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Abstract

Gerontechnology has become a new field of interest in aging, showing the potential of these new tools to promote the well-being of the elderly and active aging. Although few studies have focused on analyzing the online resources available for this purpose. Here, we identify and analyze the online resources focused on some of the main areas of interest in active aging, according to its main characteristics, as well as aspects of accessibility, use and quality, with special emphasis on those resources aimed specifically at older people. We identified and coded 557 links. These links are focused on 7 dimensions of active aging. *Descriptive and multivariate analyses* show a lack of online resources aimed specifically at older people, especially in relation to psychosocial and emotional variables. We have found significant limitations of accessibility, use and quality of resources. We conclude on the need for greater involvement institutional, social and scientific to maximize the possibilities offered by the Internet and to overcome the limitations found and that might serve as some of the causes of the generational digital divide existing

Keywords: online resources; active aging; digital divide; Gerontechnology

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Análisis de Recursos Online Gerontecnológicos

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Resumen

La gerontecnología se ha convertido en un nuevo campo de interés en envejecimiento, mostrando el potencial de estas nuevas herramientas para favorecer el bienestar integral del adulto mayor y con ello, el envejecimiento activo. Si bien, pocos estudios se han ocupado de analizar los recursos online disponibles para este fin. En este estudio se identifican y analizan los recursos existentes en la red en relación a algunas de las principales áreas de interés en envejecimiento activo, atendiendo a sus principales características, así como a aspectos de accesibilidad, uso y calidad, con especial énfasis en aquellos recursos dirigidos específicamente a personas mayores. Se identificaron y codificaron 557 enlaces centrados en 7 dimensiones de envejecimiento activo. Los análisis descriptivos y multivariados llevados a cabo muestran una escasez de recursos online dirigidos específicamente a personas mayores, especialmente en relación a variables psicosociales y emocionales. Se han hallado importantes limitaciones de accesibilidad, uso y calidad de los recursos. Se necesita una mayor implicación institucional, social y científica para aprovechar al máximo las posibilidades que brinda internet, así como para superar las limitaciones halladas, las cuales podrían constituirse como algunas de las causas de la brecha digital de tipo generacional existente.

Palabras clave: *recursos online; envejecimiento activo; brecha digital; gerontecnología*

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Recent years have witnessed the emergence of a new area of interest in the field of ageing: gerontechnology. This concept refers to the use of technology as a means to ensure good physical and mental health, full social participation and independence throughout life (Wu, Damnée, Kerhervé, Ware, & Rigaud, 2015). This in turn implies that older adults must be equipped to live in a dynamic technological society.

The new technologies, including online resources, possess unquestionable potential to promote the physical, psychological and social well-being of older adults (Jones, Ashurst, Atkey, & Duffy, 2015; Vancea & Boso, 2015). However, two questions remain unclear. One is whether older adults are equipped to live in this technological society, since they may lack the necessary training, interest, attitude or other personal variable, and the other is whether these technologies, and especially the online resources available today, are adapted to the interests, needs, abilities and demands of older adults, and even more importantly, whether they offer guarantees of quality, efficacy and effectiveness (Hill, Betts, & Gardner, 2015). The present study focused on these latter aspects.

To date, few studies have conducted a systematic search and analysis of the availability, characteristics, accessibility and usability of websites and online resources related to a particular subject. Most of these have focused on the field of health (Bari, Kemeny & Bari, 2014; Campbell & Wallace, 2015; Spencer & Sheridan, 2014), while a small minority have analysed educational websites (Clink, 2015; Marques et al., 2015) or sites related to ideology, politics, business or trade (Grana & Ling, 2015).

Although conducted in fields other than the subject of our research, some of these studies have focused exclusively on the quality of the information published on such websites and have reported substantial problems as regards the accuracy, quality and reliability of the information, as well as problems of legibility due to the excessive use of technical elements (Brigo, Otte, Igwe, Tezzon & Nardone, 2015; Carlsson, Bergman, Karlsson, & Mattsson, 2015; Gray et al., 2015). Based on different international standards (e.g. the World Wide Web Consortium, W3C) or user opinions, other studies have assessed compliance with criteria aimed at ensuring website accessibility and usability, and have reported substantial limitations in this regard according to indicators such as contrast, content presentation,

font size, accessibility on different devices, complexity of home pages, difficulties in navigation and lack of accessibility support (Mangalore et al., 2015).

However, none of the studies reviewed has focused solely or partially on the field of active ageing and its main areas of interest, such as the emotional, psychosocial (coping, self-efficacy, social skills), cognitive and other variables that contribute to successful active ageing, well-being and quality of life. Furthermore, although accessibility, usability and information quality have all been studied, no detailed analyses have been conducted of other website characteristics such as who designs these digital resources or what strategies are employed, aspects which could influence the former and might shed light on some of the possible causes of the present generational digital divide. This could have important theoretical and applied implications when developing and adapting online resources for older adults as regards enhancing their use and effectiveness.

