added value to other media and therefore they seem not to need the Internet or

computers in general (Gerhards & Mende, 2009). But also fear of technology can be a reason, especially for women. Women also report more negative feelings against computers and the Internet (Broos & Roe, 2005). The group of older women who are not using a computer is also very stable during the last couple of years and they are hard to reach and persuade.

However, with new approaches like mobile learning, which requires less technology skills and is easy to use, some new users, especially women, might be persuaded. As the use of computers and the Internet can have some benefits on quality of life for older adults, e.g. by learning new possibilities for more social interactions (Schweiger & Ruppert, 2009), especially for those who are mobility restricted or live in rural areas, it seems useful to try to motivate more older adults to become active users. It might be impossible to reach all older adults, and not all will benefit from ICT, but it is important to give everybody the opportunity to become not excluded from new technologies.

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# Off-the-shelf Non-Intrusive Load Monitoring Devices Utilised in a Low Activity Detection Service

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## Abstract

There is a growing awareness for the need to provide low cost solutions for the care of the elderly and in particular to allow them to keep living independent lives. In parallel to this, there have also been significant advances in a number of technical areas including 1) monitoring electricity consumption for the purpose of reducing power costs, 2) non-intrusive load monitoring (NILM), 3) using sensors to determine activities of daily living and 4) cloud computing. The purpose of this work was to demonstrate that it is possible to use a readily available consumer off the shelf electricity monitor to provide a low intrusive activity monitor for older persons. This work uses the Design Science Research Methodology and builds on the results of our previous work that used raw electricity usage data. In this work we are trailing the use of a meter that uses NILM to identify individual appliances in the home. The information on appliance use was analysed by a cloud base program and alerts were sent to the carer when lower than expected activity was detected. Participants both in this work and those reported in the literature have mentioned the annoyance of having multiple sensors in a home, especially if they emit either constant or flashing light. In contrast, NILM allows the use of multiple electrical appliances to be monitored without the need for a large number of sensors to be deployed – just one sensor at the meter or fuse board. The confluence of a number of technologies has enabled the creation of a low intrusive and low cost monitoring system to have become a reality. The initial trial of the system has been shown to be a most reliable alternative to a system built on multiple sensors. Based on previous work that involved the deployment of multiple sensors, the new system is expected to be more acceptable as it has the desired attribute of becoming invisible to the user.

Keywords: activities of daily living, non-intrusive load monitoring, elderly, cloud.

## Resumen

Existe una creciente concienciación respecto a la necesidad de proporcionar soluciones de bajo coste para el cuidado de la tercera edad y, en particular, para permitirles seguir manteniendo una vida independiente. De forma paralela, se han producido también importantes avances en diversos ámbitos técnicos, entre los que se incluyen: 1) monitorización del consumo de electricidad con la finalidad de reducir los costes de energía; 2) monitorización no invasiva de la carga (NILM, por sus siglas en inglés); 3) uso de sensores para determinar actividades de la vida diaria, y 4) computación en nube. La finalidad de este trabajo es demostrar que es posible emplear un dispositivo de control fácilmente disponible a la venta para el consumidor, con el fin de proporcionar una monitorización poco invasiva de la actividad de las personas mayores. Este trabajo emplea la metodología de investigación científica sobre el diseño y parte de los resultados de nuestro trabajo anterior, en el que se emplearon los datos brutos sobre el uso eléctrico. En este trabajo realizamos un seguimiento del uso de un contador que emplea la NILM para identificar electrodomésticos individuales en el hogar. Se analizó la información sobre el uso de electrodomésticos mediante un programa base de computación en nube y se enviaron alertas al cuidador cuando se detectó una actividad menor de la esperada. Los participantes en este trabajo y en otros que constan en el corpus científico han mencionado la molestia de mantener múltiples sensores en el hogar, especialmente si emiten una luz constante o intermitente. Por el contrario, la NILM permite supervisar el uso de múltiples electrodomésticos sin necesidad de desplegar un gran número de sensores: basta con un sensor colocado en el contador o en el cuadro de fusibles. La confluencia de diversas tecnologías ha permitido hacer realidad la creación de un sistema de monitorización poco intrusivo y de bajo coste. La prueba inicial del sistema ha demostrado ser una alternativa totalmente segura al sistema basado en múltiples sensores. A partir del trabajo previo que implicó el despliegue de múltiples sensores, se espera que el nuevo sistema sea más aceptable, pues tiene la característica positiva de hacerse invisible para el usuario.

Palabras clave: actividades de la vida diaria, monitorización no invasiva de la carga, tercera edad, nube.

## 1. Introduction

The search to find socially acceptable methods of using technology to assist the lives of older people has been ongoing for a number of years. One aspect of this is to provide an acceptable method of monitoring that does not intrude into people's privacy. This objective is probably not completely achievable and so we are left with finding a compromise between helping and interfering. Many studies have taken the technology driven approach that seems to ignore not just the actual privacy of the person, but also the perceived privacy. In some studies living spaces have been saturated with numerous sensors (Monekosso & Remagnino, 2007; Chen, 2010; Cook & Holder, 2011), and even if the data collected is not continually monitored, it can still leave the person feeling that they have lost their privacy.

One method of monitoring that shows promise for being low intrusion is the use of electricity consumption data (Clement, Ploennigs, & Kabitzsch, 2012). A considerable amount of information can be gathered from looking at which appliances are

used. The advantage of this technique is that it does not require sensors such as cameras or motion detectors that are usually deemed to be intrusive. Previous work by the authors (Hunt, Rajendran, Bennett, & Fendall, 2014) used analysis of electricity consumption to create basic alerts when expected activity did not occur. This previous investigation was the starting point for this current study and will be briefly discussed later.

Using the total electricity consumption of a home can give a basic idea of whether the occupant is using appliances, however, this is not as useful as knowing what appliances are actually used. This is especially important if the home contains appliances that automatically switch on and off such as an air conditioning unit or a hot water heater. The situation can be improved by monitoring each wiring circuit separately, or for more precise information, by monitoring at the individual appliance.

However, monitoring at each individual appliance increases the complexity of the system with each additional monitoring device being an extra cost, source of failure and inconvenience to the per-

son. An area of research called Non-Intrusive Load Monitoring (NILM) that starts with the total consumption for a home and separates out the switching on and off of individual appliances offers an elegant solution: with only one physical monitoring point yet giving individual appliance data (Farinaccio & Zmeureanu, 1999; Hart, 1992; Berges, Goldman, Matthews, Soibelman, & Anderson, 2011; Chahine, *et al.*, 2011). A number of such devices that use NILM have become available to the consumer, primarily for the purpose of keeping track of electricity costs of appliances (smappee, 2015; Navetas energy management, 2015; The energy detective, 2015). This offers the possibility of using these devices to determine some of the activities of daily living (Lawton & Brody, 1969) via the appliance use data.

## 2. Previous Work

This work builds on our previous study that used the electricity meter from Current Cost (Current cost, 2015). The setup consisted of monitoring individual circuits (such as the bedroom) as well as at individual appliances of interest such as the television and microwave oven. The data was sent to the Current Cost server where it was analysed by our own cloud based program running on Google App Engine (GAE) (Google, 2015). Basic logic was implemented that allowed the raising of an alert via email, text message or voice call if a set threshold of current was not reached during a specific time period. The system allowed the person being monitored to be contacted before their carer, thus giving them the chance to acknowledge to the system that they were okay, and so avoiding the system informing the carer when there was no need to. This feature was seen as an important feature to empower the user and help reduce the sense of being watched.

## 3. Method

We frame our research within the Design Science Research Methodology (DSRM) (Peffer, Tuunanen,

Rothenberger, & Chatterjee, 2007) as it is suitable for the creation of artefacts, especially when an iterative process is used to build on previous results such as this.

## 4. Evaluation of previous work

Consistent with the DSRM, we start this work with an evaluation of the previous trial which came to an end after approximately one year. Although we intended for the trial to be ongoing, both of the participants chose to end the trial. Reasons given for wanting to end the trial included:

- Not liking the fact that a light flashed on the monitor every time they entered the room.
- Concern over the amount of electricity being used by the monitor.
- A crackling noise from one of the monitors.
- Tripping of a power board.
- A possible reason for the problems they were having with their Internet connection.

These issues were very real for the participants and no attempt was made to persuade them otherwise. What we learnt was that we really need to make the technology invisible to the person being monitored. It is also worth noting that the common trouble shooting practice is to do exactly what the participants did do and suspect, and remove any extra sources of fault when something went wrong—such as the Internet connection.

## 5. Implementing a NILM based meter

NILM has been implemented in the consumer energy monitoring device from smappee and can automatically identify appliances in a home from a single current measurement point. The smappee device offers an Application Programming Interface (API) to their server allowing third party developers to access the appliance usage information. We have modified our GAE server application to collect this

information and again use basic logic to determine if there is a need to raise an alarm.

Figure 1 shows a picture of the smappee device installed at the fuse board of a home. This is the only piece of hardware required, but it does rely on the home having a Wi-Fi based Internet connection. Unlike the Current Cost device that was battery powered, the smappee device requires a mains power supply. The device has a relatively straight forward setup procedure but the physical installation needs to be done by a qualified electrician and software configuration by someone with basic computer skills.

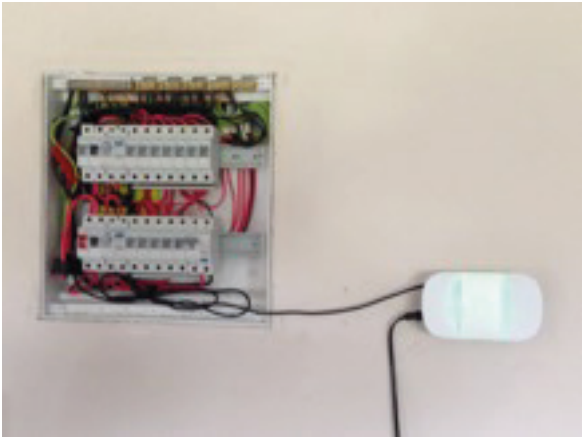


Figure 1. The smappee meter (white box with green lights) located at the fuse board. The actual current sensor is located out of sight behind the fuse panel

### Which appliances are useful?

We sought to implement a system that required as little setup as possible. So instead of requiring the user to decide which appliances would be worth monitoring, we automatically assessed each appliance and if the number of times it turned on and off did not change significantly over each 24-hour period, we assumed that it was likely to be turning on automatically and so would not give any useful information about the wellness of the occupant. A percentage difference of greater than 80 % between the busiest hour and the quietest hour seemed to give good differentiation as given by: if

$$\frac{(\text{maximum number of times appliance used} - \text{minimum number of times appliance used}) * 100}{\text{maximum number of times appliance used}} > 80$$

then the appliance is useful. This analysis was repeated daily to allow for changing patterns of behaviour and changes of appliances being used.

An 80 % level of difference was able to label the refrigerator as not being a useful appliance. With all the appliances appropriately labelled, analysis was then performed to create a basic alert that identified ‘low activity days’. The day of the week was taken into account and the number of events of all useful appliances was compared with a 4-week average for the same day of the week. The carer can choose the level of sensitivity for alerts being created from a change (from normal) of either 25 %, 50 % or 75 %, where 25 % is going to have the most false positive alerts.

The carer can set the time of day for checking the number of events. This enables an alert to be sent after a particular time of day, for example, after breakfast. If an alert has been set for say 11 a.m., then the system compares the number of events for the day up to 11 a.m. with other days also up to 11 a.m.

