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Editorial: Gender sensitive research in adult education: Looking back and looking forward to explore what is and what is missing in the research agenda

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Despite legislation, policies and practice, and while some progress has been made in many countries, there are still no countries who have achieved a hundred per cent gender equality (Gender Equality Index, EIGE, 2019). Over the years this has included several supranational agreements and mandatory regulations signed by countries such as the Convention of the Elimination of all Forms of Discrimination against Women (CEDAW, 1979), the Platform of Beijing (1995), the Istanbul Convention (2011), and more recently the UN Sustainable Development Goals (2015), among others. The failure of these initiatives indicate that gender inequality, discrimination and prejudice suffered by women are embedded in structural unequal power relations. The ultimate goal of the 'gender mainstreaming principle' is the integration of a gender perspective into the preparation, design, implementation, monitoring and evaluation policies, regulatory measures and spending programmes (including research ones), with a view to promoting gender equality between women and men, and combating discrimination[1]. This is still a challenge between and within countries but as stressed by the EU Gender Equality Strategy 2020-2025[2]: it is necessary to work together to build a 'Europe where women and men, girls and boys, in all their diversity, are equal – where they are free to pursue their chosen path in life and reach their full potential, where they have equal opportunities to thrive, and where they can equally participate in and lead our European society' (p. 19).

It is a myth to think that social evolution is a one-way movement, always in a positive direction. If we look, for example, at the use of women´s rights as 'a bargaining chip' in the international negotiations between countries seeking economic aid to solve internal problems (Carvalho-Pinto & Fleschenberg, 2019), it becomes clear the regrettable instrumentalisation of human rights and the unequal situations and voices that are given

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(or taken from) specific vulnerable groups. As Verloo (2007) states more than a decade ago that despite the European Union and the Council of Europe's efforts to set standards in relation to the member states' legal and policy choices concerning the implementation of gender mainstreaming, the engagement with feminist principles and the meaning given to gender equality vary tremendously across European nations.

Gender sensitive research in adult education shaped by feminist thinking promotes the use of the concept of gender as a grid to interpret reality and a tool – 'gender lenses' (Bem, 1993) – to identify specific areas where women and men suffer explicit and/or silent forms of inequality and discrimination across the lifespan (Ostrouch-Kamińska & Vieira, 2016). Talking about gender – a controversial concept among feminist scholars (Ubieta, Henriques, & Toldy, 2018) – is about uncovering structural inequalities, cultural norms and values which have imposed unequal power relations between women and men.

Feminist research developed in the 1970s importantly critiqued male sociology or 'malestream' as termed by feminists as the study of women's lives had previously been ignored and deemed unimportant. For Dorothy Smith: 'The women's movement has given us a sense of our right to have women's interests represented in sociology, rather than just receiving as authoritative the interests traditionally represented in a sociology put together by men' (1987, p. 85). Feminist research also opposed 'traditional' positivistic research by developing a humanistic and subjective approach through the use of biographical methods. Feminist research gives voice to marginalised women through the telling of their stories. Importantly feminists argued that research is political as echoed in their slogan 'the personal is political' by highlighting and challenging women's oppression in society.

Similarly, female academics in adult education across Europe, influenced by feminism, challenged the dominance of male researchers, and using largely biographical methods, highlighted the lives of women adult students in a range of adult education settings such as community education, higher education, and the labour market. Gender studies was also introduced into adult education pedagogy and was largely aimed at women students.

While in the past resistance to studying gender came from the positivist paradigm new resistances and anti-gender discourses are now emerging. Many feminists themselves turned to postmodernism and other perspectives which led to a highly theoretical and abstract approach which excluded the lives of working class women (Merrill & Puigvert, 2001). Today researchers who study human rights' violations in general and specific gender inequalities within the framework of gender studies, feminist studies and women studies face continuous adversities and hidden obstacles to their career progression and consolidation (Vieira, 2012). The distressing neoliberal times, the tendency for the marketisation of intellectual products and the 'taken for granted' weakness of social areas of knowledge when compared to exact or natural sciences makes the scenario even more difficult for researchers who have a self-commitment with gender equality principles.

Acknowledging that 'knowledge has a situated nature' (Haraway, 1988), there are epistemological, ontological, ethical, and political implications for planning and doing research. In recent years researchers have highlighted the intersectional nature of inequalities in people's lives recognising that a person is classed, gendered, raced etc. so that being a black working class woman is different to being a white working class woman. As Skeggs asserts in her research 'The women never see themselves as just women: it is always read through class' (1997, p. 2).

The choices of research methodologies and the tools used for doing research must give voice to inequality and diversity experienced by women and men. As Ollagnier

(2014) states when emphasising the importance of a gender sensitive approach on the education and training of adults, the uses of the gender lenses in doing research may open to participants – and to researchers – the possibility of access to (new) life opportunities.

Papers on gender

For this thematic issue on gender we have a range of five papers illustrating the diverse field of gender research in adult education.

The first article *Beyond the trinity of gender, race and class: Exploring intersectionality in adult learning* is written by Cindy Hanson and Amber Fletcher from Canada who invite us to go beyond the trinity of gender, race and class in exploring adult education. The authors claim that intersectional approaches are much more diverse than that trinity and that we need to consider the nuances of inequality and the complexities of representation and collective identities. By exploring literature in feminism, adult education, and intersectionality, the authors illustrate a gap at the core of adult education for social justice. They present two examples of national research with and by the Canadian Research Institute for the Advancement of Women to illustrate how intersectionality is understood and works in practice.

In the second paper *LGBTI Sexualities & intersectional research. Looking for inclusion beyond gender in adult learning & education (ALE) practice* we continue a discussion about intersectionality in research but in the context of LGBTI sexualities. The article is written by Portugese and Spanish researchers Rosanna Barros, Agustin Romero Lopez and Alejandro Granero Andujar who analyse the testimonies of the integration of a gender perspective beyond the dichotomy man-woman in practices of affective-sexual adult learning and education (ALE). Using the narrative literature review method, they discuss the inclusive practices described in 25 educational interventions on discriminations and oppressions among the aged when belonging to LGBTI communities. The authors found 'a small number of internationally documented experiences on affective-sexual education with the elderly and adults, a prevalence of the integrative model, as well as a little presence of the LGBTI community'. In conclusion they postulate the implementation of inclusive and egalitarian affective-sexual adult experiences in ALE.