Given this background and the absence of studies in this area, the aim of the present study was to identify and analyse the online resources available in some of the principal areas of interest in active ageing, determining their main characteristics and exploring accessibility, use and quality, with particular emphasis on resources aimed specifically at older adults.

We hypothesised that: (i) in contrast to other age groups, few resources will be specifically aimed at older people, since it is only recently that there has been a surge in the use of these tools by older adults, who now constitute the age group with the fastest rate of growth in Internet use (Kania-Lundholm & Torres, 2015); (ii) the resources will be aimed at providing information rather than for intervention purposes, since previous studies have reported that older adults mainly use these tools to obtain information (González, Fanjul, & Cabezuelo, 2015); (iii) the resources will mainly have been developed by self-help organisations, given that it is only recently that efforts have been made to implement training policies; (iii) the resources will have been developed using an integrated approach within an eclectic sphere of activity; (iv) online resources targeting older adults will be primarily aimed at optimising cognitive variables, based on the deficit approach that has prevailed for years; and (v) the predominant mode of resource access will be public and will not require advanced digital skills,

but will present substantial limitations of accessibility, usability and quality that explain the current digital divide.

Method

Corpus of Websites

We conducted a search for websites using the search engine *Google* and the key words *emotions*, *self-efficacy*, *coping*, *social skills*, *communication skills*, *cognition*, *physical health* and *mental health* combined with *older adults*, to refine the search, and their respective translations into Spanish, obtaining a corpus of 557 websites. The following inclusion criteria were applied: (i) websites related to psychosocial, emotional, cognitive and other variables of ageing; (ii) websites falling within the following types of tool: blogs, educational tools, office automation tools, multimedia resources, social networks and functional websites; (iii) websites aimed at different age groups but which could be adapted for older adults; and (iv) websites that could be consulted independently by older adults themselves or by third parties who work with this group.

Indicators Analysed

We used three types of indicator:

Table 1
Indicators analysed in the present study

Type of indicator	Specific indicators
Population	*Developer* (governmental organisations, self-help organisations, non-governmental organisations, researchers, not specified)
	Target audience (older adults, adults, people with a specific disease or disorder and other groups)
Resource characteristics	*Type of tool* (blog, educational tool (e.g. Webquest, Moodle, Wikis), office automation, multimedia resource, social network, functional website)
	Purpose (intervention, information, both) (continued)

Table 1
Indicators analysed in the present study (continued)

Type of indicator	Specific indicators
Resource characteristics	*Autonomous Region*
	Country
	Focus (cognition, emotions, self-efficacy, communication skills, social skills, coping, other variables related to active ageing)
	Theoretical approach (holistic, cognitive-behavioural, behavioural, educational, non-professional)
	Activity (education, psychology, leisure and eclectic)
	Strategies (cognitive-behavioural techniques, coping techniques, self-control/self-regulation, communicative and educational)
Accessibility, use and quality indicators	*Accessibility*
	Accessibility and use support (screen support, audiovisual support, both screen and audiovisual support, no support)
	Access mode (public, restricted, partial, paid)
	Audiovisual environment
	Digital competence
	External resources and websites
	Links with other services (messaging, social bookmarking, content management systems, social networking)
	Interactivity with the user and with other users
	Functional assessment
	Limitations (in relation to virtual application, accessibility, verification of efficacy)
	Activity log

Statistical Analysis

Once the websites had been identified and encoded, we conducted descriptive and multivariate analyses using the software program SPSS 22.0 and using target audience as the grouping variable.

Procedure

We conducted a search for websites after deleting the cache and browsing history to avoid biased results. Once the websites had been identified, they were encoded in *Excel* according to the indicators listed above. To ensure objective encoding, the procedure was conducted several times to ensure intra-coder consensus, and objective indicators were verified by contrasting various sources or routes and ensuring the existence of ample objective data and evidence. We confirmed that all the websites were active prior to conducting descriptive and multivariate analyses (GLM) using SPSS 22.0.

Results

Description of the Websites Included in the Study

In total, we identified 557 websites that addressed the psychosocial, emotional and active ageing variables described above. Of these, 105 exclusively targeted older adults, accounting for 18.85% of the total, 65 were aimed at adults (11.67%) and 52 at people with a specific disease or disorder (9.33%). The remaining 335 websites (60.14%) targeted other age groups.