## 6. Integration into existing system

The existing Java (Oracle, 2015) based program running on GAE was modified to incorporate the new features. The user interface was modified to allow the carer to enter configuration information to access the smappee server and set up the alerts as described above. The rest of the code was largely left unchanged, which greatly reduced the time required to implement and test the new features based on the smappee meter. This allowed the original code that integrated with the Twilio (Twilio, 2015) server to continue to be used to send text or voice messages as before.

## 7. Results and future work

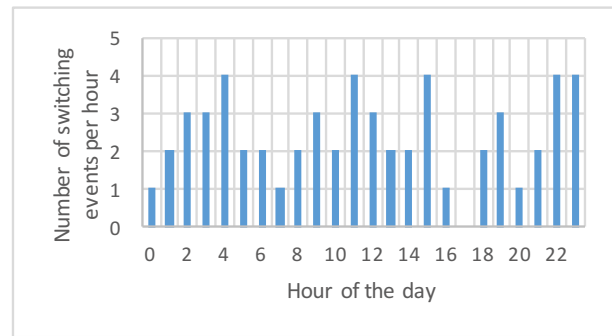
The smappee device has so far only been tested in a trial home rather than in homes of older people. The trial home had a family of four rather than the intended one person occupancy. The trial was able



to ascertain the technology did mostly function as designed with alerts being raised when activity was low. One concern with the smappee device is that it lost connection to the server on two occasions in the 4-month period and had to be powered off and on to reconnect. This seems to be a known issue and will hopefully be resolved by smappee in future versions of their device. As it stands, it is going to be impractical to have to manually power off/on the device, but perhaps a device to automatically do this could be installed.

One of the reasons that the smappee device has not yet been installed in participants homes is the need to have a mains power supply near the switch board installation location. This was not required for the previous meter that was battery powered and we are waiting for the necessary work to be done. We are also looking at installing the devices in a number of homes situated in a community location with the intention that a single Internet access point is used by all the meters. This will avoid the issue of finding participants with Internet access and besides it will not rely on the need to configure different Wi-Fi access passwords for each smappee meter. In the previous setup we used a mobile phone network to connect the Internet router to the Internet service provider as no phone line was available. To avoid unexpected network costs, the system was on a pre-pay arrangement and this caused some instances of connection interruption. We are intending to have a fixed phone line for the new trial.

It was earlier suggested that the fridge was not a useful appliance for determining the person's wellbeing as it turns on and off automatically. However, this is not entirely true as on closer inspection (see Figure 2), it was found that the number of switching events actually decreased dramatically around times of high use on some days. This at first seems counter intuitive as you might expect that a fridge would need to turn on more often when the door is being opened. Nevertheless, the observation might be explained by the fact that the particular fridge being monitored is designed to not turn on when the fridge door is open. Therefore it might be possible to use this information to determine if the occupant is actually using the fridge – a useful sign of their wellbeing. It also suggests that a longer period of inactivity (say 5 hours) should be used to determine if an appliance is turning on automatically or not.



*Figure 2. The frequency of switching (on and off) of a fridge on one particular day. It can be seen that the frequency changes throughout the day with a noticeable reduction at 5 p.m. (17) when the fridge door was being frequently opened*

The smappee user interface allows users to manually label the individual appliances that it finds – otherwise they are just referred to by a number. However, it is possible that an analysis of the appliances characteristics (power and frequency of use) may identify some of these appliances with a reasonable accuracy, for example, the microwave oven or kettle. Machine learning techniques could be used to help with this identification process.

## 8. Conclusions and summary

The confluence of a number of technologies has enabled the creation of a low intrusive and low cost monitoring system to become a reality. The initial trial of a system based on an off-the-shelf NILM based electricity monitor has been shown to be a most reliable alternative to a system built on multiple sensors. Based on previous work that involved the deployment of multiple sensors, the new system is expected to be more acceptable as it has the desired attribute of becoming invisible to the user.

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# EHLSSA: Europe-Wide Online Learning for Seniors

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## Abstract

Technology dominates the future and it is increasingly penetrating culture and society. In the course of this trend, online learning is gaining importance and becoming a crucial and integral component of lifelong learning. Still, the group of senior citizens is one of the groups that are predominantly excluded from using new technologies, though digital devices provide each citizen with new opportunities and perspectives. The EHLSSA project– European Home Learning Service for Seniors Association – takes this finding as its starting point and develops e-learning solutions for seniors around Europe. The importance and added-value of specially adapted e-learning models for this highly heterogeneous group is presented in this article.

Keywords: senior learners, e-learning, pedagogy and didactics.

## Resumen

La tecnología domina el futuro, y cada vez en mayor medida penetra en la cultura y en la sociedad. En el curso de esta tendencia, el aprendizaje en línea está adquiriendo importancia y se está convirtiendo en un componente fundamental e integral del aprendizaje permanente. Sin embargo, el grupo de ciudadanos de la tercera edad es uno de los principales que quedan excluidos del uso de las nuevas tecnologías, aunque los dispositivos digitales proporcionan a cada ciudadano nuevas oportunidades y perspectivas. El proyecto EHLSSA –siglas de European Home Learning Service for Seniors Association, Asociación de Servicios Europeos para el Aprendizaje de las Personas Mayores desde el Hogar– toma este hallazgo como punto de partida y desarrolla soluciones de aprendizaje en línea para la tercera edad en toda Europa. El presente artículo presenta la importancia y el valor añadido de modelos de aprendizaje en línea específicamente adaptados a este grupo tan heterogéneo.

Palabras clave: alumnos de la tercera edad, aprendizaje en línea, pedagogía y didáctica.

## 1. About Seniors and e-learning in Europe

The concept of e-learning has developed rapidly with the advent of the Internet and new technologies. In the beginning, e-learning was almost exclusively for company employees, but in recent years it has expanded its activity in many areas and it affects a wider audience. Nowadays trainers, university students and academics use this learning method.

Seniors are increasingly seen as lifelong learners, too, and the most recent public involved in e-learning. The fact that they can attend lessons from home is a major advantage for some of them, specially for those with reduced mobility. Also, taking classes in a domestic environment allows them to choose a learning environment, which might be less stressful in some cases. Therefore, e-learning presents a successful and most suitable solution for many senior citizens.

All over the European Union, government bodies and departments have recently produced a number of reports and white papers related to older people in general and to ageing in specific. Whereas previously the matter was mainly seen in the light of health and social care, active ageing is now becoming more and more important. In Finland, for instance, a lot of research has been done in the field of teaching information and communication technologies (ICT) to seniors.<sup>1,2,3</sup> The results prove positive effects on the activity, health and well-being of seniors. In Ireland, a guide for teaching ICT to older people was created within the remit of government funded programs by the national organization Age Action.<sup>4</sup> In Germany, again, several online courses for seniors were successfully performed and evaluated. The results were documented in a series of literature on the importance, effects, and benefits of e-learning for older people.<sup>5,6</sup>

Overall, there is a general trend and need to open up learning opportunities for senior citizens and to develop models, in which technology and pedagogy are well integrated as online learning brings a significant added value to this highly heterogeneous group of elderly people. In the following lines, the EHLSSA project and its approach for developing e-learning solutions for seniors are presented. Further, results of the user profile analysis on needs, interests and the state of affairs regarding seniors and technologies are shown.

## 2. The EHLSSA Project

The EHLSSA project –European Home Learning Service for Seniors Association– aims at providing access to continuing education to seniors through the establishment of a Europe-wide, specifically adapted learning infrastructure: the European Home Learning Service. This learning service includes the provision of a learning management system, training programmes for seniors and measures for tele-tutors to support older people in learning.

The project intends to support and strengthen e-inclusion for seniors by offering new learning opportunities, as many European seniors are excluded from the digital world. Either in formal or informal settings, digital competencies provide seniors with skills that enhance individual empowerment and participation in society. Access to learning and life skills programs will be guaranteed by the development and implementation of a sustainable and comprehensive learning infrastructure.

The European Home Learning Service will be established in five European countries (Finland, France, Germany, Ireland and Spain) with national and regional contact points. In the long term, the offer shall be extended to further European countries while also increasing the range of courses.

The project focuses on three main development areas, described as follows:

1. Development of three e-learning courses specially adapted to the needs and interests of senior citizens, following a carefully designed didactic concept. The aim of the online courses is to enable older people to acquire know-how and skills when dealing with ICT. The course topics are selected according to the interests of the target group, which are derived from the results of the user needs analysis (see heading 4). The didactic approach is based on immediate use and transfer of skills learned, with regular practical trainings and repetition possibilities to consolidate skills already acquired, and on continuous feedback.
2. An open source learning platform is developed to serve as the host for the training courses. The surface of the learning platform is adapted to the target group, strictly respecting its pedagogical and usability needs. The screen layout is clear and easy to handle; it only provides necessary information. To reduce potential fears and to ensure

competent handling of the learning environment, an introduction to using the platform is given. At the beginning, senior learners learn how to display the content and how to navigate through the modules. The learner is shown how to handle embedded media, i.e. simulations, demonstrations, interactive elements or audio and video clips. For a better understanding, online training and several exercises are provided. Finally, the use of communication facilities available within the e-learning platform (i.e. forums, e-mail, chat) is explained. All these components are thoroughly explained and assisted.

3. In the training phase, in-depth support related to the content, technical aspects and motivational factors are provided by the support team consisting of project managers and tele-tutors. The latter are seniors themselves having completed a special training course on how to assist learners in their learning process, how to provide feedback and how to moderate discussions in the forums. Further support elements are provided through feedback and self-training features as well as complementary sound and visual elements to compensate physical impairments. Interactive elements are designed in such a way that they are clear and self-explanatory.

### 3. Pedagogical and didactic approach

The model that is used for EHLSSA is the e-learning cube model, developed by Paul Held in 2004.<sup>7</sup>

The cube consists of different sides that are all connected to the learner and the learning process. The sides are defined in order to create a successful learning approach. The cube model describes different important parts, which are part of e-learning and should always be considered, and also the relation and organization of these parts in relation to each other.

In the model, the learner is placed in the inner part of the cube and surrounded by five different sides: content, technology, support, quality and didactics/methodology. These sides are again surrounded by the also meaningful parts of this model: organisation, economy and valorisation/evaluation.

Every side can be split up in as much fields as necessary regarding the special context and/or needs/requirements of the e-learning course. Here are some examples of aspects which are relevant for the different sides/parts of the cube:

- Learner (nucleus): potentially relevant factors are age, gender, intrinsic/extrinsic motivation, number, prior knowledge, digital literacy level, organic/physical disabilities/problems, etc.
- Content: consists of curriculum, authoring, pedagogy and didactics, learning approach, knowledge creation, media theories/didactics, pedagogical approaches, etc.
- Technology: includes software, hardware, bandwidth, system, etc.
- Support (and communication): contains tutor(s), communication channels, synchronous and asynchronous approaches, peer-group building, human support (tutoring and community support), technical support, etc.
- Organisation: contains all actions to be taken for quality management, embedding, course and learning management, acquisition of learners and tutors, training and quantitative or/and qualitative system evaluation.
- Economy: contains all aspects of learning and training economy (e.g. effort, time, money), variable and fix costs, economy of scale, preparation and running costs.