With the next article: *The new feminist frontier on community-based learning: popular feminism, online misogyny, and toxic masculinities* we move to the digital environment of learning. Departing from the concept of social movement learning, Rita Basílio Simões, Inês Amaral and Sofia José Santos examine the significance of Internet feminist activism together with the surge of anti-feminist and misogynist ideas to adult education. They claim that social media brought opportunities both to provide social movement learning and empower feminism, while at the same time reveal misogynists ideas based on toxic understanding of masculinity. They perceive the online environment as a space for an ongoing battle towards deconstructing patriarchy in which adult education has an important role to play by focusing on connections between education and learning, communities of practice, and emancipatory struggles. In the fourth article we find a contribution from Germany. Lisanne Heilman discusses how quantitative large studies, such as PIACC and a positivistic approach in planning and doing research in social sciences may be excluding some people and groups from mainstream research. Concepts such as diversity and

intersectionality are difficult to apply in quantitative research for uncovering the silenced sides of phenomena, even in adult education research. In her opinion, there is a need to develop a feminist approach to statistical methods and quantitative research and in particular a feminist approach to a careful and critical interpretation of methods and technics of data collection and analysis in adult education research.

With the next paper we move to an interesting but under-researched area in gender and adult education: informal learning in the family with a focus on Poland. The paper *Gender and Polish Family Discourse in adult education: Towards family informal learning of adults* is written by Joanna Ostrouch-Kamińska. In this paper Joanna Ostrouch-Kamińska is asking us to look at the family as a place where adult learning, in an informal way, occurs. For her the family should be viewed as an 'educational environment' in a 'culturally determined space'. From this perspective the family is not only a place where children learn but also adults. 'Reflexive criticism' forms the basis for family learning and this is shaped by the experiences and biographies of the family members. The focus is on dual career parents in Polish families and how gender shapes experiences and perceptions in relation to the same activities within the family so that gender sensitive research becomes important in understanding informal adult learning in the family.

Open papers

Besides the five papers which address the special edition on gender there are two open papers included in this edition. The first one from Finland focuses on informal learning from a quantitative perspective and is entitled *The role of informal learning in adult literacy proficiency* by Sari Sulkuren, Kari Nissinen, and Antero Malin. The article draws on secondary data from the PIAAC database focusing on adults aged 35 – 65. The authors look at informal learning in both the workplace and outside the workplace and in particular reading literacies activities. They state that informal learning in the workplace is linked to occupation while outside the workplace it is associated with education, parents' education and gender and that informal literacies learning varies by social conditions and individual experiences.

For the second open paper we move to the south to Spain. It also focuses on literacy and is entitled *Boosting adults' scientific literacy with experiential learning practices* and is authored by Eduardo Dopico, Alba Ardura. Yousel J. Borrell, Laura Miralles and Eva Garcîa-Vázquez. The research is interdisciplinary drawing on researchers from education and biology to look at the promotion of citizen scientific literacy. An experimental learning seminar as well as a hands-on workshop were set up aimed at adult students. The programme focused on looking at DNA to 'identify unknown fish species'. The study illuminated that while adult students find scientific concepts difficult to understand they are motivated to engage with science education.

Notes

[1] Available at: https://eige.europa.eu/gender-mainstreaming/what-is-gender-mainstreaming
[2] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2020%3A152%3AFIN

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Beyond the trinity of gender, race, and class: Further exploring intersectionality in adult education

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Abstract

Research exploring the gendered dimensions of adult learning has blossomed in the past two decades. Despite this trend, intersectional approaches in adult learning, research, and teaching remain limited primarily to the intersection of gender, race, and class. Meanwhile, intersectionality theories are more diverse, and include discussions of social structures, geographies, and histories that serve to build richer, nuanced descriptions of how privilege and oppression are experienced. Because the purpose of intersectionality is to understand how social identities and positions are constructed and to challenge the structures of power that oppress particular social groups, this approach is important for feminist and social justice educators. We, the Canadian authors of this manuscript, posit that adult education should move beyond intersectionality that focuses only on the trinity of gender + race + class to consider the other inequalities and the true complexities of representation and collective identities. By exploring literature in feminism, adult education, and intersectionality, we illustrate a gap at the core of adult education for social justice. We draw upon two examples of national research with and by the Canadian Research Institute for the Advancement of Women to illustrate how intersectionality is understood and works in practice.

Keywords: Feminism, inequity, intersectionality, social justice, solidarity.

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Intersectionality and adult Education

In the field of adult education, literature exploring intersectional approaches and practices (Hanson, 2019; Keskitalo-Foley & Naskali, 2018; Merrill & Fejes, 2018) has primarily focused on categories and intersections of gender, race, and class, an intersection sometimes referred to as the *trinity* (Dhamoon, 2011; Monture, 2007). Recent work edited by Merrill and Fejes (2018) acknowledged that intersections of gender, race, and class are examined in more recent adult education work; however, these categories of representation are frequently complicated by other factors—such as age, ability, location, and sexuality—which are less frequently addressed in the literature. In spite of this gap, there is recognition that intersectionality gives voice to nuanced dimensions of privilege and oppression as they are experienced and, thus, these dimensions are very much at the core of adult learning for social justice. A study by the European Association for Education of Adults (2019) posits that a challenge for adult learning in civil society remains the inclusion of underrepresented groups in adult nonformal learning processes. Because intersectional approaches consider multiple combinations of marginalization and (under)representation, they can help address such inclusion gaps. Ultimately, intersectional approaches are compatible with goals of social justice and equity, diversity, and inclusion as they are practiced within community-engaged adult education.

> Intersectionality's objective is social justice. It is an orientation to research that focuses on revealing and responding to oppression and privilege in peoples' lives, by considering the effects of interpersonal interactions, and of socioeconomic and political structures. […] Intersectionality can strengthen an analysis of the systemic power relations at work in peoples' lives, and help reveal allies who are working for reconciliation. (Levac et al., 2018, p. 25)

Intersectionality recognizes that people's experiences may be affected by several interacting systems of power that combine, reinforce or challenge each other. These systems construct people's experiences of marginalization and oppression, or of power and privilege. Intersectional approaches can provide a rich analysis of how communities or groups of people are marginalized and how inequitable structures or practices can be challenged. This paper first discusses how feminist theory and practice are foundational to intersectional approaches and, secondly, draws on two research projects to demonstrate the application of intersectionality in practice.

The first is a national study in Canada led by the Canadian Research Institute for the Advancement of Women (CRIAW), which aimed to identify and strengthen intersectional approaches to advocacy by women's organizations in Canada. The second is an interdisciplinary project designed to stimulate conversations and analysis about feminist intersectionality and knowledge systems from Indigenous learning and worldviews. Although the studies discussed in this manuscript emerge from Canadian contexts, they borrow from and lend to intersectional approaches also used in Europe (see, for example, the 2006 issue of *European Journal for Women's Studies*, or the special issue of the *European Journal for Research on the Education and Learning of Adults* (RELA, 2018). The two examples cited in this manuscript may additionally contribute to broader applications or insights into lived oppressions and power dynamics in the field of adult education.