We obtained statistically significant results for 55 of the 64 target audience variables analysed, accounting for 85.94% of the total. The *activity* indicator yielded the highest values [X^2 = 380,103; $p \leq .001$]. Websites and resources for older adults predominantly fell within the fields of psychology [f = 41; p = 7.3] and entertainment and leisure [f = 36; p = 6.5], compared with those for other age groups, in which educational websites predominated [f = 277; p = 49.7], as was also the case with websites for people with a specific disorder [f = 45; p = 8.1]. Resources targeting adults were also mainly psychological [f = 38; p = 6.8].

Other statistically significant results of interest in relation to the target audience were those obtained for the *developer* indicator [X^2 = 131,932; $p \leq .001$]. Resources for older adults were predominantly designed by non-governmental organisations [f = 30; p = 5.4] and self-help organisations [f = 28; p = 5], as was also the case with adults. However, the most common resources for other age groups were government websites [f = 140; p =

25.1], as was also the case with websites for people with a specific disorder [f = 30; *p*= 5.4].

As regards *type of tool* [X^2 = 166,833; $p \leq .001$], multimedia resources were especially common for older adults[f = 44; *p* = 7.9], followed by educational tools [f = 23; *p* = 4.2] and functional websites [f = 21; *p* = 3.8]. Similarly, the most common resources aimed at adults were functional websites [f = 26; *p* = 4.7] and multimedia resources [f = 22; *p* = 3.9], and these latter were also the most common type of tool for other age groups [f = 208; *p* = 37.3] and for people with a specific disorder [f = 28; *p* = 5.01].

The most common *theoretical approaches* adopted when developing resources for older adults were holistic [X^2 = 260,931; $p \leq .001$; f = 35; *p* = 7.9] and cognitive-behavioural [f = 27; *p* = 4.9]. For other age groups [f = 182; *p* = 32.7] and people with a specific disorder [f = 32; *p* = 5.7] a holistic approach again predominated, while in the case of adults, a cognitive-behavioural approach was more common [f = 46; *p* = 8.3].

With regard to *focus*, most of the websites aimed at older adults focused on cognitive variables [f = 70; *p* = 12.6; X^2 = 76,774; $p \leq .001$] and other variables related to active ageing [f = 22; *p* = 4; X^2 = 34,835; $p \leq .001$], but rarely focused on optimising psychosocial and emotional variables. For other age groups, the main focus of websites was more varied and included cognitive variables [f = 93; *p* = 16.7], emotional skills [f = 111; *p* = 19.9; X^2 = 59.95; $p \leq .001$], communicative skills [f = 97; *p* = 17.4; X^2 = 35,041; $p \leq .001$] and social skills [f = 63; *p* = 11.3; X^2 = 13,341; $p \leq .01$]. Resources aimed at adults mainly focused on emotional variables [f = 44; *p* = 7.9] and coping [f = 18; *p* = 3.2], whereas resources for people with a specific disorder primarily focused on emotional skills [f = 18; *p* = 3.2].

As regards *accessibility* [X^2 = 79,038; $p \leq .001$], most websites aimed at older adults presented medium accessibility [f = 65; *p* = 11.7] in terms of fulfilling at least three of the following conditions: no password required, accessibility and use support provided, content presentation adapted to legibility indicators (size, contrast, layout), and free. Most did not provide *accessibility and use support* [f = 64; *p* = 11.7; X^2 = 137,704; $p \leq .001$]. However, in the majority of cases the resource *access mode* [X^2 = 53,054; $p \leq .001$] was public, i.e. free, and did not require a password [f = 90; *p* = 16.1]. For the other age groups, accessibility was high [f = 196; *p* = 35.2]

and despite a continuing absence of accessibility support [f = 139; p = 25.01], a high number of resources offered audiovisual and screen support [f = 123; p = 22.1], or at least one of them, and the access mode was public [f = 333; p = 59.8]. Similarly, accessibility was also high in the case of people with a specific disorder [f = 35; p = 6.3]. In addition, audiovisual support predominated over screen support [f = 22; p = 3.9] and the access mode was public [f = 49; p = 8.8].

Lastly, a mere 25 of the 557 websites (i.e. 4.49% of the total) presented functional assessment, raising doubts about the quality of the content.

Comparative Analysis between variables (GLM)

Multivariate analyses using the general linear model revealed significant multivariate contrasts for all the grouping variables considered: (i) *Target audience* [λWilks = .280; $F_{(168,\ 2004)}$= 4.480; $p \leq .001$; η^2 = .272]; (ii) *Purpose* [λWilks = .003; $F_{(84,\ 1004)}$= 192,145; $p \leq .001$; η^2 = .941]; (iii) *Activity* [λWilks = .465; $F_{(123,\ 1492)}$= 3,536; $p \leq .001$; η^2 = .225]; (iv) *Target audience-Purpose interaction* [λWilks = .279; $F_{(294,\ 3483)}$= 2,400; $p \leq .001$; η^2 = .167]; and (v) *Target audience-Activity interaction* [λWilks = .159; $F_{(451,\ 5334)}$= 2,230; $p \leq .001$; η^2 = .154].