Figure 1. E-Learning Cube Model



- Valorisation/evaluation: includes all activities and tools for a qualitative/quantitative summative and formative evaluation of the system. Evaluation includes not only the learners, but also all other people involved in and related to the e-learning environment, i.e. tutors, course organisation, technical support, etc.

EHLSSA courses will focus on experimental and active learning, including a series of real life examples and the connection of each learning unit with the daily life of seniors. Therefore, the learner is always aware of the relevance of the learning content for her/his life. The structure of the online modules is based on a step-by-step approach and integrates different types of media.

Based on the vast experience of ILI, the principle for every learning unit will contain at least the following basic elements:

- A short introduction with the description of the aims of the unit.
- Definition of terms which belong to the topic.
- Description of contents by means of various illustrations.
- A summary at the end.
- Usage of interactive exercises in order to test one's gained knowledge/experience.
- Feedback for the user regarding his/her results reached in the exercises.
- Feedback survey asking the opinion of the user regarding different aspects of the unit.

#### 4. Results of the user needs analysis

Being a project with a user-centred approach, a user needs analysis is essential as the basis for the development of learning materials but also for the methodology and pedagogy of the online courses. The questionnaire aims to find out the current use, skills and motivation on computer, Internet tools and services, and also the experiences and motivation regarding e-learning for senior citizens. Here it was particularly interesting to see which fears and barriers senior citizens face when it comes to learning online and how e-learning providers can counteract.

Both face-to-face interviews and surveys on paper were provided to people above the age of 55. Quantitative questions were designed to know the main ICT-level and preferences statistically, while qualitative questions were aimed to explore opinions or suggestions about certain questions.

In total, 187 seniors participated in the survey. Only 12 percent out of them mentioned that they are not able to use a computer and access the Internet independently. The majority of the respondents own a computer, tablet or smartphone.

#### *Interests and use*

The topics and programs seniors are most interested in and that are mainly used are:

1. Surfing the web (59 %)
2. Information seeking/Research (55 %)
3. E-Mail (45 %)
4. Reading news, watching videos... (43 %)
5. Writing texts using word processors (43 %)
6. Organising pictures (42 %)
7. Google + (34 %)
8. Online shopping (31 %)

Both little interest and little knowledge exist for the following themes:

1. Domotics (26 %)
2. Self-directed writing in a Blog or a wiki (21 %)
3. Cloud services (21 %)
4. Google+ (20 %)

#### *Obstacles and difficulties*

The question on obstacles and difficulties in the usage of digital devices and online services was analysed separately for seniors with ICT experience and those without.

The major barriers for non-ICT experienced seniors when using digital technologies are related to economic factors (price of devices) and individual capacities (diseases, mobility reductions, visual impairments or limited dexterity). More personal reasons are related to lack of knowledge, lack of technical understanding, fear of digital devices and the Internet, and fear of dependence.

Seniors with ICT experience, however, consider problems with specific tools and services (i.e. the file management and organization of the computer, security risk caused by viruses) the main barriers when using digital devices and going online.

Despite the differences, there are common topics identified as obstacles for both groups. Finding support to solve doubts or finding a solution when they do not find a file or have a question seems to be the main concern for seniors both with and without ICT-experience.

## 5. Conclusion

As a conclusion, the EHLSSA consortium can definitely state that promoting digital competen-

cies among senior citizens is an important element of supporting older people in active ageing and in becoming full members of today's knowledge and information society. Particularly because seniors are a very heterogeneous group, specifically adapted pedagogical and didactic approaches need to be developed and applied.

The EHLSSA project embraces this challenge and develops online courses in which ICT competences are taught while learning content at the same time. In an initial step, a needs analysis with the target group was conducted; the next step is to develop the course contents.

The courses will run in the beginning of 2016 and their evaluations will contribute to further develop learning and teaching methods for senior citizens in an online environment.

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# Expression of Physical Activity in the Elderly: Lithuanian Case

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## Abstract

The research shows that active physical activity ascertains healthy ageing, helps to avoid the risk of falling, prevents from all kinds of physical indispositions, betters psychological state and cognitive characteristics, and helps to avoid diseases such as overweight, etc.

Aim of the research: to assess expression of physical activity in the elderly. Respondents: there were 307 elderly people from various Lithuanian cities and districts who participated in the survey. Methods of research: structured questionnaire. Data were processed using an SPSS program (Statistical Package for Social Sciences, version 19.0). Methods of statistical analysis: descriptive statistics, T-test, Anova test, Spearman's Correlation. The results of the research: The research showed that the most popular forms of physical activity for old people are walking outside (70.8 %), housekeeping (63.4 %), gardening and truck farming (43.5 %), and playing with grandchildren (25.8 %). Only 25.5 % of respondents ride a bike. Only 7.8 % of respondents jog or use Nordic walking. The least popular forms of physical activity among elderly people are swimming (5.9 %), dancing (5.2 %) and yoga (4.6 %) classes. The differences in physical activity forms between people of various ages were defined. 60 - 74 year old people ride their bikes ( $p=0.011$ ) and do some gardening or truck farming more often than older people ( $p=0.009$ ). When looking for connections between physical activities and falls, it was determined that elderly people who dance tend to fall the least ( $p=0.042$ ). The research helped to determine some benefits of physical activity for the health. Nordic walking has the strongest and the best impact on good night sleep. People who dance have indicated the longest duration of sleep. People who were using physical activity forms such as yoga, dancing, jogging, riding a bike and Nordic walking used less medicine during the last three months ( $p\leq 0.05$ ). There were no significant statistical differences found between body mass index and the form of physical activity used.

Conclusion: Elderly people link physical activity with housework without paying enough attention to it or having an opportunity to go in for sports or to use other forms of active living.

Keywords: elderly, physical activity, falls, sleep, Body Mass Index.

## Resumen

La investigación muestra que realizar una actividad física favorece un envejecimiento saludable, contribuye a evitar el riesgo de caídas, previene todo tipo de trastornos físicos, mejora el estado psicológico y las capacidades cognitivas, y contribuye a evitar enfermedades como el sobrepeso, etc.

Objetivo de la investigación: evaluar la expresión de la actividad física entre personas de la tercera edad. Encuestados: participaron en la encuesta 307 personas de la tercera edad, procedentes de diversas ciudades y distritos de Lituania. Métodos de investigación: cuestionario estructurado. Los datos fueron procesados con el uso del programa SPSS (siglas en inglés de Paquete Estadístico para las Ciencias Sociales, versión 19.0). Métodos de análisis estadístico: estadística descriptiva, test-T, test Anova, correlación de Spearman. Resultados de la investigación: la investigación muestra que las formas más populares de actividad física para las personas mayores son caminar al aire libre (70,8 %), la realización de las tareas de mantenimiento del hogar (63,4 %), la jardinería y el cultivo de hortalizas (43,5 %), así como jugar con los nietos (25,8 %). Tan solo el 25,5 % de los encuestados monta en bicicleta. Únicamente el 7,8 % de los encuestados practica el *jogging* o la marcha nórdica. Las formas menos populares de actividad física entre las personas de mayor edad son la natación (5,9 %), el baile (5,2 %) y las clases de yoga (4,6 %). Se definieron las diferencias en las formas de actividad física entre personas de diversas edades. Las personas de 60 a 74 años montan en bicicleta ( $p=0,011$ ) y realizan algunas labores de jardinería o de cultivo de hortalizas con mayor frecuencia que las personas de edad superior ( $p=0,009$ ). Al examinar la relación entre las actividades físicas y las caídas, se determinó que las personas de la tercera edad que practican algún baile tienden a ser las que menos caídas sufren ( $p=0,042$ ). La investigación contribuyó a determinar algunos beneficios de la actividad física para la salud: la marcha nórdica obtiene los mejores y más sólidos resultados sobre un buen sueño nocturno; las personas que practican algún baile han informado de un sueño más prolongado; las personas que practican actividades físicas como el yoga, el baile, el *jogging*, montar en bicicleta y la marcha nórdica utilizaron menos medicamentos durante los tres meses anteriores ( $p \leq 0,05$ ). No se hallaron diferencias estadísticas significativas entre el índice de masa corporal y la forma de actividad física empleada.

Conclusión: las personas de la tercera edad relacionan la actividad física con la realización de las tareas domésticas, sin prestar demasiada atención a esta cuestión ni teniendo la oportunidad de participar en deportes o de recurrir a otras formas de vida activa.

Palabras clave: tercera edad, actividad física, caídas, sueño, índice de masa corporal.

## 1. Introduction

Ageing of society is humanity's universal problem and is deeply connected with an often physical and emotional discomfort of elderly people, life quality and physical passiveness. It is foreseen that in the beginning of 2030, 28.9 % of Lithuania's inhabitants will be elderly people (60 years old and above) and the situation in the European Union will be similar – 30.4 % of people will be older than 60. One of the main challenges that we face during society's ageing is to assure that we still have productive members of society, and older people can age in a healthy, independent way. Healthy ageing is defined as an ability to ensure physical, social and emotional health. In other words, it is a solving process of how to enable elderly people to participate in society's

social life without experiencing discrimination and to enjoy independence and quality of life (Javtokas, 2008; WHO, 2015).

Low physical activity is one of the most common features of modern society's way of living because domestic technologies, computerizing and the development of communication means have decreased the need to constantly move. 70 % of all deaths in the United States are caused by chronic diseases. The spreading of chronic diseases dramatically grows with age. More than 80 % of people older than 65 years old has at least one chronic disease. Physical activity helps to decrease dying from chronic diseases up to 30 % (arterial hypertension, cardiovascular disease, diabetes, colon and breast cancer). Regular physical activity has a positive influence on the health of various aged people.

Physical exercises can decrease or even stop depression and chronic diseases which are very common among elderly people. For example, least depression danger was discovered for people who were highly physically active, which means that their aerobic activity lasted not less than 90 minutes a day or 4 hours a week. Furthermore, physical activity unquestionably influences some other aspects of health positively: short memory, comprehension, mood, self-esteem, ability to take care of oneself and move independently, ability to communicate (Warburton, 2010; Chalder, 2012; Zumeras, 2013). According to WHO recommendations in older than 65 years old adults and above, physical activity includes leisure time physical activity, transportation (e.g. walking or cycling), occupational (if the individual is still engaged in work), household chores, playing games, sports or planned exercise, in the context of daily, family and community activities. Adults aged 65 and above should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or do at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate and vigorous-intensity activity. Aerobic activity should be performed in bouts of at least ten minutes duration (WHO, 2010).

It is important to mention that a suitable way to keep physical activity for elderly people (especially the ones who are passive and do not move very often) is dog walking and taking care of it in general (Toohey, 2011). It is important to remember that general physical activity (elderly people as well) is displayed in four main life areas (apart from sport itself): in free time, the professional area (if a person is still working), everyday life, and mobility/ transportation area (Zumeras, 2013).

People living in the European Union do not live a physically active life (Special Eurobarometer, Sport and Physical activity, 2014). The main findings of the Eurobarometer survey on sport and physical activity are as follows: the majority of the respondents (59 %) say that they never exercise or play sport. The findings for the countries show that citizens in the Northern part of the EU are the most physically active. The proportion that exercises or plays sport at least once a week is 70 % in Sweden, 68 % in Denmark, 66 % in Finland, 55 % in the Netherlands. Most respondents who never exercise or play sport can be found in Bulgaria (78 %), Malta (75 %), Portugal (64 %), Romania (60 %), Italy (60 %), Poland (52 %), Lithuania (46 %) and Spain (44 %).