Review of the literature

Many feminist adult educators have already explored intersectional approaches—particularly as they relate to gender, race and class. Thus, we start this literature review by situating our work within the history and analysis of feminist thought and theory. This is followed by a closer examination of how adult education might further apply intersectional approaches and frameworks. Our goal is to suggest that the practice of adult education for social change—or for understanding how social structures impact and shift the lived experience of communities and learners— might be further enhanced by more attention to intersectionality.

Feminist theory and intersectionality

Variously defined as a concept, a theory, or a framework, intersectionality originated from Black feminist theory and activism, building on the work of Sojourner Truth and the Combahee River Collective (1977 [2007]; see also May, 2014) and finally named in the work of feminist legal scholar Kimberlé Crenshaw (1991). Intersectionality revises the analysis of gender in large part because 'feminist researchers have come to understand that the individual's social location as reflected in intersecting identities must be at the forefront in any investigation of gender' (Shields, 2008, p. 302). Collins (1990) termed these multiple identities and systems "interlocking" and posited a matrix of domination to ensure gender analysis was linked to other forms of power relations (Shields, 2008), further positing that agency was required to break the patterns of domination.

In an intersectional approach, social identities are complex and multidimensional – that is, they can be sources of oppression, but also of privilege and in particular situations they may be both. An emphasis or bias may also be intentional or unconscious. For example, a White woman typically experiences racial privilege, but the white woman's sexual orientation, age, education, location (e.g., rural, urban), class, and employment status also affect how she is treated in particular situations. For this reason, intersectionality considers the contextual fluctuation of power while still recognizing that experiences and identities are linked to relatively stable systems of power like patriarchy, systemic racism, class, colonization, heteronormativity, and other deeply rooted social structures (Anthias, 2013; Fletcher, 2018). In other words, intersectionality is both an approach to power and to understanding social positions and structures.

Importantly, the fact that many analyses are structured to point out difference, not explain linkages, challenges efforts at intersectionality (Shields, 2008). Adult educators concerned with community development or citizenship, for example, not only need to conceptualize difference and structures that create it, but also develop strategies that highlight intersections of identity—something explored more fully in the examples following this literature review. Similarly, May (2014) noted that intersectionality itself is not merely focused on macro-level structures or micro-level identities; rather, it is linked and hybrid, both 'particular *and* universal in scope, though, from the stance of binary thinking, this can seem illogical, even nonsensical' (p. 96).

Feminist scholars of intersectionality have recognized the multi-level nature of intersecting oppressions, which exist at individual and structural levels simultaneously (Djoudi et al., 2016; Hanson, forthcoming; May, 2014; Winker & Degele, 2011) and manifest discursively, ideologically, and materially (Fletcher, 2018). Importantly for adult educators, intersectionality offers us the opportunity to more fully embrace the complexities of lived experiences and thereby develop teaching and research practices that take those complexities into account, thus helping to address oppression in its various

forms. Through intersectional approaches, individual experiences can be linked to their structural roots in oppressive systems. This may lead to building of coalitional politics (May, 2014).

Feminist intersectional practices challenge conventional norms and deepen analyses about how universal meta-narratives of truth can be interrupted. Denis (2008) analyzed how feminist intersectionality affected sociological thought, and in particular, how intersectionality exposed normative assumptions, even within feminist thought:

> Intersectional analysis involves the concurrent analyses of multiple, intersecting sources of subordination/oppression, and is based on the premise that the impact of a particular source of subordination may vary, depending on its combination with other potential sources of subordination (or of relative privilege). I argue that intersectional analysis can be understood as an outcome of applying the same type of critiques within feminism that (second wave) feminist sociologists had applied, in the 1960s and early 1970s…. Their critique was that women were invisible in most sociological theorizing and analysis – an outcome of the (often implicit) assumption that men's experience was both universal and normative, except in (the primarily) affective relations within the family. (p. 677)

The description here is similar to how many educational programs or policies are explained without attention to experiences shaped by gender, race, age, immigration or citizenship status, location, (dis)ability, or sexuality; however, such constructed positions influence outcomes for individuals and collectives on a daily basis.

Adult education and intersectional frameworks

Broad constituencies of adult learners are discussed in adult education for social justice, and marginalization and inequity are common themes encountered in feminist and community-based policy and research work. There are however, limited adult education frameworks that interrogate lived inequalities (Groener, 2011; Rubenson & Desjardins, 2009), despite the historical emphasis of feminist and adult education for social justice and collective community action (Groen & Kawalilak, 2019). Shields's (2008) work for example, acknowledges the difficulties for researchers in making this shift 'without falling back into the status quo approach' (p. 304). Her argument, to move into new understandings and identities by making the invisibility of intersectionality more visible, bodes well with adult education for social change. It suggests that intersectionality can further interrogate understanding how power is exerted, how inequality is experienced, and how solidarity with marginalized groups can be approached.

The aforementioned special issue of the *RELA* (volume 9) edited by Merrell and Fejes (2018) provided examples of how an intersectional analysis was framed in the European adult education literature. Similarly, an analysis of intersectionality in the Finnish journal, *Aikuiskasvatus* (adult education) between 2010-2016 provided important findings in terms of how intersectionality in adult education is framed around discourses of difference. The authors of this review, Keskitalo-Foley and Naskali (2018), argued for a more inter-categorical approach where categories of identity are used with intersectional theories and feminist pedagogies. This manuscript builds on that argument and provides examples in practice.

A rapid scoping of key adult education journals in North America, namely, *Adult Education Quarterly, the Canadian Journal for the Study of Adult Education,* and *Adult Learning* yielded similar results when the search terms *intersectional* and *adult education/learning* were used. The most frequent form of intersectionality discussed in these journals was race and gender; this finding is consistent with other literature on

intersectionality which demonstrates that the most common identity variables considered are gender, race, and class (Yuval-Davis, 2006). One title explored the intersection of race and gender, with reference to these factors as the key components of intersectionality introduced by Kimberlé Crenshaw in 1989 (Jean-Marie et al., 2009). Crenshaw (1997) challenged single-identity analyses for women, noting that race and gender interlocked in her life as a Black woman. While the concepts of gender, race, and class are central to the discussions and analysis on intersectionality, limiting discussion to gender plus race or class (or one or two other components of identity) may omit other attributes and associated narratives that frame and construct complex lived experiences.

The European Society for the Research of Education for Adults (ESREA) gender network highlighted intersectionality at its 2017 conference entitled, *Gender - Diversity - Intersectionality. (New) Theories and Policies in Adult Education*. Like the book by the same name (Endepohls-Ulpe & Ostrouch-Kaminska, 2019), the majority of presentations highlighted gender and one or two other aspects of diverse representations. Clover, Butterwick and Collins (2016) extended the understanding of intersectionality in their book, *Women, Adult Education, and Leadership in Canada,* which provides a unique decolonizing perspective addressing women and leadership in adult education; however, they were critiqued for lack of attention to LGBTQ issues (Huron, 2017).