According to Target Audience

Websites targeting older adults and adults were mainly developed by non-governmental organisations. Post hoc comparisons revealed differences for this variable when comparing older adults with other age groups (governmental organisations) ($p \leq .002$) and people with a specific disorder (self-help organisations) ($p \leq .001$).

No differences were detected for the theoretical approach on which websites were based, with a cognitive-behavioural approach predominating in all cases.

In relation to the purpose [F = 5,916; $p \leq .001$; η^2 = .042], resources aimed at older adults, adults and people with a specific disorder were mainly informative, whereas intervention was the purpose with other age groups.

This was confirmed by the post hoc results obtained when comparing older adults with other age groups ($p \leq .001$).

Websites targeting older adults mainly focused on cognitive aspects and were associated with the leisure or entertainment sphere of activity. Post hoc comparisons revealed statistically significant differences in relation to this indicator when comparing older adults with the other groups: adults (psychology) ($p \leq .002$), people with a specific disorder ($p \leq .001$) and other groups ($p \leq .001$) (education).

Multimedia resources predominated for all groups except that of older adults, for whom functional websites were most common, and post hoc comparisons revealed this finding to be statistically significant when comparing this group with each of the others ($p \leq .001$).

Websites for older adults presented medium *accessibility*. The post hoc results indicated statistically significant differences when comparing older adults with other age groups ($p \leq .001$), for whom accessibility was high, as it was for people with a specific disorder ($p \leq .001$). However, independently of the target audience, most online resources did not offer accessibility and use support. Furthermore, whereas websites aimed at the other groups at least promoted interactivity with users, this was not the case with websites targeting older adults.

The remaining statistically significant results are given in Table 2.

Table 2
Statistically significant results when using target audience as the grouping variable

Indicators	Older adults		Adults		Specific disease or disorder		Other groups				
	M	σ	*M*	σ	*M*	σ	*M*	σ	*F*	*p*	η^2
Developer	2.529	1.105	2.769	1.072	1.712	1.035	2.033	1.13	7.599	.001	.053
Autonomous Region	4.654	1.782	5.446	1.723	4.558	1.719	4.654	2.084	3.632	.006	.026

(continued)

Table 2
Statistically significant results when using target audience as the grouping variable (continued)

Indicators	Older adults		Adults		Specific disease or disorder		Other groups				
	M	σ	*M*	σ	*M*	σ	*M*	σ	*F*	*p*	η^2
Country	1.647	.8	1.954	.856	1.423	.75	1.699	.926	4.662	.001	.033
Purpose	1.784	0.91	2.031	.9677	1.500	.8745	1.140	.4906	5.916	.001	.042
Accessibility	1.581	.537	1.831	.518	1.327	.474	1.421	.506	7.934	.001	.055
Accessibility and use support	2.528	1.202	3.4	1.129	2.788	1.143	3.006	1.099	9.218	.001	.064
Type of tool	2.131	1.091	2.754	1.263	2.635	1.189	2.869	1.095	5.783	.001	.041
External resources and websites	1.816	.37	1.662	.477	1.865	.3446	1.824	.3815	5.094	.001	.036
Links with messaging services	1.886	.212	1.692	.465	1.981	.1387	1.949	.219	9.531	.001	.066
Links with bookmarking	1.809	.345	1.662	.477	1.942	.235	1.937	.243	8.504	.001	.059
Links with content management system	1.809	.345	1.677	.471	1.962	.194	1.952	.214	9.464	.001	.065
Links with social networking	1.732	.398	1.538	.502	1.923	.269	1.916	.277	8.893	.001	.061
Interactivity with the user	1.538	.468	1.323	.4713	1.288	.458	1.287	.453	4.518	.001	.032
Interactivity with other users	1.733	.422	1.646	.482	1.827	.382	1.916	.277	4.465	.001	.032
Theoretical approach	2.174	1.347	2.200	.852	1.981	1.365	2.191	1.406	2.373	.051	.017

(continued)

Table 2
Statistically significant results when using target audience as the grouping variable (continued)