After conducting a research in healthy living among elderly people in Lithuania, it was discovered that only 20.1 % of older people are physically active (this means that they do some activities individually, do exercise or jog). The majority of respondents, especially the ones living in the countryside, did not know or did not understand how physical activity could be beneficial for their health. They think that the only way to better their health is by resting and drinking medicine (Valinteliene, 2012). Only 13 % of elderly people exercise every day, and 29 % a couple of times a week. Every third respondent estimated their physical activity as satisfactory, 37 % as bad. The respondents think that they lack information about health strengthening and benefits in old age. Another research made in Lithuania showed that people older than 60 are extremely passive because only 32.7 % of such age respondents claim to be doing physical activity during their working hours and only 12.5 % in their free time (Valinteliene, 2012). According to the data of a research about the elderly people way of living in Lithuania carried out in 2010 (European Project CHANGE), only 20.1 % of older people have an active lifestyle and most of them live in big cities, the 82.2 %. Elderly people who live in the countryside were more into singing, did physical work or used bikes but did not do any other physical exercise (Juozulynas, 2010). Since 2002, the Lithuanian Sport Department is conducting a research (every 5 years) and according to the data from 2011, 60 % of elderly people do not exercise at all (Zumeras, 2013). Elderly women who are physically active are psycho-physically healthier than physically inactive women. Physically passive women have high blood pressure and often get ill with all kinds of heart diseases. Physical activity influences elderly women's cognitive function positively. Data from research showed that 42.9 % of physically active women have good blood pressure and only 14.3 % of women who do not do physical activity have normal blood pressure. According to the data, 48.6 % of women who do not exercise and only 24.3 % who exercise complained about having insomnia. 44.3 % physically active women consider themselves as totally healthy and only 22.1 % of physically passive women do the same. Respondents took Veston test before physical activity and after and it was clear that elderly women who did exercise finished the test faster and it was more accurate (Klizas, 2012).

The Lithuanian situation shows that the least active are elderly people who are sick or take medica-



tion, also the ones who are less educated or get lower income, besides the ones who live in the countryside. According to the data of health education received from the Lithuanian government in 2012, only 2.1 % of people who participated in health education events were elderly people (60 years old and above). That is why it is important to encourage elderly people in physical activities and to organize health education events for elderly people (Plan of assuring healthy ageing in 2014-2023, Ministry of Health, Lithuania).

Lithuania has not got a system for observing the physical activity of its inhabitants but there are many questionnaires made around the world to evaluate physical activity. On the other hand, it is difficult to interpret and often impossible to compare with the index of physical activity in another country when you research people’s physical activity with different measures or research attitudes towards different forms of physical activity. Lithuanian people are not physically active enough. Physical activity (together with other factors of healthy living) can give elderly people a real opportunity to lengthen the time of their independent living and to decrease functional limitation and social insulation. The programs of encouraging physical activity should be oriented to elderly people who are not physically active and live in the countryside.

**2. Research**

Aim of the research: to assess expression of physical activity in the elderly.

Methods of the research: structured questionnaire. Data were processed using an SPSS program (Statistical Package for Social Sciences, version 19.0). Methods of statistical analysis: descriptive statistics, T-test, Anova test, Spearman Correlation Coefficient.

Sample: there were 307 elderly people (from 60 years old and older) from various Lithuanian cities and districts who participated in the survey. The majority of people examined (77 %) were 60-74 year old. The minority (21 %) of people who participated in the survey were 75-90 years old and only 2 % were older than 90 years old. Among the people who participated, there were 66 % women and 34 % men. Respondents lived in various districts: in the

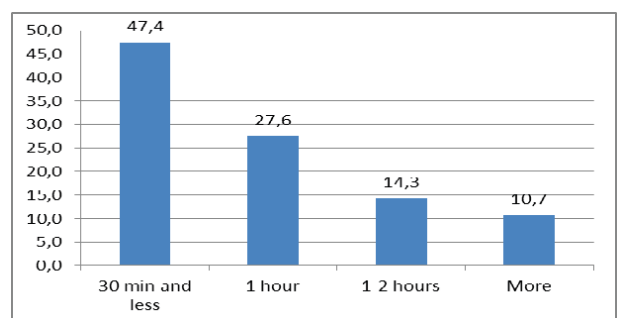
city (59 %), in the settlement (17.9 %) and in the countryside (23.1 %).

*Table 1. Characteristics of respondents*

Characteristics of respondents	N (%)
<i>Age</i>	
60-74	238 (77.5 %)
75-90	65 (21.2 %)
More than 90	4 (1.3 %)
<i>Gender</i>	
Female	203 (66.1 %)
Male	104 (33.9 %)
<i>Living location</i>	
City	181 (59 %)
Settlement	55 (17.9 %)
Countryside	71 (23.1 %)

**3. Results**

This article presents the results of elderly people’s physical activity. Physical activity will be compared with socio-demographic data, and data which reveal the physical activity influence on physical health will be presented.



*Figure 1. Elderly people spending time on physical activity/day*

The research showed that almost half of the people older than 60 who participated in this research

spend 30 minutes (or less) a day exercising. This means that only every second person spends not less than 30 minutes a day exercising, as the WHO (2016) recommends. After carrying out a test of comparing average (Anova) there was no significant statistical difference found between people who lived in different locations (city, countryside) and physical activity.

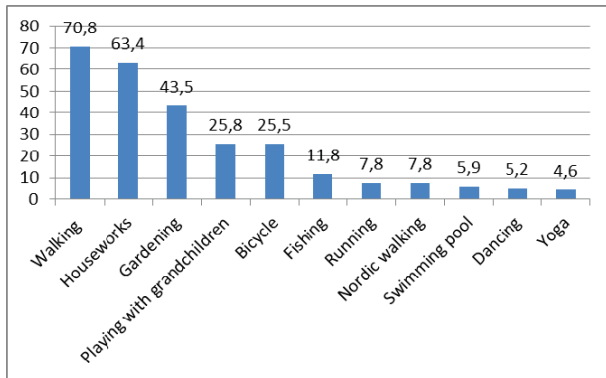


Figure 2. Physical activity types

One of the most popular forms of physical activity among people older than 60 years old is walking (70.8 %). Domestic work, which is one of the possible forms of exercising, was named by 2/3 respondents (63.4 %). Less than half of the people who participated in this research do gardening and truck farming (43.5 %). It is very interesting that a quarter (25.8 %) of respondents named playing with grandchildren as one of the physical activity forms. A similar number of people said they regularly rode a bike (Figure 2). The least popular forms of physical activity are jogging (7.8 %), Nordic walking (7.8%), swimming (5.9 %), dancing (5.2 %) and yoga (4.6 %).

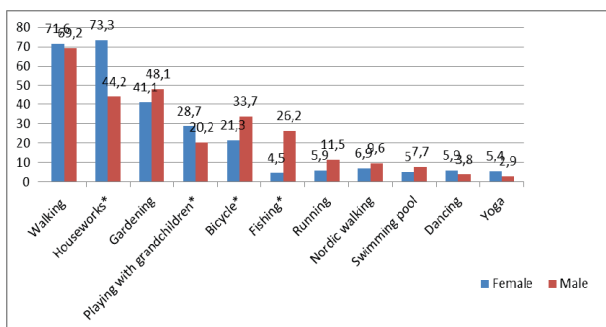


Figure 3. Physical activity types by gender

There were significant statistical differences found, which showed that forms of physical activity are connected. People who ride a bike also tend to use other forms of physical activity, such as: walking (R= 0.145; p= 0.011), jogging (R= 0.155; p= 0.007), pool swimming (R= 0.141; p= 0.014), gardening/truck farming (R= 0.0244; p= 0.000) and fishing (R= 0.321; p= 0.000). People who do Nordic walking are also more likely to choose jogging (R= 0.134; p= 0.019), yoga (R= 0.285; p= 0.000) and swimming in a pool (R= 0.185; p= 0.001). People who spend more time playing with their grandchildren tend to go for a walk more often (R= 0.203; p= 0.000) and link their physical activity with domestic work: gardening/truck farming (R= 0.230; p= 0.000) and keeping the house (R= 0.283; p= 0.000).

There were significant statistical differences found, which let us claim that physical activity of men and women differ by the kind of activity (Figure 3). When doing domestic work, men are more passive than women (T test, p≤ 0.05). 77.3 % of women consider domestic work as one of the physical activity forms. It is possible to think that women (28.7 %) pay more attention to taking care of their grandchildren (and actively playing with them (T test, p≤ 0.05)) than men (20.2 %). The physical activity form which requires less motion is fishing. 26.2 % of men choose it and only less than half their percentage of women (T test, p≤ 0.05). Other forms of physical activity between men and women did not come up during the research.

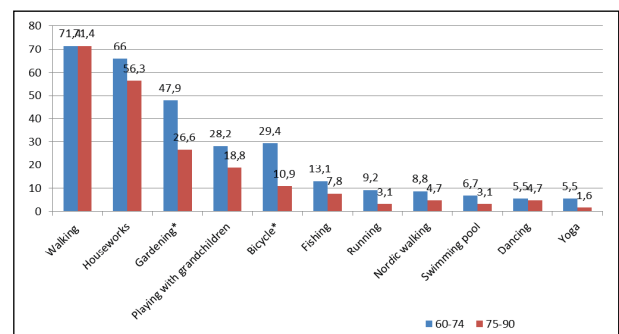


Figure 4. Physical activity types by age

It was discovered that physical activity tends to decrease with age (Figure 4). Gardening and truck farming is most popular among 60-74-year old people (T test, p≤ 0.05). Riding a bike is one of the physical activity forms that 64-74-year old people

use (T test,  $p \leq 0.05$ ). Only two kinds of physical activity are used by people older than 90 – walking and domestic work. But it wouldn't be fair to estimate physical activity of such old people by the percentage of age expression because only 4 people (older than 90 years old) participated in the research.

In many cases, the results of various researches show that physical activity is connected to good physical and psychological state. This article presents data about falls, sleep and a good Body Mass Index (BMI).

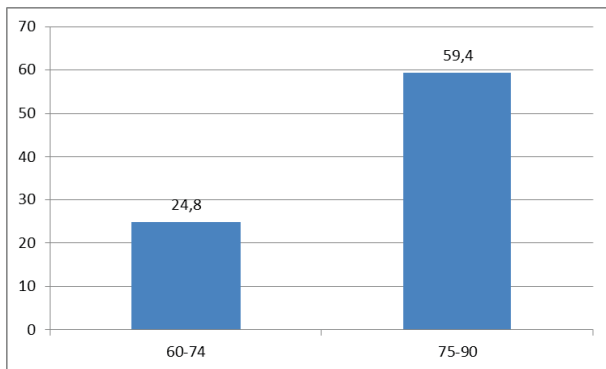


Figure 5. Falls by age groups

Almost every third person who participated in the research experiences falls (28.5 %). It was discovered that falling is a frequent problem among elderly people (Figure 5). In a group of 60-74-year olds, 24.8 %, people fall, when in a group of 75-90-year olds, people fall twice as often. Almost 2/3 people of such age suffer falls (Anova,  $p \leq 0.05$ ). People of such age were not included when making the statistical calculation because it would not be correct, since only a couple of people such age participated in the research and none of them were able to walk because of their health condition. When looking for connections between physical activities and falls, it was determined that elderly people who dance tend to fall the least ( $p \leq 0.05$ ).