In a ten-year review of themes and issues in the journal *Adult Learning* (Cherrstrom, Robbins, & Bixby, 2017), the sole application of the word *intersection* was to illustrate the noun *intersection* as a link between two fields—adult learning and higher education. Similarly, the theme of diversity appears more often in the final years of their ten-year study (leading up to 2015), but the authors' uptake of diversity does not critically interrogate how different components of identity or representation intersect to construct particular experiences of marginalization and oppression, power and privilege—whether unconsciously and/or intentionally. Intersectionality approaches explore those themes as fluid and performative, but emphasize that experiences are also linked to broader systems of power (Smooth, 2013).

Leaving out other categories or complexities beyond the trinity—gender, race, and class—can make the outcomes of research less comprehensive. Recently for example, a study reported in *Adult Learning* on acculturation experiences of Syrian Muslim refugee women in the US (Ugurel Kamisli, 2020) demonstrated a more complex intersection of identities including nationality, religion, gender, and refugee status, thus illustrating how adult learning is bound by constraints beyond the trinity. The use of gender *plus* race or class is undoubtedly the most common way intersectional issues are understood, in part because there are few frameworks in adult education from which the more complex analyses can emerge.

Frameworks for an Intersectional Analysis

Intersectional analyses demonstrate how complex experiences of oppression that occur at the intersection of multiple aspects of identity—for example, gender, race, class, ability, age, belief systems, language, sexuality, and location—are influenced by and combine with structures of inequality and power. Put more simply, if equality is possible through structural change processes, then categories matter – for example, painting all women as equal when we know that poor, older, or rural women are less likely to participate in adult education or, similarly, ethnic minorities, migrants, Indigenous or transgender persons may have life experiences very different from each other and from those of college, group, or community leaders (Hanson, forthcoming). None of the categories are homogeneous

and differences or linkages within each can identify additional locations for structural analysis.

Recently, institutional efforts to apply more intersectional approaches in policy and program development have become evident. For example, national governments in Europe use additive (multiple) discrimination (or similar) terms, including discrimination as synergistic (Fredman, 2016), and federally, Canada uses Gender-Based Analysis *Plus* (GBA+) as a method to aid government departments in analyzing the impact of gender and intersecting forms of identity discrimination on policies, programs, and projects (Status of Women Canada, 2018). Although challenges remain in fully implementing GBA+ across government departments and initiatives in Canada (Wright, 2019), an obvious advantage is increased recognition that all policies and programs interact with inequality in the social body.

Intersectional frameworks attempt to provide a more complex analysis that explores the diversity and complexity of lived experience. Such frameworks help to identify the structures of oppression or advantage, the kinds of discrimination these structures construct or co-construct; and how aspects of social position, history or identity are impacted and a starting point for making essential changes. A *feminist* intersectional analysis puts women at the centre of this framework in order to make policies, services and programs more accessible and inclusive for all people, while ensuring that the feminist origins and aims are not lost (Manning, 2014). According to CRIAW, 'The goal of a feminist intersectional analysis is to understand power relations and systems of power that create barriers to women's equality so we can work to remove those barriers and redistribute power equitably' (CRIAW, 2019, p. 4).

The following diagram, originally developed by the Canadian Research Institute for the Advancement of Women (CRIAW), demonstrates components of a feminist intersectional framework:

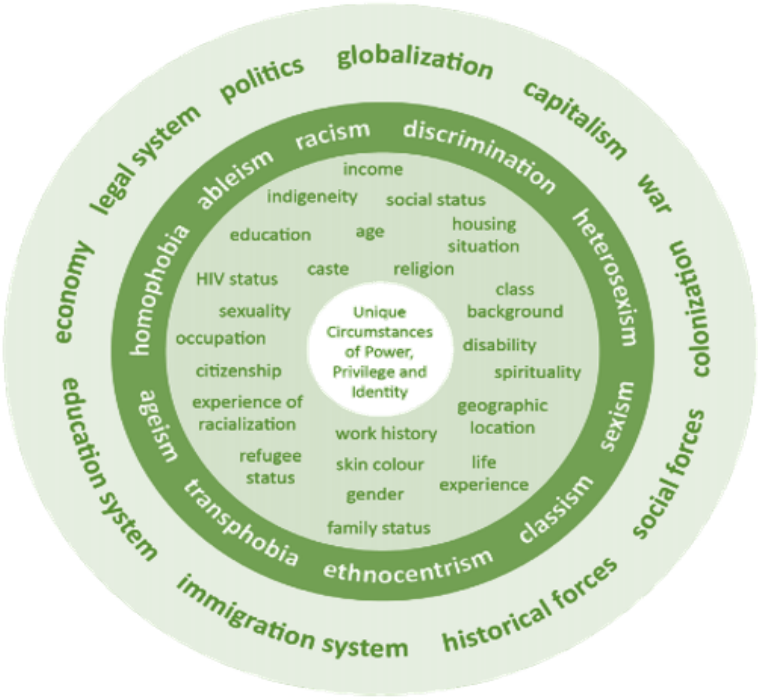

Diagram provided with permission of CRIAW

In this nested intersectionality diagram, the innermost circle is meant to represent an individual's particular circumstances; the second circle, aspects of identity; the third indicates various types of discrimination; and the outermost circle shows broader social forces and structures that cause and construct experiences of marginalization and exclusion (Simpson, 2009). This tool has been widely used and adapted and, more recently, critiqued for what it does/does not include (Hanson, forthcoming).

The key challenge in an intersectional analysis is to consider the multiple, intersecting forms of oppression, power and disadvantage experienced by certain groups. Further, the inclusion of gender identities that go beyond binaries of men and women (for example transgender or non-conforming identities) bring to light how the very notion of gender or sex as a binary can create a structure of oppression. Such structural barriers have socio-political and personal consequences (Hanson, forthcoming).

The following sections present two examples of efforts to advance intersectionality in practice; both were conducted by CRIAW and affiliated researchers. The first example is a Canadian study of women's organizations' capacity to engage in intersectional advocacy. The second is an attempt to synthesize feminist intersectionality and Indigenous ways of knowing in order to advance reconciliation and epistemic pluralism. Both examples reveal current challenges in implementing intersectional approaches, while simultaneously demonstrating the value of intersectional analysis for highlighting both experiential and systemic forms of inequality.