Indicators	Older adults		Adults		Specific disease or disorder		Other groups				
	M	σ	*M*	σ	*M*	σ	*M*	σ	*F*	*p*	η^2
Focus-cognition	1.228	.354	1.831	.378	1.75	.437	1.722	.449	14.754	.001	.098
Focus-communication skills	1.954	.215	1.892	.312	1.673	.474	1.71	.454	4.873	.001	.035
Focus-social skills	1.953	.149	1.800	.403	1.712	.458	1.812	.391	6.447	.001	.045
Focus-emotions	1.918	.271	1.323	.471	1.654	.480	1.669	.471	15.462	.001	.102
Activity	2.527	.765	2.215	.893	1.288	.8004	1.367	.829	29.762	.001	.180
Limitations in relation to virtual application	1.564	.405	1.692	.465	1.654	.48	1.761	.427	5.649	.001	.040
Limitations in relation to accessibility	1.472	.435	1.231	.425	1.673	.4737	1.585	.4934	3.616	.022	.030
Strategies-Cognitive-behavioural	1.661	0.415	1.700	0.461	1.520	0.397	1.543	.4372	5.024	.001	.04
Strategies-Self-control/self-regulation	1.713	.419	1.538	.502	1.788	.412	1.857	.351	2.311	.05	.017
Strategies-Coping	1.897	0.288	1.7	0.45	1.479	0.4175	1.878	.3285	3.933	.01	.03
Strategies-Communicative	1.690	0.39	1.862	0.3185	1.654	0.397	1.645	.4405	4.038	.02	.03
Strategies-Educational	1.71	0.42	1.84	0.311	1.42	0.449	1.524	.405	5.443	.004	.039

According to Purpose

When considering *purpose* as the grouping variable, we found statistically significant results for website characteristics and for accessibility, use and quality. These results are shown in Table 3. An analysis of the post hoc comparisons between the significant variables obtained in the tests for between-subject effects in the different types of purpose revealed statistically significant differences in 40 of the 66 cases analysed (60.61%).

Table 3
Statistically significant results when using purpose as the grouping variable

Indicators	Information		Intervention		Both				
	M	σ	*M*	σ	*M*	σ	*F*	*p*	η^2
External resources and websites	1.409	.5032	1.875	.3308	1.521	.502	26.246	.001	.088
Links with messaging services	1.5	.512	1.950	.218	1.745	.438	14.152	.001	.050
Links with bookmarking	1.500	.512	1.912	.284	1.734	.444	9.043	.001	.032
Links with content management system	1.500	.512	1.921	.271	1.766	.426	9.299	.001	.033
Links with social networking	1.364	.492	1.884	.32	1.617	.489	12.868	.001	.045
Interactivity with other users	1.318	.477	1.907	.291	1.574	.497	22.798	.001	.077
Theoretical approach	2.727	1.549	2.086	1.283	2.66	1.418	8.967	.001	.032
Focus-cognition	1.909	.294	1.615	.487	1.84	.368	15.013	.001	.052

(continued)

Table 3
Statistically significant results when using purpose as the grouping variable (continued)

Indicators	Information		Intervention		Both				
	M	σ	*M*	σ	*M*	σ	*F*	*p*	η^2
Focus-social skills	1.864	.351	1.85	.357	1.681	.469	9.082	.001	.032
Focus-emotions	1.500	.512	1.726	.447	1.447	.499	6.105	.002	.022
Audiovisual environment	1.682	.779	1.413	.746	1.957	.891	4.324	.014	.016
Limitations in relation to virtual application	1.773	.43	1.79	.408	1.489	.503	10.319	.001	.037
Strategies-Cognitive-behavioural	1.841	.362	1.466	.468	1.591	.481	11.17	.001	.039
Strategies- Self-control/self-regulation	1.773	.429	1.859	.348	1.553	.499	5.076	.007	.018
Strategies- Coping	1.864	.345	1.895	.308	1.681	.467	7.136	.002	.03
Strategies-Communicative	1.478	.323	1.794	.394	1.522	.411	26.263	.003	.08
Strategies-Educational	1.924	.267	1.666	.465	1.734	.423	5.482	.019	.02

According to Activity

In addition to the results reported above, some of the other most important findings concerned the target audience [F = 13,817; $p \leq .001$; $\eta^2 = .071$]. Thus, eclectic, educational and psychological resources were primarily aimed at other age groups, whereas those in the field of leisure and entertainment were aimed at older adults.

The psychological, leisure and eclectic websites were developed by non-governmental organisations, in contrast to educational ones which were developed by self-help organisations.

Eclectic and psychological resources were mainly informational, whereas the purpose of educational and leisure ones was intervention.

As regards accessibility, quality and use, we found that online resource accessibility was medium in all cases, with the exception of educational resources, which presented high accessibility, thus indicating that there were no accessibility limitations. Another aspect of note concerned accessibility support [$F = 21{,}443$; $p \leq .001$; $\eta^2 = .106$]. A combination of screen and audiovisual support predominated in psychological, educational and eclectic websites, whereas the majority of resources that most commonly targeted older adults, leisure and entertainment websites, did not provide accessibility support.

The remaining statistically significant results are given in Table 4.