It was interesting to find out how physical activity is connected with sleep quality at night by counting the sleep length. On average, elderly people sleep 7.5h during the night (Std. Deviation 1.630). The ones who walk with Nordic walking sticks have an average sleep of 7.6 hours during a day and those who do not, 6.9 hours a day (Anova test,  $p \leq 0.05$ ). People who dance have indicated the longest du-

ration of sleep (8 hours), which lets us claim that dancing is an effective measure to ensure a good night sleep.

Some other facts also prove that physical activity has a great impact on patients' sleep. People who jog ( $p = 0.088$ ), ride a bike ( $p = 0.008$ ), do Nordic walking ( $p = 0.023$ ), gardening ( $p = 0.024$ ), go dancing ( $p = 0.043$ ) and fishing ( $p = 0.038$ ) do not use drugs to better their sleep.

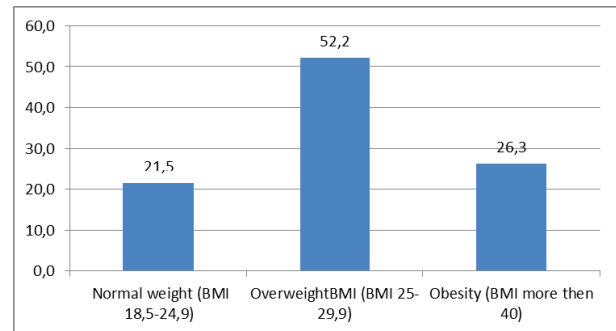


Figure 6. Body Mass Index in elderly and old age groups

The research showed that only 21.5 % of elderly people who participated in the research have the right body mass index, when  $BMI = 18.5-24.9$ . Other 52.2 % are overweight and 26.3 % are obese (Figure 6). There were no significant statistical differences found between body mass index and the form of physical activity used.

#### 4. Conclusions

The research shows that active physical activity ascertains healthy ageing, helps to avoid the risk of falling, prevents from all kinds of physical indispositions, betters psychological state and cognitive characteristics, helps to avoid diseases such as overweight, etc.

After summarizing the data of the research, we can claim that the physical activity of Lithuanian people is insufficient, especially among elderly people.

Elderly people link physical activity with housework without paying enough attention to it or having an opportunity to go in for sports or use other forms of active living. Dances and Nordic walking are very effective forms of keeping good health in older age, and they also help to avoid risk of falls and improve the quality of sleep.

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# Motivation for Pursuing Further Education amongst Adult Learners

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## Abstract

The present paper is based on a study aimed at understanding the motivation and experiences of senior citizen learners in pursuing Diploma in Gerontology at Centre for Lifelong Learning, Tata Institute of Social Sciences, Mumbai. The issue of what motivates older adults to participate in educational activities is important specially from the perspective of Active Ageing. Six out of the total thirteen senior citizen learners were selected and interviewed in depth. Qualitative methodology, including content analysis was used to explore older persons' backgrounds and experiences, and to gain an understanding of their involvement in the learning activities while pursuing Diploma in Gerontology. Their motivation, experiences, challenges, and benefits of engagement in lifelong learning are discussed. One of the major findings of the study is that, despite the course being described as rigorous and demanding in terms of hard work, the learners are found to have perceived a positive impact on their social, psychological and even physical wellbeing. The most preferred teaching method among senior citizen learners are group activities, discussion and assignment-based projects over written examinations. The study recommends more awareness and publicity of such educational programmes among the elderly and courses more elder-friendly so that they may become an integral component in active ageing.

Keywords: active ageing, andragogy, gerontology, motivation.

## Resumen

El presente artículo se basa en un estudio cuyo objeto es comprender la motivación y las experiencias de personas de la tercera edad a la hora de obtener el Diploma en Gerontología otorgado por el Centro para el Aprendizaje Permanente, del Instituto Tata de Ciencias Sociales, en Bombay (la India). La cuestión de lo que motiva a los adultos de mayor edad a participar en actividades educativas es importante, especialmente desde la perspectiva del envejecimiento activo. Se seleccionaron seis de un total de trece alumnos pertenecientes a la tercera edad, a quienes se entrevistó en profundidad. Se empleó una metodología cualitativa, que incluye el análisis de contenido, para explorar las experiencias y los antecedentes de las personas de la tercera edad y llegar a obtener un conocimiento sobre su participación en las actividades de aprendizaje mientras cursan el Diploma en Gerontología. Se analizan su motivación, sus experiencias, sus retos y sus beneficios al participar en el aprendizaje permanente. Una de las principales conclusiones del estudio es que, a pesar de que el curso se describe como riguroso y exigente en cuanto al esfuerzo que requiere, se comprueba que los alumnos han percibido un impacto positivo sobre su bienestar social, psicológico e incluso físico. Los métodos de enseñanza favoritos entre los adultos de la tercera edad son las actividades de grupo, el debate y los proyectos basados en las tareas docentes, antes que los exámenes escritos. El estudio recomienda mayor divulgación y publicidad de tales programas educativos entre la tercera edad, y conseguir que los cursos sean más adecuados para las personas mayores, de forma que puedan convertirse en un componente integral del envejecimiento activo.

Palabras clave: envejecimiento activo, andragogía, gerontología, motivación.



## Introduction

Population ageing has implications for social, political and economic aspects of care giving, health services and social security measures and overall wellbeing of the elderly. In a society where life expectancy is continually rising, lifelong learning is not just a slogan but a way of life (Chang & Lin, 2011). While the motivation of adult learners in lifelong education has been thoroughly studied (Kwong *et al.*, 2006), specially in the western world, not as much has been explored for older adults specifically. The relevance of lifelong education is no longer in debate; however, whether its primary goal should be economic or social continues to be a subject for debate.

The Centre for Lifelong Learning (CLL), Tata Institute of Social Science, Mumbai, India, conducted a study aiming to understand the motivation, the perception, and the expectations among senior citizen learners for pursuing further education. Previous studies indicate that continuing education can buffer mental and physical wellbeing. Therefore, CLL was interested in understanding the educational experiences of its Diploma students who are older than 60 years old and its impact on their life and wellbeing.

The Centre for Lifelong Learning (CLL) was established on February 15, 2006, with the objective of providing training for adult learners in the areas of expertise in the Institute. The CLL was earlier known as the Department of Extra-Mural Studies, which was established in 1981. It caters to two kinds of adult learners: (a) Professional groups being trained for their continuing education and (b) the general population from diverse backgrounds who are outside the formal education system. While the Centre focuses on developing manpower for the social sector, it concurrently provides for continuous education of the educated as well as the marginalised and for the enhancement of adult life and culture, which puts it into the realm of Lifelong Learning in the genuine sense of the term.

## 1. Need For The Study

Every year, the CLL, TISS receives senior citizen learners in its Diploma programmes in addition to younger adults. Over the years, it has been observed that senior citizens (60+) prefer to pursue the Diploma in Gerontology more than the other diploma programmes. Since the inception of the Diploma in Gerontology in 2007, there have been thirteen senior citizen learners (60+) out of a total of 62. This course provides opportunities to adult students to extend or continue their education in order to adapt themselves to the changing conditions. In order to improve the existing course and to develop and to recommend new ones, there is a need to develop an understanding of the needs and requirements of older persons, understand what motivates them to pursue higher education and under what circumstances they are actually able to do it. There remains relatively little research on older adults who participate in educational activities and less evidence on the benefits of learning activities. A ten-country survey of European countries (BeLL Project 2014) concluded that studying improves quality of life and learners with lower qualifications such as school-level or less reported highest gains in self-esteem and feelings of self-worth than those with higher education (cited in Rustomfram, 2014). Therefore, it would be interesting to understand the motivation of older adult learners. Participation is one of the pillars of Active Ageing. Efforts to encourage participation normally begin with the removal of barriers and provision of opportunities (Sloane-Seale & Kops, 2008). This article explores and aims to contribute to the knowledge of senior citizen learners by understanding their motivation and educational experience. It includes their perception regarding the challenges faced, as well as the benefits derived.

## 2. Methodology

The research design is exploratory in nature. Qualitative methodology, including content analy-

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\* Paper presented at the 4<sup>th</sup> International conference on Elderly and New Technologies, 13-15<sup>th</sup> May, 2015 Senior Citizens University, Castellon, Spain.

sis has been used to explore senior citizens' backgrounds and educational experiences, and to gain an understanding of their involvement in the learning activities while pursuing Diploma in Gerontology. A semi-structured interview schedule was used for data collection. This tool encouraged narration of experience and allowed for further probing questions while conducting the interview.

The study is conducted in Mumbai. Out of total 13 senior citizen students (12 men and 1 woman), 6 students were purposively selected and approached for their consent. The purposive sampling is based on year of study, age, gender and educational qualification of the six selected learners. The only female senior citizen learner who ever attended the course was included. Starting with an in-depth understanding of one case, the analysis of the cases was done simultaneously and the findings of one case directed the further data collection process. The interviews were conducted over a period of two months, commencing in late 2014. Interviews generally lasted for

approximately 120 minutes. The saturation of data was assumed when sufficient information about the objectives of the research were attained.

#### *Ethical consideration*

Written consent from the participants to take part in the research has reassured them that this is an academic research and that the information shared will be confidential. Participants consent was sought for recording the interview.

#### *Sampling Method*

The sampling technique employed in the study is purposive sampling. Table 1 describes the age-wise distribution of the senior citizen learners from 2007-2008 to 2014-15. (8 batches)

*Table 1*

S.no	Age group	Total number of students	Number of female students	Number of male students	Selected participants
1	60-65	7	1	6	1F+2M
2	66-70	Nil	-	-	-
3	71-75	2	Nil	2	1M
4	76-80	4	Nil	4	2M
	Total	13	1	12	1F & 5M= 6

*F-Female M-Male.*

*Table 2. below gives the profile of the participants who were finally interviewed for the study*

S.No.	Name of the learners*	Age**	Gender	Education	Batch
	Mr. Udhav	62	M	B.A	2009
	Mr. Jayaprakash	78	M	B.Sc	2010
	Ms. Lila	63	F	B.A	2012
	Mr. Anishankar	65	M	LMM	2012
	Mr. Mukesh	80	M	M.A	2012
	Mr. Suresh	74	M	PH.D	2013

*\* Names have been changed. \*\*Age at the time of admission.*

### 3. Discussion

While the diploma in Gerontology also admits learners with a qualification of Standard XII (A level), it was found that all senior citizen learners who applied were graduates and above. All were physically mobile except for a degree of reduced speed in walking and climbing. Gender appeared to be a restricting factor as only one female senior citizen learner was found among all 62 students across eight years. Household responsibilities along with other characteristics like lower literacy level, financial dependency and other cultural hindrances may reduce educational opportunities for older women in India.

The discussion in this study is constructed along the themes of 'Self' and self-growth, learning preferences, gender differences, challenges encountered and overall impact on physical, cognitive, social and psychological wellbeing.

#### 3.1.A. 'Self' and self-growth

Participants offered several interrelated reasons for participating in the learning activity. The main objective for joining the course appeared to be to engage in productive activity so as to improve their wellbeing. Other stated motivators were: to make appropriate use of the leisure time after formal retirement from work; to expand the horizon of knowledge to lead a meaningful life; and to involve themselves in volunteer activity in order to engage with the welfare of senior citizens.