Example one:

Building capacity for intersectional advocacy on women's issues

CRIAW is a not-for-profit, member-based women's organization with 45 years of experience doing feminist research.[1] As a national institute focused on producing publicly accessible feminist analysis, CRIAW is concerned with structural inequality and the role patriarchy plays in shaping women's diverse experiences (CRIAW, 2019). The organization takes a feminist intersectional stance that centres women in their multiple diversities and explores how different identity categories, separately, together and combined, influence women's lives.

CRIAW recently completed a five-year project (funded originally by Status of Women Canada; in 2018 renamed Women and Gender Equality Canada) to examine the capacity of Canadian women's organizations to do intersectional advocacy work. In the study, women's organizations were invited to respond to a survey inquiring about their current understandings of intersectionality and its application in practice. In a second phase, organizations were invited to engage in a series of regional focus groups aimed at deepening collective understandings of what intersectionality means in theory and practice. The third phase involved using that knowledge to identify how to build inclusive networks that strengthen collective capacity for advocacy on women's issues. The study produced a series of publicly accessible, no-cost resources to support organizations in their intersectional practice. Although the study focused on women's organizations, the question more broadly queried the role of intersectionality in building social movements.

We, the authors of this manuscript, are CRIAW members and have both served as the organization's President in recent years. We served as co-applicants on the application for the study's behavioural ethics approval through our university's Research Ethics Board. We worked collaboratively on the methodological design and participated in several stages of the data collection process; we also served on the five-person advisory committee that oversaw the process from design phase to knowledge mobilization.

Study methodology

CRIAW's study began with an environmental scan, which produced a list of over 600 diverse women's organizations operating at the local, provincial, and national levels across Canada. The list was compiled from publicly available sources, existing lists, internet and social media searches and suggestions from CRIAW members. The list was organized into a matrix identifying each organization by province or region, official language of operation (English or French), and main constituency and issue(s) in order to select a diverse sample of women's organizations across the country. From the original list, 100 women's organizations were selected to complete an on-line survey in English or French; 50 organizations responded (33 in English, 17 in French). Next, CRIAW held five regional discussion groups (i.e., focus groups) across Canada, which were attended by representatives of 34 organizations in total. These data collection efforts were supplemented by key stakeholder interviews. After the data were analyzed, CRIAW staff and the advisory group worked collectively to develop a webinar and toolkit to support organizations' efforts at intersectional advocacy.

Results: Challenges of and lessons in intersectional advocacy

The results of the study demonstrated that women's organizations have an overwhelming interest in intersectionality, both in theory and in practice. Survey data showed half of the responding organizations had a strong grasp of intersectionality as a concept, while a few had virtually none. Respondents' definitions often emphasized the intersection of gender, race, and class but, notably, survey responses frequently went beyond the trinity to identify additional intersecting dimensions, such as sexuality and citizenship. For example, one responding organization noted that:

> Intersectionality recognizes that identities and social roles related to gender, race, ethnicity, socio-economic class, age, immigrant or refugee status, mental and physical abilities, religion, sexuality, family and other statuses intersect. (survey respondent)

Despite strong interest, the application of intersectionality, as noted by the participating organizations, was hampered by structural barriers, particularly resource constraints. Women's organizations spoke frequently about having *too much work and too few resources*, which negatively affected their ability to engage in intersectional advocacy. Most of the participating women's organizations reported having very few paid staff members. Almost all of those responding in French (93%) and almost half (49%) of those responding in English reported having five or fewer staff members. Almost two-thirds (63%) of English organizations employed ten or fewer staff members. The results indicate that capacity issues are inhibiting organizations' ability to do intersectional work.

Despite these challenges, many of the women's organizations said they would like to do more intersectional advocacy work. In order to do this work, organizations reported a need for 1) more staff or full-time advocates; 2) more financial and human resources; 3) expanded ability to advocate on behalf of groups that are currently not served and on issues where there is not currently a gender lens; and, 4) coordinated advocacy with other equality-seeking groups and more opportunities to network, educate, and provide resources to women. Half of the responding organizations (12 of 23 responses) mentioned training as the most helpful way for the organizations to build capacity for intersectional work. The type of training they desired included webinars, workshops, training modules,

professional development, and engaging with outside resource people to expand knowledge. A few did not want online webinars or online tools, saying, "they do not facilitate dialogue" and instead named preferences for interactive and in-person training.

The organizations said the services women needed were often not available, that research and policy work frequently went undone, and that tools for advocacy were not well developed. They reported no time for an intersectional analysis of issues or outreach and input from the surrounding community because they did not have the capacity. One survey participant said:

> With only one employee, [the organization] struggles to meet the needs regarding advocacy. A good chunk of the ED's [Executive Director's] time is spent reporting to funders, coordinating projects, and searching for new streams of funding. Unless advocacy is built into a project there's not always time to address it.

The results of this study illustrate that the lack of core resources for women's organizations is the primary barrier in taking an intersectional approach to their work. Weak capacity, unstable funding and inadequate resources to do advocacy work means women's organizations cannot do the necessary research and policy work or tool development required to build strong movements. Despite capacity gaps, the commitment to equality and to the women's movement keeps these organizations doing their work, albeit with varied levels of understanding about intersectionality and how to implement it.

> On provincial level, we advocate for improved educational curriculum, changes to family law act, improved services for victims of violence, improvements in mental health and substance use services, for the development of a taskforce on violence against women and girls, improved services for LGBTQ+ populations, for the establishment of a municipal committee to address social issues, for the establishment of additional women's centres in areas of the province that require services. (Survey participant)

Other non-governmental or community-based groups who participated mirrored this sentiment. Because of adult education's relationship to non-formal learning in social movements (English & Mayo, 2012; Holford, 1995), studies of organizing, resourcing, and sustaining community capacity are of ongoing interest to the field. Moreover, Irving and English (2011) add that a lack of resources can lead to internal conflict within the organizations themselves, and this can weaken the movements.

Ultimately, the data collected by CRIAW will help build capacity for intersectional feminist advocacy resources amongst Canadian equity-seeking organizations. In the current neoliberal context of Canadian and many European institutions and policy-making (Arat-Koç, 2012; Paterson, 2010), this knowledge can serve to improve the narrow gaze of binary or one-dimensional thinking. There is a role for educators, policy-makers, and activists in efforts to advance intersectional thinking; however, the key challenge is best summed up by the survey participant who said, '[Women's organizations] need more funding to be able to effectively make change through advocacy.'

The impacts of social inequities are ongoing pieces in the history of adult education in Canada (English, 2016). Yet, an intersectional approach that examines sustained or even temporary experiences of exclusion and privilege (Levac & Denis, 2019) is rare. Funding is recognized as necessary for doing advocacy work, but so too are tools and capacity to ensure the work is inclusive of diverse groups. The next example explores inclusivity among diverse epistemic groups.