Table 4
Statistically significant results when using activity as the grouping variable

Indicators	Eclectic		Education		Leisure		Psychology				
	M	σ	*M*	σ	*M*	σ	*M*	σ	*F*	*p*	η^2
Developer	2.955	1.238	1.815	1.063	2.614	.9876	2.859	1.037	13.207	.001	.069
Target audience	2.568	1.591	3.156	.566	2.386	1.245	3.165	1.7651	13.817	.001	.071
Autonomous Region	4.864	1.9718	4.291	2.0001	6.455	1.1132	5.212	1.6554	12.400	.001	.065
Country	1.795	.9042	1.488	.8254	2.568	.7701	1.788	.8032	15.721	.001	.081
Purpose	1.818	.8963	1.221	.6156	1.239	.6250	1.906	.9590	5.244	.001	.028
Accessibility	1.818	.6567	1.335	.4790	1.909	.4190	1.694	.4885	9.357	.001	.050
Accessibility and use support	2.886	1.4502	2.871	1.0975	3.682	.8650	3.001	1.3801	3.975	.008	.022
Type of tool	2.864	2.0413	2.801	1.0976	3.011	1.0774	2.341	.9704	6.473	.001	.035
External resources and websites	1.432	.5011	1.821	.3843	1.920	.2721	1.765	.4267	8.738	.001	.046
Links with messaging services	1.841	.3700	1.953	.2121	1.955	.2095	1.647	.4807	4.834	.002	.026

(continued)

Table 4
Statistically significant results when using activity as the grouping variable (continued)

Indicators	Eclectic		Education		Leisure		Psychology				
	M	σ	*M*	σ	*M*	σ	*M*	σ	*F*	*p*	η^2
Links with bookmarking	1.773	.4239	1.941	.2356	1.841	.3679	1.635	.4842	4.103	.007	.022
Links with content management system	1.795	.4080	1.953	.2121	1.875	.3326	1.624	.4874	4.931	.002	.027
Links with social networking	1.591	.4974	1.924	.2661	1.795	.4057	1.541	.5013	9.307	.001	.049
Interactivity with the user	1.386	.4925	1.324	.4685	1.205	.4057	1.376	.4874	3.314	.020	.018
Interactivity with other users	1.636	.4866	1.903	.2965	1.864	.3451	1.588	.4951	6.309	.001	.034
Theoretical approach	2.364	1.2956	2.024	1.4077	2.955	1.1029	2.094	.9835	7.954	.001	.042
Focus-cognition	1.727	.4505	1.821	.3843	1.193	.3971	1.494	.5029	5.800	.001	.031
Focus-social skills	1.750	.4380	1.785	.4112	1.932	.2535	1.894	.3095	3.777	.011	.020
Focus-emotions	1.636	.4866	1.635	.4821	1.966	.1825	1.518	.5027	3.056	.028	.017
Audiovisual environment	1.523	.7310	1.491	.8037	1.273	.5618	1.859	.9149	5.056	.002	.027
Advertising	1.636	.4866	1.879	.3261	1.727	.4479	1.671	.4728	4.840	.002	.026
Limitations in relation to virtual application	1.682	.4712	1.718	.4508	1.966	.1825	1.612	.4902	6.937	.001	.037
Limitations in relation to accessibility	1.318	.4712	1.668	.4718	1.136	.3451	1.318	.4683	7.532	.001	.040

(continued)

Table 4
Statistically significant results when using activity as the grouping variable (continued)

Indicators	Eclectic		Education		Leisure		Psychology				
	M	σ	*M*	σ	*M*	σ	*M*	σ	*F*	*p*	η^2
Strategies-Cognitive-behavioural	1.613	.4903	1.554	.4614	1.678	.3296	1.698	.4549	6.297	.003	.033
Strategies-Self-control/self-regulation	1.523	.5053	1.832	.3741	1.955	.2095	1.682	.4683	3.810	.010	.021
Strategies-Coping	1.773	.423	1.847	.3605	2.001	.0001	1.795	.3751	3.585	.017	.019
Strategies-Communicative	1.531	.389	1.613	.455	1.928	.245	1.694	.428	6.463	.001	.034
Strategies-Educational	1.783	0,398	1.791	0,389	1.906	0,247	1.763	0,403	4.761	0,015	.031

According to Target Audience-Purpose Interaction

We found statistically significant results in relation to multiple indicators. Some of the most relevant results are shown in Figure 1. Thus, we found that the quality of the audiovisual environment on all websites aimed at older adults was medium, regardless of their purpose, whereas it was high on websites aimed at all other age groups [F = 2,946; $p \leq .005$; $\eta^2 = .037$]. We also found statistically significant results in relation to certain strategies and to links between the websites and different services.