In general, to acquire a certificate was not the main goal, but rather to make the most productive use of this learning opportunity along with building the knowledge base and skills to be able to deal with ageing issues themselves and others. To pursue further education to them meant that they could be independent and ultimately improve their quality of life. Suresh stated that quality of life is very important. Therefore, he had to do something about it. He had already completed his Diploma in Counselling and after a year's break, he was pursuing the Diploma in Gerontology.

Udhav reported that he was inspired to study because of a book he came across.

The book named «How to Make the Rest of your Days as Best of your Days» had a great influence

on my life. I set a goal for myself that I would make the best use of my time and resources, and also aim to do some good for society.

It was revealed from the interviews that engagement through lifelong learning enhanced their social, psychological and physical activities contributing to their wellbeing. However, unlike what Sloane-Seale and Kops (2008) reported in their study, socializing was not the primary objective for the participants to join the course.

#### 3.1.B. Why choose Gerontology as a subject?

Participants reported that they were keen to understand life processes and ageing so that they could improve their own life situation as well as understand what others experienced. The motivation was to gain a systematic comprehensive knowledge of ageing issues, whether social, physical, psychological, civic or political with the objective of applying it to themselves as well as to others. Some of the participants derived motivation from seeing elderly people around them. Lila narrated that she wanted to help her mother who was living alone. Her sister had suffered from Parkinson and was no longer there. Incidents like losing dear ones or encountering age-related problems encouraged them to learn Gerontology. Four participants were already engaged in social activities working for the welfare of society and specially of the elderly population. Considering the trend of population ageing and the neglect of elderly population, they realized that this area required attention. Studying Gerontology was a need as well as an interest.

#### 3.1.C. The «Other» options

Participants reported that they planned to use the course to pick up new skills for self-development. It emerged that prior to this, they had undertaken courses and planned to do more in the future, too. Mukesh took admission for the Diploma in Counselling after completing the Diploma in Gerontology. Suresh had already completed the Diploma in Counselling before joining Gerontology. Anishankar is a practicing advocate. Before joining the Diploma in Gerontology, he had done a certificate programme

in Securities Law and wanted to study cyber laws in the future. Jayaprakash had also an M.A. in Naturopathy. Lila had done a Diploma in Tourism five years before joining Gerontology.

Such short-term and part-time courses added to their qualifications and improved their opportunities. The benefits were manifold. They could earn a living; they could spend their time meaningfully; strengthen the social support network and improve their wellbeing by staying active and healthy.

### 3.1.D. *Elderly for the elderly*

Participants were reportedly willing to work for the welfare of the elderly in society, which was their main interest in pursuing the Diploma. Two expressed a desire to open their own retirement home for elderly people in need. Mukesh wanted to educate people on ageing issues through his writing. They wanted to apply the knowledge gained through Gerontology by helping themselves and elderly people. Jayaprakash was already associated with a senior citizen foundation. He was helping the organization in managing an online website. As a lawyer, Anishankar observed the increasing number of cases related to elder abuse and started taking up such cases. He was hopeful that the proper understanding of ageing issues would help him to deal with such cases efficiently. Lila wanted to learn about diseases, like Parkinson, which may come with ageing. They all had a desire to work for the betterment of the elderly and wanted to be efficient and knowledgeable when reaching out.

### 3.1.E. *Consciousness regarding personal and professional growth*

Participants perceived the gains in personal and professional growth and narrated them. The student-friendly teaching model gave them an opportunity to improve social and interpersonal skills. They made presentations, worked on projects and assignments and wrote examinations. Initially, they faced problems in matching up with younger batch mates, but they gradually gained pace. For a few participants, it took the first fifteen weeks to gain confidence. Standing and speaking in front of others

was no more a difficulty for them. They had gained verbal fluency by the end of the course. During the interview Lila was amused by remembering her struggle with English at the start. In order to cope with the pace of the course, Udhav spent hours in the library and made the best use of resources. Two of the participants stood first in class and won the gold medal.

## 3.2. *Learning preferences*

Sustaining learner motivation is also about how a learner wants to learn (Boulton-Lewis & Tam, 2008). Andragogy as a science and an art of adult learning points out that adult learners should be involved in all stages of learning, including the identification of their learning needs, and the planning of how those needs are met. In this study, two themes with regard to learning preferences that emerged can be stated as «preferences in modes» of teaching and «preferences in modes of assessment».

### 3.2.A. *Preferences in modes of teaching*

The most preferred teaching method among senior citizen learners was group activities and group discussion. It gave them an opportunity to interact and know each other. They bonded through working on common tasks or presentations. Each contributed as per their expertise and comfort.

I wasn't comfortable speaking in front of the class but through such group exercises, I got confidence; I learnt by seeing others and became able to give presentations fluently by the beginning of the second semester, said Jaiprakash.

Participants reported that the lectures delivered in the Diploma in Gerontology were very informative and taught interestingly. They also appreciated the invited guest faculty. Both the young-old (60-70) and the middle-old (70-80) expressed that they preferred the more interactive mode of teaching. They preferred discussion and debate based sessions. This also gave them the opportunity to contribute to the class by sharing their own life experience. They came to feel that they could acquire their own space in the class process.

Another distinct feature of the Diploma in Gerontology is the Field practicum, which the participants reported to have enjoyed. The primary goal of field experience is to provide the student with the opportunity to engage actively in professional tasks that complement and reinforce classroom learning. This is learning by doing. Two of the participants placed within the low income group expressed that they had entered a world which they had never known about.

### 3.2.B. *Preferences in modes of assessment*

The various modes of assessment encountered by the learners were written exams, group and individual assignments, presentations, class participation, etc. No single preferred mode of assessment among senior citizen learners was stated, but the group assignment mode was preferred. Writing exams was comparatively difficult for many of the participants. Memorizing concepts and reproducing them in a limited time created stress and discomfort. Only one of them proudly reported that he accepted it as a challenge. The other five felt examination was not the best method to assess the learner.

### 3.3. *Gender differences*

There are entrenched economic, social and cultural determinants influencing life experiences of older women (Frederika, speech "Population Found", New Delhi, 30.10.2012). The fact that there is only one female participant in the study reflects the gendered scenario. Domestic tasks and the care giving role of women often limit workforce participation, as well as mobility outside the domestic sphere. Opportunities for education are often denied due to social and cultural mind sets. Overwork and nutritional neglect contribute to poor health in old age. Lila felt that she was fortunate that she could take time out and attend the diploma. She said that her husband's support was important for her. However, her struggle didn't end with taking admission in the course. She shared that she could not focus on the course as she would have liked to because of domestic responsibilities.

Gender remained an impediment for her even after the completion of the course. She wanted to work with an NGO but had to limit her choices in that organisations should be close to her home, and

she could not be out of the house for a full working day. She states;

I did it, but not doing it now.

She means that she actively completed the course but is not able to take it any further. However, she continues to struggle within these conditions. She recently wrote an article on the issues of the elderly for a magazine addressed to old people which received much appreciation.

### 3.4. *Challenges encountered*

All the participants found the course hectic, difficult and demanding. Suresh said he felt he had never worked so hard in his entire life. In particular, seven hours of study on Saturday was tiring for them. For those who stayed at a long distance from the Institute and had to travel for an hour or more, it was a further challenge.

Sitting for long periods and the lack of hearing were two health-related difficulties for senior citizen learners. Jayaprakash and Suresh both had a hearing problem because of which they could not always follow the class discussion properly. They used to sit in the front row so that they could hear the teacher clearly. Those learners who had lost the habit of writing quickly found writing examinations and assignments a challenge. Understanding technical and scientific terms, collecting reading material and becoming accustomed to reading in the library were other challenges. Only two out of the six were technology-friendly, therefore, getting help from the Internet was not easy for them. Presentation skills and English speaking skills were also a challenge for some of them.

Financial affordability also posed a challenge. In this study, all the participants were financially sound. Even so, Lila narrated that she wanted to study for the Diploma in Counselling but as the fees were higher, she took admission in the Diploma in Gerontology, which was comparatively cheaper. The elderly from a lower socio-economic background may not be able to pursue the course even if they want to.

Another challenge for three of the six senior citizen learners was to gain the support of family members to pursue the Diploma.

Even friends had to be convinced about the benefits of participating in educational activities. They questioned the utility of the course and saw it as a



waste of time. After successful completion of the course, friends and relatives questioned the learners as to whether they would make some productive use of this course or not. To avoid this kind of pressure, some learners decided not to inform those family members and friends who they thought would be insensitive to them.

### 3.5. Overall experience of the course

This section highlights the experiences of senior citizen learners with regard to their experiences as students; getting along with other class fellows; building a social support system; helping each other, attending classes, and experiencing fun and challenges while learning. Interestingly, participants of the study reported that they didn't make any particular friends but preferred to be with everyone. Being a senior, they received special attention and support from others. Mukesh described it as:

Being a senior in the class was mostly an advantage for me. Young fellows were very considerate, they used to help me out in each and every task and respected me. It was 80 to 22 in our batch.

All the senior citizen learners reported that they maintained full attendance throughout the course. They reported themselves as being sincere and punctual. They stated that they were not given any concession because of their age. However, they didn't take a competitive position. Learning and understanding the subject was their goal. They all stated that they had some inhibitions at the start, but they managed to overcome them with each other's help.

### 3.6. Impact on wellbeing

#### 3.6.A. Physical & psychological wellbeing

The participation in the course, as well as the information gained through the subjects, motivated the learners to remain active. They reported to have become more conscious of their own health and became regular with fitness exercises. They felt mentally stronger and derived ideas to remain engaged in social welfare activities. Mukesh expressed it this way:

I strongly feel I need to do the best I can do, people must remain active. I am keeping myself active as much as possible.

After completing the course, he brought out a booklet in English on the need to study Gerontology and had it printed, too.

#### 3.6.B. Cognitive wellbeing

Learning stimulates the cognitive process and reduces the risk of memory loss. Middle-old participants (70-80 years old) shared their challenges when trying to remember. Suresh informed that after completing the Diploma, he was able to learn and grasp ideas faster. However, he states that he has had to put much effort in it.

#### 3.6.C. Social wellbeing

The participants of the study shared that their social wellbeing has improved after this course. Their status among their family, peers and society has also improved. They have received appreciation from family and other people for making this voluntary effort at their age. This has provided them with the motivation to pursue their interests further. They now look for more such opportunities.

People look at me with more respect after this course, I get special consideration. I feel that life was not interesting before this course. I used to just keep sitting with my friends in the senior citizen association discussing political stories. Now I can speak about other things. Said Jayaprakash.

During the course of the programme, students learnt from each other and built friendships. They have remained in touch with their batch mates and do find opportunities to get together.

## 4. Conclusions

Educational experience derived from studying the Diploma in Gerontology indicated that it was a tool for senior citizen learners to increase participation

and quality of life of older persons, which is a requisite for active ageing. Participation in civic life has been stated as the third pillar of Active Ageing, the other two being health and social security (WHO, 2002). In this study, making productive use of time in the years after 60 was a primary motive to join the course. Socialising was an outcome of joining and not the reason to enrol.

As in the BeLL Project (2014), this study also demonstrates that one educational experience can become a motivator to continue to other courses. Four participants in the study had done other courses before enrolling, and those who had not, went on to join programmes. While the economic benefits were not perceived as significant, they gained self-esteem, saw themselves as being recognised in society and made improvements in their own lifestyle. They perceived an increased sense of self-worth and individual capacity.