Example two:

Linking epistemic knowledges and adult education

The second example is a *knowledge synthesis* project. Knowledge synthesis is a systemic analysis of existing evidence based on prior knowledge and study. In health sciences it is commonly used to accumulate evidence systematically in order to draw out new conclusions or solutions from existing research (Grimshaw, 2020).

The project, *Learning across Indigenous and Western knowledge systems and intersectionality: Reconciling social science research approaches* was a funded knowledge synthesis grant[2] – thus, it was a structured and a systematic attempt to gather existing academic and community-based materials, and synthesize the materials looking for evidence-based points of convergence as they existed in relation to feminist intersectionality and Indigenous knowledge. The project sought ways of framing two knowledge systems —intersectionality and Indigenous—as complementary, and possibly as collaborative:

> Some knowledges have long been marginalized within Western scientific traditions as well. The knowledges of women, queer, disabled, and racialized knowledge holders are examples. One of the responses to this exclusion is the theoretical idea and practice of intersectionality, which contends that varying forms of oppression are interrelated, interactive, and co-constitutive. (Levac et al., 2018, p. 6)

Through a coding of the 27 original principles that emerged from the data (literature and discussions with key informants including knowledge keepers), the research team were able to summarize seven principles that were linked to intersectionality, non-Western, and Indigenous epistemologies. The seven principles were reciprocity, relationality, reflexivity, respect, reverence, responsivity, and responsibility (Levac et al., 2018). Importantly, the analysis illustrated both points of convergence and of tension between the models.

Epistemological difference is seldom central to in an intersectional analysis, but it does illustrate deep-seated points of potential contention and/or possible collaboration, even solidarity. Using intersectional frameworks provides insight into these points of diversity that would not otherwise be viewed as compatible. As Shields (2008) argued, intersectionality points out linkages, not just differences. In the field of adult education, linkages, solidarities, and participatory practices all remain central to work in communities, in organizations, and in social movements. Such solidarity and participatory practices can, in turn, help to reveal and build collective challenges to existing power and privilege; thus, intersectional analyses and adult education can be mutually reinforcing.

Learning and sharing how intersectional approaches might influence our methods of research and engagement, our pedagogies in communities or classrooms, and our ways of building social movements is timely. For example, the field of adult learning has tended to view social movements in adult education from the perspective of a divide between the global North and the global South (Mayo & English, 2012), likely due to the influence of Freire (1970) and emancipatory possibilities/oppression, but this knowledge synthesis project demonstrated that there may be other ways of building and linking ideas.

In addition to the factors already mentioned, epistemic pluralism opens conversations for multiple perspectives. For example, recent patterns in migration to Europe can open conversations about policy and practice issues in new ways that are not bound by Western constructs or epistemologies and include diverse histories and geographies. Adult education, especially as it relates to community engagement, aims to

create equity, collaboration, and solidarity, and more recently, efforts to decolonize approaches to learning (Hanson, 2019; Hanson & Jaffe, 2021). Thus, engaging with intersectional approaches such as those described in the Levac et. al. (2018) project can build pathways for knowledge and epistemic solidarities while challenging hegemony.

Conclusion: From invisibility to solidarity

Given the growing importance of representational politics and the need to continue traditions of building movements, democratic communities, classrooms and collective histories, expanding the influence of intersectionality in research and pedagogical practices offers an opportunity for deepening our practice. Ideologies of superiority and privilege through gender, race, class, sexuality, age, location—as well as associated forms of over-representation or under-representation—are (re)constructed by institutional and social structures; for example, the locations of our work, our history, and by the curricula and the examples we choose. The absence of certain examples can reinforce oppression. A structural analysis demonstrates that how power is exercised in teaching and research can support possibilities for transformation and solidarity. Conversely, refusing to make such efforts can lead to further homogenization and hegemony.

The development of tools such as CRIAW's intersectionality framework, or synthesis research that connects epistemic knowledges, provide examples for how community organizations and adult educators can analyse categories beyond gender, race, and class and demonstrate that none of the categories are homogeneous. Further making the public education tools freely available, such as those developed by CRIAW in both of our examples, can support organizations dealing with under-funding and resource challenges in order to bring intersectionality into their work.

Importantly for the field of feminist/adult learning, intersectional frameworks provide a conceptual, theoretical, and discursive way to analyse the intersecting attributes encountered in our practices within communities, organizations, and learning groups. An intersectional approach also creates space for epistemic pluralism and highlights complex experiences of inequality, potentially leading to more inclusive educational practices and solidarity-building. Within the realm of nonformal and informal learning, these practices remain key components of liberatory values in adult education (English & Mayo, 2012). If adult education— particularly in communities, and in nonformal education or social movement contexts—aims to create conditions for change and pedagogies of solidarity (Freire, Araújo Freire, & Ferreira de Oliveira, 2014), then intersectional frameworks are a much-needed resource.

Notes

[1] Additional information about CRIAW, along with free resources on feminist and intersectionality topics, can be found at: https://www.criaw-icref.ca

[2] Funding for this knowledge synthesis grant was provided by the Social Sciences and Humanities Research Council of Canada (SSHRC).

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LGBTI Sexualities and intersectional research: Looking for inclusion beyond gender in Adult Learning and Education (ALE) Practices

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Abstract

We examine testimonies pertaining to the integration of a gender perspective beyond the dichotomy man-woman into practices of affective-sexual adult learning and education (ALE). We are interested in inclusive practices able to expand voices from specific vulnerable groups against discriminations and multiple oppressions among the aged when belonging to LGBTI Communities. The narrative literature review method was chosen, and international scientific search engines and databases were consulted to find literature in Portuguese, Spanish and English. A total of 25 educational interventions were selected for analysis. To discuss the data, we resorted to Barragán Medero's (1996) theoretical models and postfeminist contributions. The results show a small number of internationally documented experiences on affective-sexual education with the elderly and adults, a prevalence of the integrative model, as well as a scant presence of the LGBTI community. We concluded that there was a need to continue with the implementation of inclusive and egalitarian affective-sexual adult experiences in ALE.

Keywords: Adult learning and education, gender minorities and intersectionality, gerontology, LGBTI, sexuality education

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Introduction

Trying to explore what is missing in a gender sensitive research agenda is an interesting challenge (Ostrouch-Kamińska & Vieira, 2016). Representing a positive road through inclusion, feminist thinking and "gender lenses", however, have brought little attention to invisible minorities under the gender issue, as those connected with the LGBTI Communities (McAllister, 2018).