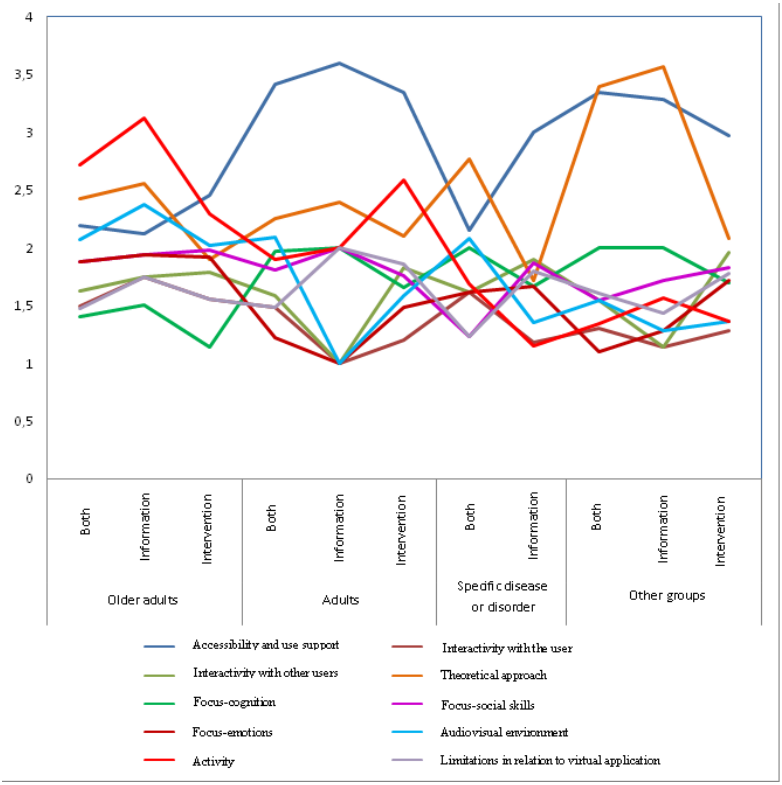

Figure 1. Statistically significant results according to target audience-purpose interaction

According to Target Audience-Activity Interaction

We obtained statistically significant results for 28 of the 65 indicators analysed, accounting for 43.08%. Some of the most relevant results concerned *accessibility* [F = 2,243; $p \leq .01$; $\eta^2 = .44$]. Thus, educational or eclectic websites aimed at people with specific disorders and other age groups presented high accessibility, whereas this was medium in all other cases. Other statistically significant and noteworthy results are given in Figure 2.

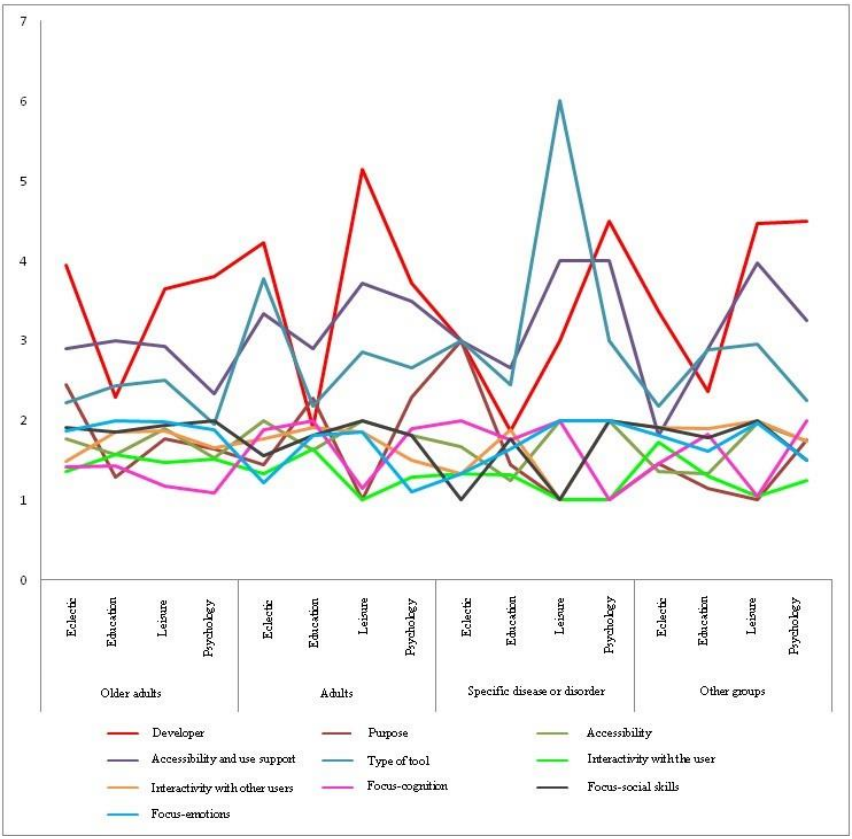

Figure 2. Statistically significant according to target audience-activity interaction