The consciousness which participants shared in the study with regard to their self-growth and personal development included growth in communication (verbal fluency and speaking in the English language), as well as class presentation skills. Communication skills which had been acquired earlier and which could be enhanced in senior years refer not only to instrumental capacities (e. g. making presentations or speaking in English) but they are the vehicle for being able to participate in social and civic life.

A further enhanced communication skill also impels capacity of seniors to define their own needs and to ensure that their aspirations and rights are realised in society (Niederfranke, 1992).

The finding that seniors in the study preferred group methods in teaching and assignment relates to their comfort in being able to bring their life experience into the classroom. Senior citizen learners showed openness to new learning methods as well as the use of technology, e. g. use of LCD projectors for presentations. Chown (1961) cited in McClusky (1965) found that rigidity, which is considered to be a part of behaviour amongst seniors, has actually more to do with the nature of the task and is more significantly associated with low intelligence rather than with age. Botwinick and Brinley (1962) cited in McClusky (1965) concluded that older people give optimum performance if a task is clear and time is allowed for monitoring and correcting potential errors. 'Self-pacing' may contribute to this process,

at least it improves performance (McClusky, 1965). Several participants referred to being comfortable in a learning process where they could control the pace of their learning instead of being driven for long hours or through didactic teaching methods.

The study had only one female participant and amply demonstrated the personal, family-related and cultural issues which prevented her from giving her best. Apart from working to reduce or eliminate these obvious hurdles resulting in denial of educational opportunities for older women, Niederfranke points out that, life expectancy of women being higher than that of men, education programmes for this group of seniors will have to receive urgent and immediate attention (1992).

Despite the fact that the participants in the study came from a relatively better socio-economic profile, at least half of them spoke about having to stretch financially. If this was a challenge for them, it goes without saying that seniors from low socio-economic backgrounds would find it much more difficult to access educational opportunities. Unless they have their own income, families in general may not find it worth 'investing' in their quality of life. Even if they have family resources, elderly women would face this situation with greater intensity. Finding support from families has been stated as significant by all the participants. Niederfranke points out that the encouragement of self-reliance and maturity into old age has to be considered an essential part of educating (1992). While the culture in India encourages that seniors be supported and respected for their experience and wisdom, in practice, this occurs only when seniors stay within the confines of their conventional role and often not even then.

Increased social, psychological, cognitive and physical wellbeing was narrated as a tangible gain by all the participants over the year-long educational programme. Participants stated that their life experiences had been valued by their classmates. They felt they had contributed in equal measure through their own strengths. This experience constitutes an important part of the educational experience for the elderly. In gerontological literature, experience is also conceptualised as knowledge referring to wisdom or just as wisdom (Smith *et al.*, 1988, cited in Niederfranke, 1992). It is expected that this will contribute to their capacity to make decisions and to use these for specific tasks and situations in life, particularly in senior years where changes in life and

the need to give up certain roles and to take on new roles characterises life and the acquisition of status in one's old age. Capacity to face critical life events (retirement, loss of spouse, «empty nest» situation, redefining relationships with children and/or ageing parents, etc.) in a constructive way with strengthened individual capacity will be integral to a successful educational experience.

Lifelong education and learning strategies are fundamental for elderly people to meet the demands of age. A system of education which will study their needs, provide the elements which motivate them to pursue educational experience and is sensitive to the needs of elderly women as well as of those from low income groups is an imperative need. In view

of the demographic, social, economic and technological changes, universities may do well to focus upon the motivations which are thought to influence the participation of senior citizen learners in educational programmes and courses of study. To become genuinely responsive to the needs and interests of the elderly, universities would do well to understand the kinds of adult learners it attracts and attempts to serve (Morstain and Smart, 1977). Too often, educational programmes are developed and offered by universities on their understanding of what is best to offer and how it is best to offer it. However, the interests of learners would be better served if institutions examined the needs and motivations of the potential learners.

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# Influencia de los programas universitarios para mayores sobre la mejora del rendimiento cognitivo

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## Abstract

The aim of this paper is to apply a rigorous econometric approach to analyze the benefits derived from participation in Third Age University Programs (3AUP). Two waves from the SHARE (Survey of Health, Ageing and Retirement in Europe) corresponding to 2007 and 2011 are used. This survey contains information concerning the degree of satisfaction with life and allows to define indicators for cognitive achievement in memory, vocabulary and fluency. A sample of individuals aged between 50 and 85 years old is selected. The percentage of participants in 3AUP has increased from 3.25 % to 5.47 %, which represents an average growth rate of 13.90 %. For the sample of all respondents we appreciate that: (i) the probability of retaining 10-14 words in the memory test increases by 0.34 points for participants in 3AUP, (ii) the probability of developing a list with at least twenty words increases by 0.45 points for participants in 3AUP, and it attains a maximum of 0.88 point for participants with high school education.

Keywords: Third Age University Programs, benefits, satisfaction, cognitive achievement.

## Resumen

El objetivo de este trabajo es aplicar un enfoque econométrico riguroso para analizar los beneficios derivados de la participación en programas universitarios para mayores (PUM) en España. Se utilizan dos olas de la encuesta SHARE (*Survey of Health, Ageing and Retirement in Europe*) para 2007 y 2011. Esta encuesta contiene información sobre el nivel de satisfacción general y permite construir indicadores para pruebas cognitivas de memoria. Se selecciona una muestra de personas de entre 50 y 85 años. El porcentaje de participantes ha aumentado del 3,25 % al 5,47 %. Por tanto, en el intervalo de cuatro años la tasa de participación ha crecido a una tasa media anual acumulada del 13,90 %. Para el conjunto de todos los individuos se constata que: *i*) la probabilidad de recordar entre 10 y 14 palabras en la prueba de memoria aumenta en 0,34 puntos si participa en PUM, y *ii*) la probabilidad de que la lista confeccionada en la prueba de fluidez contenga 20 o más nombres aumenta en 0,45 puntos, si participa en un PUM, con un máximo de 0,88 puntos de diferencia si tiene estudios secundarios.

Palabras clave: programas universitarios para mayores, beneficios, satisfacción, rendimiento cognitivo.

## 1. Introducción

Recientemente, se ha acuñado la expresión «envejecimiento activo» para transmitir una connotación positiva sobre la base de tres pilares: la salud, la participación y la seguridad (WHO, 2002). La idea fundamental que subyace es que independientemente de cuál sea la edad, la persona puede mantener una participación activa en cualquier ámbito, económico, social y cultural.

En España, se han llevado a cabo fructíferas investigaciones sobre las características de los programas universitarios para mayores y los beneficios derivados de estos. El análisis de Carmen *et al.* (2004), centrado en la Universidad de las Islas Baleares, ponía en relieve no solo la adquisición de conocimientos, sino la importancia del apoyo social recibido por los participantes. A nivel nacional, Bru (2007) realizó una evaluación de 47 programas universitarios para mayores, y señaló que los objetivos perseguidos en la mayoría de ellos son promover el conocimiento de nuevas tecnologías y el desarrollo personal. Por otra parte, Vilaplana (2010), utilizando la Encuesta de Condiciones de Vida de Personas Mayores (IMSERSO, 2006), observó que la participación en estos programas aumenta la probabilidad de considerar que la calidad de vida es buena o muy buena en un 48,99 %. Por último, Fernández Balles-teros *et al.* (2012) plantearon un análisis comparativo entre participantes en programas universitarios para mayores (PUM) (grupo de tratamiento) y no participantes (grupo de control). Al final del periodo (2007-2010) se constató que la función cognitiva, el estado de salud y el nivel de actividad social eran significativamente superiores en el grupo de tratamiento.

El objetivo de este trabajo es contribuir a esta área de investigación aportando nuevas evidencias, con datos más actualizados y diferentes técnicas econométricas. En particular, en este trabajo se dará respuesta a la siguiente pregunta: ¿Ejerce la participación en PUM un efecto significativo sobre el rendimiento cognitivo, evaluado este a partir de pruebas de memoria y fluidez de vocabulario? La ventaja frente a otros estudios es que el tamaño de la muestra de participantes en PUM es mayor que en los anteriores trabajos mencionados, y además es posible comparar los resultados de participantes en PUM con los de no participantes.

## 2. Metodología

Se utilizan datos de la segunda y cuarta ola de la encuesta SHARE (*Survey of Health, Ageing and Retirement in Europe*),<sup>1</sup> correspondientes a los años 2007 y 2011. Para el diseño de la muestra de este trabajo se ha seleccionado a individuos de entre 50 y 85 años residentes en España. Las muestras finales constan de 2003 observaciones en 2007 y 2927 observaciones en 2011.

### 2.1. Definición de variables

#### *Participación en programas universitarios para mayores*

Se define una variable binaria «PUM» que toma el valor 1 cuando ha respondido afirmativamente a esta pregunta, y cero en caso contrario. El número de participantes aumenta de 65 en 2007 a 160 en 2011, lo que en términos porcentuales supone un 3,25 % y un 5,47 %, respectivamente. Por tanto, la tasa de participación ha crecido a una tasa media anual acumulada del 13,90 %.

#### *Prueba de memoria*

Esta prueba consta de las siguientes fases:

- En la pantalla de un ordenador se muestra al entrevistado una lista de 10 palabras. Por ejemplo, en el cuestionario para 2007 las palabras eran: mantequilla, brazo, carta, reina, ticket, césped, esquina, piedra, libro y vara.
- Se espera un minuto y se pide al entrevistado que diga todas las palabras que recuerda.
- Se continúa con otras preguntas y, pasados unos minutos, se vuelve a pedir al entrevistado que enumere todas las palabras que recuerde.
- La puntuación total es la suma del número de palabras recordado en cada tanda, por lo que toma un valor mínimo de 0 y un valor máximo de 20.

#### *Prueba de fluidez*

Se pide al entrevistado que enumere todos los animales que pueda en el tiempo máximo de un mi-

1 Los microdatos del SHARE son accesibles de manera gratuita a través de la página web <<http://www.share-project.org/>>



nuto. Se admiten como válidos todos los nombres de animales, quedando excluidos los nombres propios y las variaciones de una misma especie. La puntuación oscila entre 0 y el número máximo de animales válidos que pueda citar una persona.<sup>2</sup>

La tabla 1 muestra la información descriptiva de las personas entrevistadas en SHARE (2007, 2011)

en función de su participación en PUM. La distribución de los no participantes está compuesta por un 47 % de hombres y un 53 % de mujeres, frente a un 32 % de hombres y un 68 % de mujeres en el grupo de participantes. Los participantes son aproximadamente cinco años más jóvenes en promedio (60 frente a 65 años). Entre los participantes hay un mayor peso de los niveles educativos secundarios y

*Tabla 1. Características de la muestra en función de su participación en PUM*

	2007		2011	
	<i>No participa en PUM</i>	<i>Sí participa en PUM</i>	<i>No participa en PUM</i>	<i>Sí participa en PUM</i>
Hombre (%)	46,80	32,31	46,98	33,13
Mujer (%)	53,20	67,69	53,02	66,88
Edad promedio	65,23	61,28	64,66	59,52
Nivel de estudios (%)				
Sin estudios	16,44	3,45	14,55	8,08
Educación primaria	58,60	31,04	65,92	33,34
Educación secundaria	11,86	27,59	8,42	24,24
Educación superior	12,00	34,47	9,70	30,30
No indica el nivel de estudios	1,10	3,45	1,42	4,04
Estado civil (%)				
Casado	78,83	73,89	77,93	75,91
Separado	3,81	4,35	3,46	4,82
Soltero	7,22	8,70	4,37	4,82
Viudo	10,14	13,05	14,25	14,46
Número promedio de enfermedades	1,46	1,34	1,74	1,39
Número promedio de discapacidades para actividades personales de la vida diaria	0,22	0,05	0,37	0,13
Número promedio de discapacidades para actividades instrumentales de la vida diaria	0,36	0,11	0,51	0,14
Relación con la actividad económica (%)				
Ocupado	20,74	33,85	14,13	35,63
Desempleado	2,94	7,69	4,81	6,25
Incapacitado para trabajar	4,23	4,62	3,69	1,88
Jubilado	39,11	26,15	46,11	24,38
Labores del hogar	31,63	27,69	29,20	31,25
Otra situación	1,34	0,00	2,06	0,63
Ingreso anual (€ constantes de 2011)	9.639	10.096	13.950	14.693
Prueba de memoria N.º promedio de palabras recordadas (mínimo: 0; máximo: 20)	6,30	8,25	6,39	9,34
Prueba de fluidez N.º promedio de animales citados	14,25	17,89	13,83	18,35
Número de observaciones	1.938	65	2.767	160

<sup>2</sup> El número máximo de animales citados fue 39 en 2007 y 47 en 2011.

universitarios (62,06 % en 2007 y 54,51 % en 2011) frente a solo 23,86 % y 18,12 %, respectivamente, en el grupo de no participantes.