Looking for testimonies of the integration of a gender perspective beyond the dichotomy man-woman into practices of affective-sexual ALE, including the elderly, was our goal. This work is part of the initial phase of a research project on that subject. We are interested in highlighting inclusive practices able to expand voices from specific vulnerable groups against discriminations. As stated in the EU Gender Equality Strategy 2020-2025, the meaning given to gender equality is variable. However, more "sensitive research" is necessary if the purpose is to work together to build a world where women, girls, men, boys, and also intersex, trans identities and non-heterosexuality, in all their diversity, are equal – 'where they are free to pursue their chosen path in life and reach their full potential, where they have equal opportunities to thrive, and where they can equally participate' (p. 19).

Talking about affective-sexual ALE is about revealing structural inequalities, cultural norms and values which have imposed discursive binaries of "normality and abnormality" fostering an incessant interplay of unequal power relationships between human beings. Therefore, this is a specific area where we can discuss explicit and implicit forms of inequality and discrimination across the lifespan of adults and elderly persons (Mortimer & Shanahan, 2003). In this context, conquering academic space for research is crucial, as well as highlighting effective and affective ALE able to contribute to deconstructing multiple oppressions among the ageing when belonging to LGBTI Communities (Sokan & Teaster, 2016).

This article tries to offer an original panorama of those issues by means of the analysis of the existing literature reporting (Fejes & Nylander, 2019; Belando-Montoro, Barros & Lampreia-Carvalho, 2020) on internships and practices intended to carry out affective-sexual education with adults and elders. For that purpose, the narrative literature review method (Grant & Booth, 2009) was chosen, and international scientific search engines and databases were consulted to find literature in Portuguese, Spanish and English.

Theoretical framework

Adult learning and education (ALE) as a field committed with socioeducational justice

When thinking of the role of ALE, if we consider the point of departure to be Article 26.2 of the Universal Declaration of Human Rights, that states 'education shall be directed to the full development of the human personality and to the strengthening of respect for human rights and fundamental freedoms. It shall promote understanding, tolerance, and friendship among all nations, racial or religious groups', then a vision of educational justice as something more than compulsory and free elementary education emerges. Here we agree with Tomaševski (2001) when she stated:

> The importance of the right to education reaches far beyond education itself. Many individual rights are beyond the grasp of those who have been deprived of education (…) education operates as a multiplier, enhancing the enjoyment of all individual rights and

> freedoms where the right to education is effectively guaranteed, while depriving people of the enjoyment of many rights and freedoms where the right to education is denied or violated (p. 10)

As Freire (2006) has showed, it is possible to turn ALE into a condition for freedom by encouraging critical thought about unequal power structures. Also, Milana states ALE "can raise awareness of civic issues, while developing both a range of skills and knowledge and an ability to think critically" (2007, p. 8). However, this field of educational *praxis* presents a trajectory where "justice lenses" have been understood differently through time. Indeed, in the history of the evolution of the political meaning given to the concept of ALE, since the twentieth century the concept has remained mainly trapped in three programmatic perspectives: one relating to vocational qualification and training, another related to the campaigns of so-called functional literacy and a third inscribed in the permanent education movement (Jarvis, 1987; Titmus, 1989)

In the contemporary understanding conferred to the concept of adult learning and education, the six international conferences[1] promoted by UNESCO represent important beacons, particularly by counterbalancing a restricted vision of lifelong learning (subdued to the immediate interests of the neoliberal economy) with a more enlarged vision of lifelong education, embedded with critical and humanist principles and values (Mayo & Thompson, 1997; Barros, 2012). It is only when they are inscribed in the "great tradition" of the last paradigmatic understanding that policy and practices for an emancipatory ALE, able to contribute to the deconstruction of multiple oppressions, are possible.

Within this theorethical framework, holistic andragogical reflection has been developed by several researchers (Gitterman, 2004; Kapur, 2015; Knowles, 1980) and a range of techniques and active teaching-learning methods are made available to adult educators, seeking to ensure processes where the learning of adults and elders takes place in an appropriate and meaningful manner (Konopka, Adaime & Mosele, 2015; Wie, 2003). A critical andragogical approach, independently of the content being studied, prioritizes, in all educational contexts (and for both types of education: formal and non formal), the need to work in collaboration and ethical integration with each other (Barth, 1996). Thus, social and communication skills are to be developed side by side with analytical and critical thinking skills to achieve higher order thinking and meta-cognition, and this, to be transformative, involves student-centred approaches as well as collaborative and inquiry-based educational processes (Mezirow, 1991).

Inclusive ALE practices for emancipation are usually inspired by critical theories and radical philosophies (Foley, 2001), and can take several different forms in which dialogue is vital. Those educational interventions and workshops attempt to help the participants to question, destabilize commonsense beliefs (in terms of their own thoughts, ideas, views, strategies, practices, etc.) and challenge the mechanisms of power and domination. The underlying ideia is to highlight the complexity of human interations to acquire an in depth understanding of alterities and what is required to respect the rights of the Other.

In effect, affective-sexual ALE is associated with those mentioned set of characteristics not always adopted in the communities of practices (Wenger, 1998), as we were able to ascertain in this study, concerned with more than the 'industrialised global North' and therefore examining different times and geographies (see table 3). However, as McAllister (2018) put it, it remains important to:

> explore in more in depth and purposeful ways what may constitute empowering CEG [critical educational gerontology], particularly the pedagogic practices through which older

> LGBTI adults are enabled to counter ever shifting forms of heteronormativity as well as strengthen their participative voice to contribute to evolving social and legal reform (p. 58)

This has been the *leit motif* underlying the need for "sensitive research" on the existing literature reporting on internships and practices, in the field of ALE. intended to improve socioeducational justice through affective-sexual education with adults (18-60 years old) and elders (over 60 years old).

Conceptual approach to affective-sexual ALE and its models

As pointed out by Jones (2011), sexuality education is a broad concept and the ways it is conceived and understood, as well as the idiosyncratic characteristics of the experiences undertaken are the subject of multiple debates. As such, it can encompass the most varied experiences, such as workshops on reproduction, health initiatives against Sexually Transmitted Diseases (STD), talks with an underlying moral purpose based on a religious-traditional view, informal conversations, pornography and other online spaces, the media, etc. Based on this broad view of the ways of understanding how one learns about the diverse range of contents and perspectives that the field of sexuality comprises, in this paper we use the term affective-sexual education to refer to the experiences and approaches included within formal and non-formal education.

In this regard, Soler (2003) described affective-sexual education as having two parts that were differentiated by the sexual dimension and the affective dimension which, when viewed together, allowed for a better understanding of this educational field. On the one hand, sexuality education is defined as a science which is meant to provide information in a transversal manner about human sexuality with a view to it becoming a free, healthy and responsible activity. On the other hand, it was maintained that affective education fosters the addressing of self esteem needs, forms of internal control, social skills, and shared responsibility.