Discussion

We achieved the study aim and partially confirmed our initial hypotheses. First, in contrast to websites targeting other age groups, we found a paucity of websites and online resources specifically targeting older adults that were aimed at optimising psychosocial, emotional or any other variables related to

active ageing besides cognitive variables. This may be because gerontological research has traditionally focused on deficits, mainly those associated with cognitive processes, and it is only recently that psychosocial and emotional variables —which play an important role in healthy ageing– have received research attention (Strough, Lockenhoff, & Hess, 2015).

Significant effort has been invested in digital literacy programmes in recent years, in an attempt to bridge the digital divide that affects older adults (Abad, 2014). Similarly, the possible causes of this divide have been studied, emphasising both personal variables and technical factors associated with the tools themselves. However, such studies may have overlooked the principal reason, namely that in light of our results, there does not appear to be a wide range of online resources aimed at this age group and adapted to their needs, interests and capacities (Yang & Chen, 2015). This presents a barrier which can only be removed through involvement at governmental, scientific and social levels. There may well be room for improvement on this score, bearing in mind that the available online resources aimed at older adults have principally been developed by non-governmental and self-help organisations. This may be due to social and institutional stereotypes whereby ageing is associated with fragility, loneliness, dependency, poor learning capacity and digital illiteracy (Twigg & Martin, 2015), thus hindering progress in this field.

As expected, the primary purpose of the resources was to provide information, despite reports in various studies on the benefits endowed by use of this medium as regards optimisation of active ageing variables (Titov et al., 2015). In a recent study, Vroman, Arthanat and Lysack (2015) argued that older adults mainly use the Internet for three reasons: (i) social interaction; (ii) information seeking; and (iii) transactional or routine activities (e.g. making reservations or reading the news online). The latter two are particularly linked to the informative nature of the websites identified that targeted older adults. However, it would be important to determine whether it is the principally informative purpose of these websites that limits the options for older adults or if, on the contrary, these genuinely reflect the needs and interests of this age group.

In contrast to our hypotheses, most websites adopted a cognitive-behavioural approach, and in the case of older adults, the sphere of activity

was mainly leisure and entertainment. This latter finding probably explains certain limitations in the quality of the resources identified in this study, such as their lack of functional assessment, which calls into question their efficacy and efficiency, as well as the rigour and accuracy of the information they contain (Brigo et al., 2015).

In terms of accessibility and usability, we detected substantial limitations. Websites targeting older adults presented medium accessibility, whereas this was high on websites aimed at other age groups. The predominant mode of access was public; however, most websites lacked accessibility and use support. This finding indicates the need to promote the application of criteria that facilitate access and use of the Internet by older adults. These could include simplifying screen design and display functions; ensuring content legibility and reliability by using clear and concise language, appropriate layout and content presentation, and professional, objective assessment to ensure the quality of the information; encouraging interactivity with the user and other users; and providing online information and feedback that is of assistance to older adults (Luna-García, Mendoza-González, & Álvarez-Rodríguez, 2015).

In sum, our findings have clarified several questions. Few resources are specifically aimed at older adults, and even fewer at addressing psychosocial and emotional variables in old age, despite the importance of these for the physical and mental well-being and quality of life of older adults. Furthermore, there is little governmental or scientific involvement in this field, and older adults accessing these resources encounter substantial limitations regarding accessibility, use and quality. Combined with a lack of training and other psychosocial, emotional and personal variables, all the above probably gives rise to the current generational digital divide (Wu et al., 2015)

This study presents a number of limitations. First, it is difficult to generalise our findings, and more so considering that the Internet is a dynamic and evolving space. Second, the website coding protocol employed was developed following a rigorous review of studies in this field, but may always be subject to modification and improvement. Lastly, this analysis should be complemented with data provided by older adults themselves, as the only means to obtain an accurate overview of the subject. Consequently,

future research should be aimed at collecting such data, but also at promoting online intervention resources tailored to the needs and capabilities of older adults —which should include psychosocial and emotional variables— in order to overcome the limitations detected in this study and place greater emphasis on psychosocial and emotional aspects as important elements to achieve healthy ageing.

The results obtained in this study have important implications. They indicate the need for greater institutional, social and scientific involvement in this field, bearing in mind that more and more older adults will need to immerse themselves in this digital society to ensure an active and independent life, and it is the responsibility of all of us make this possible and guarantee the accuracy, quality, accessibility and effectiveness of the resources available (Luna-García, Mendoza-González, & Álvarez-Rodríguez, 2015).

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