En la prueba de memoria, el número medio de palabras recordadas se encuentra en torno a 6 para no participantes, mientras que ha aumentado de 8 a 9 palabras para los participantes. En la prueba de fluidez, el número promedio de animales mencionados es superior entre los participantes, y la diferencia entre ambos grupos aumenta con el paso del tiempo (3,64 en 2007 y 4,52 animales más en promedio en 2011).

## 2.2. Modelo de los resultados de las pruebas cognitivas

Consideramos un sistema de dos ecuaciones. La primera especifica la probabilidad de que un individuo  $i$  participe en PUM en función de una serie de variables explicativas ( $W'_{1i}$ ). La segunda ecuación especifica la variable cognitiva (fluidez o vocabulario) en función de una serie de variables explicativas ( $W'_{2i}$ ) y de la participación en PUM.

$$PUM_i^* = W'_{1i}\alpha_1 + \theta_{1i} \quad (1)$$

$$Cognitiva_i^* = \gamma PUM_i^* + W'_{2i}\alpha_2 + \theta_{2i} \quad (2)$$

$$Cognitiva_i^* = \{Memoria_i^*, Fluidez_i^*\}$$

Los resultados de las pruebas cognitivas siempre toman valores no negativos y muestran una distribución con un perfil decreciente. Esta característica determina que el modelo que debemos estimar para los resultados de las pruebas cognitivas es de tipo Poisson. En ambos vectores de variables explicativas ( $W'_{1i}$  y  $W'_{2i}$ ) se incluyen edad, género, nivel de estudios, estado de salud (enfermedades crónicas y discapacidades), y relación con la actividad económica. Actuando como restricciones de identificación, y por tanto solamente en  $W'_{2i}$  se incluyen estado civil, cuidar a otras personas, tamaño del municipio de residencia, y nivel de ingresos. La filosofía que hay detrás de estas variables es que la disponibilidad de tiempo, las circunstancias económicas y geográficas pueden afectar a la motivación de iniciar un PUM.

## 3. Resultados y discusión

A partir de las estimaciones de los modelos para las pruebas cognitivas se han obtenido las probabilidades predichas. La tabla 2 muestra los resultados de las probabilidades predichas para la prueba de memoria. Para el conjunto de la muestra, la probabilidad de que el entrevistado recuerde entre 10 y 14 palabras aumenta en 0,34 puntos si participa en PUM. La probabilidad de recordar entre 10 y 14 palabras para los participantes en PUM es superior a la de los no participantes cuando comparamos personas de 50 a 59 años (0,55 puntos), estudios secundarios (0,91 puntos) y estudios superiores (0,64 puntos). En el grupo de personas de 80 y más años, aunque no hay ningún caso que haya recordado más de 10 palabras, hay que valorar muy positivamente el aumento en la probabilidad de recordar entre 5 y 9 palabras cuando se ha participado en PUM (0,78 puntos en el grupo de 80 y más años; 0,55 puntos en el grupo de sin estudios).

Los resultados de las probabilidades predichas para la prueba de fluidez se ofrecen en la tabla 3. La probabilidad de que la lista de animales que debían confeccionar los entrevistados contenga 20 o más nombres aumenta en 0,45 puntos si participa en un PUM, con un máximo de 0,88 puntos de diferencia si tiene estudios secundarios y 0,80 puntos si tiene estudios superiores. Al igual que en la prueba de memoria, se aprecia que la probabilidad de recordar un mayor número de nombres de animales disminuye a medida que aumenta la edad, pero incluso en este caso, la probabilidad de recordar entre 14 y 19 nombres aumenta sustancialmente para los participantes en PUM (0,96 puntos para el grupo de 70-79 años; 0,80 puntos para el grupo de 80 y más años).

*Tabla 2. Probabilidad predicha para la prueba de memoria. Probabilidad de recordar un número determinado de palabras de la lista propuesta por el entrevistador condicionado a participar o no en PUM*

	<i>No participa en PUM (1)</i>	<i>Sí participa en PUM (2)</i>	<i>Diferencia entre las probabilidades predichas (2) – (1)</i>
Toda la muestra			
De 0 a 4 palabras	0,18	0,00	-0,18
De 5 a 9 palabras	0,81	0,65	-0,16
De 10 a 14 palabras	0,00	0,34	0,34
Edad: De 50 a 59 años			
De 0 a 4 palabras	0,01	0,00	-0,01
De 5 a 9 palabras	0,98	0,44	-0,55
De 10 a 14 palabras	0,01	0,56	0,55
Edad: De 60 a 69 años			
De 0 a 4 palabras	0,03	0,00	-0,03
De 5 a 9 palabras	0,97	0,95	-0,01
De 10 a 14 palabras	0,00	0,05	0,05
Edad: De 70 a 79 años			
De 0 a 4 palabras	0,37	0,00	-0,37
De 5 a 9 palabras	0,63	0,93	0,30
De 10 a 14 palabras	0,00	0,07	0,07
Edad: 80 o más años			
De 0 a 4 palabras	0,97	0,20	-0,77
De 5 a 9 palabras	0,02	0,80	0,78
De 10 a 14 palabras	0,00	0,00	0,00
Estudios: Primarios			
De 0 a 4 palabras	0,19	0,00	-0,19
De 5 a 9 palabras	0,81	0,86	0,05
De 10 a 14 palabras	0,00	0,14	0,14
Estudios: Secundarios			
De 0 a 4 palabras	0,00	0,00	0,00
De 5 a 9 palabras	1,00	0,09	-0,91
De 10 a 14 palabras	0,00	0,91	0,91
Estudios: Superiores			
De 0 a 4 palabras	0,06	0,00	-0,06
De 5 a 9 palabras	0,88	0,30	-0,58
De 10 a 14 palabras	0,06	0,70	0,64

Tabla 3. Probabilidad predicha para la prueba de fluidez. Probabilidad de citar un número determinado de animales condicionado a participar o no en PUM

	<i>No participa en PUM (1)</i>	<i>Sí participa en PUM (2)</i>	<i>Diferencia entre las probabilidades predichas (2) – (1)</i>
Toda la muestra			
De 0 a 4 palabras	0,00	0,00	0,00
De 5 a 9 palabras	0,06	0,00	-0,05
De 10 a 14 palabras	0,61	0,00	-0,61
De 15 a 19 palabras	0,33	0,55	0,21
20 o más palabras	0,00	0,45	0,45
Edad: De 50 a 59 años			
De 0 a 4 palabras	0,00	0,00	0,00
De 5 a 9 palabras	0,01	0,00	-0,01
De 10 a 14 palabras	0,31	0,00	-0,31
De 15 a 19 palabras	0,68	0,28	-0,40
20 o más palabras	0,00	0,72	0,72
Edad: De 60 a 69 años			
De 0 a 4 palabras	0,00	0,00	0,00
De 5 a 9 palabras	0,02	0,00	-0,02
De 10 a 14 palabras	0,66	0,00	-0,66
De 15 a 19 palabras	0,32	0,87	0,55
20 o más palabras	0,00	0,13	0,13
Edad: De 70 a 79 años			
De 0 a 4 palabras	0,00	0,00	0,00
De 5 a 9 palabras	0,09	0,00	-0,09
De 10 a 14 palabras	0,90	0,00	-0,90
De 15 a 19 palabras	0,01	0,97	0,96
20 o más palabras	0,00	0,03	0,03
Edad: 80 o más años			
De 0 a 4 palabras	0,04	0,00	-0,04
De 5 a 9 palabras	0,34	0,20	-0,14
De 10 a 14 palabras	0,61	0,00	-0,61
De 15 a 19 palabras	0,00	0,80	0,80
20 o más palabras	0,00	0,00	0,00
Estudios: Primarios			
De 0 a 4 palabras	0,00	0,00	0,00
De 5 a 9 palabras	0,06	0,00	-0,06
De 10 a 14 palabras	0,67	0,00	-0,67
De 15 a 19 palabras	0,27	0,71	0,45
20 o más palabras	0,00	0,29	0,29
Estudios: Secundarios			
De 0 a 4 palabras	0,00	0,00	0,00
De 5 a 9 palabras	0,00	0,00	0,00
De 10 a 14 palabras	0,14	0,00	-0,14
De 15 a 19 palabras	0,86	0,13	-0,74
20 o más palabras	0,00	0,88	0,88

	<i>No participa en PUM (1)</i>	<i>Sí participa en PUM (2)</i>	<i>Diferencia entre las probabilidades predichas (2) – (1)</i>
Estudios: Superiores			
De 0 a 4 palabras	0,00	0,00	0,00
De 5 a 9 palabras	0,01	0,00	-0,01
De 10 a 14 palabras	0,25	0,00	-0,25
De 15 a 19 palabras	0,74	0,20	-0,54
20 o más palabras	0,00	0,80	0,80

#### 4. Conclusiones

En esta sección se propone ofrecer una serie de recomendaciones sobre cómo orientar los PUM de cara al futuro. En primer lugar, conviene recordar el trabajo de Duay y Brian (2008) que, a partir de entrevistas a participantes en PUM, concluyeron que el diseño de programas de aprendizaje efectivos debía sustentarse sobre las siguientes bases: 1) que los temas que se fuesen a tratar resultasen interesantes; 2) que el profesor se sintiese implicado con el tema de los programas universitarios para mayores, y 3) que las experiencias

de aprendizaje permitiesen la implicación de los estudiantes, es decir, que se fomentase una actitud muy participativa. En segundo lugar, es primordial construir un aprendizaje bidireccional, en el que las personas mayores compartan su saber y sus habilidades con las generaciones más jóvenes, y estas a su vez les transmitan sus propios conocimientos e innovaciones. Si esto llegara a suceder, conseguiríamos una sociedad más inclusiva, donde todas las formas de aprendizaje serían valoradas, se apreciaría la contribución de las personas mayores como un elemento más del sistema educativo y se reconocerían los beneficios del aprendizaje a lo largo de toda la vida.

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