Over two and a half decades ago, Bredy and Barragán (1993) defined the objectives of this educational field as follows:

> The aim of sexuality education is the construction of an explanatory model of human sexuality which is critical, open and in a continuous process of transformation. Going beyond the restrictive framework of exclusively biological or preventive aspects, building sexual knowledge is essential for our personal, affective and social development if one considers the various aspects it entails: getting to know ourselves and others, as well as getting to know the relationships between them within a cultural and historical context such as ours. (p. 5)

More recently the World Health Organization (WHO Regional Office for Europe, 2010), in keeping with the view of a comprehensive and values-based development, defined sexuality as:

> learning about the cognitive, emotional, social, interactive and physical aspects of sexuality […]. It equips and empowers children and young people with information, skills and positive values to understand and enjoy their sexuality, have safe and fulfilling relationships and take responsibility for their own and other people's sexual health and well-being. […]. In this definition, the primary focus is on sexuality as a positive human potential and a source of satisfaction and pleasure. (p. 26).

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2011, p. 9), this field of knowledge should consider the 'state of complete

physical, mental and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes'.

This notwithstanding, different affective-sexual education models have been put forward, depending on the intended purposes and the perspective adopted (Barragán, 1996; Blair & Monk, 2009; Britzman, 1995; Carlson, 1992; Elia, 2005; Font, 1990; Gaudreau, 1985; Haffner, 1992; Irvine, 2002; Jones, 2011; Kornblit & Sustas, 2014; Lameiras Fernández & Carrera Fernández, 2009; Lennerhed, 2009; López, 2005; 2019; López & Oroz, 1999; McLaren, 1992; Swain, Warne, & Hillel, 2004; Wainerman, Di Virgilio & Chami, 2008). This paper will be based on the models proposed by Barragán (1996), albeit enriched with the contributions of other of the aforementioned experts. As such, we will resort to three main models: the moral, the preventive and the integrative.

The moral model, also known as repressive or traditional, is based on a moralistic Judeo-Christian approach, in which sexuality without reproductive purposes is regarded as sinful and pathological. In this sense, the sexuality model is confined to a marital context, which is heterosexual, monogamous and reproductive in nature. Its goal is to pass on to young people normative values, such as heterosexuality as the sole and correct form of affective-sexual desire, to prohibit masturbation, to condemn the use of contraceptive metods or to defend abstinence and marriage to fend off the dangers of Sexually Transmitted Diseases (STD) and unwanted pregnancies (Barragán, 1991).

In the same vein, infantile and adolescent sexuality is rejected due to the impossibility or inappropriateness of reproduction, with the aim being to preclude sexuality before adulthood and distancing it from anything that may be conceived as a pleasurable activity. This model is, therefore, characterized by the transmission of values that are conservative in nature and meant to preserve the dominant hegemonic social system. According to Lameiras and Carrera (2009), given that this model has a prohibitive view that uses fear and disgust as control tools, this type of sexuality education does not seek to educate on sexuality but to silence and repress it.

The preventive model, also known as the health model or the medicalization of sexuality education, if one is to use Foucault's (1980) terms, is based on a pathological and healthcare view of sexuality education. It is geared towards the prevention of risks that exist in sexual relations, with healthy sexuality being understood as that which is disease-free or, in what basically amounts to the same thing, associated with the physical dimension (not pychological nor social).

Although this view may be of significance since it provides one with a range of knowledge that constitutes a basis for preventing pathological risks and unwanted pregnancies, its approach to sexuality education is biased in that it favours the emergence of behaviours and attitudes that replicate and reinforce values opposing equality due to its biologistic nature, which means that corporalities, gender identities and non-hegemonic affective-sexual orientations are left out of the curriculum.

Finally, the integrative or biographical and professional model (López, 2005) starts from a integral and broad view of sexuality, which is a vital aspect that comprises various dimensions. Sexuality education is, therefore, no longer limited to issues of reproduction or health but allows for other purposes and dimensions (pleasure, communication, socialisation, knowledge, etc.); for different forms of being and desiring (the LGBTI community); for health dimensions (physical, psychological and social); for the spectrum of individuality (self-knowledge; self-pleasure and self-care); and for social vision (critical values education).

Affective-sexual ALE: inclusion beyond gender

The LGBTI community consists of three main sectors: intersexualities; trans identities and non-heterosexualities.

We use the term *intersexualities* to refer to individuals who, due to their physiological characteristics, are not considered to fit within the binary sex categories: male or female. Therefore, intersex individuals break with the linearity of the requirements of a categorization model based on biological criteria (García Dauder & Gregori, 2018). This linearity is established, in the case of males, by individuals who have testicles and a penis as main genitalia, XY chromosomes and a hormonal prevalence of androgen. In the case of females, the main genitalia are the ovaries and the uterus, XX chromosomes and a hormonal prevalence of estrogen.

Trans identities, in contrast to cis identities, refer to individuals whose gender identity does not match that which was assigned to them at birth based on physical criteria. In the wake of the hegemonic break between sex and gender, the prevailing sociocultural values give rise to the concept of *ciscentrism,* which can be defined as the generalized conception by which it is perceived that all people identify with the gender category determined at the time of birth for biological reasons (Granero Andújar, 2020).

Finally, the term *non-heterosexualities* alludes to affective-sexual identities whose affective-sexual desires are expressed among individuals of the same gender. The use of this term, instead of homosexuality, is not accidental but intentional since its meant to broaden the sole and generalized conception of homosexuality as the expression of the affective-sexual desire between individuals of the same gender and, consequently, avoid the exclusion of affective-sexual identities that can develop intragender relationships, as is the case of bisexuality (affective and/or sexual attraction to individuals of both binary genders) or pansexuality (attraction to individuals regardless of their gender and beyond binary models). Following the same grammatical intentionality as the concept of ciscentrism, *heterocentrism* makes reference to the socioculturally established mechanisms that exclude, overlook, or render invisible non-heterosexual individuals, assuming that all relationships consist of a man and a woman and that all people have desires and affective–sexual feelings towards the opposite gender.

In this context, the LGBTI community and equality between women and men are issues that a comprehensive, egalitarian and democratic affective-sexual education needs to address. These are issues that turn out to be complementary as a result of the symbiotic relationship established by the sociocultural mechanisms of exclusion and discrimination endured by women and by the LGBTI community. Similarly, the different dimensions or cogs in the normative system of sexuality (sex, gender, gender roles and affective-sexual orientation) operate in a concerted manner on our bodies and subjectivities to legitimize, uphold and reinforce the traditional hegemonic values pertaining to sexuality (Granero Andújar, 2020). For this reason, since the postfeminist movements, gender equality has been understood to go beyond equality between women and men and has included sectors of the population that have suffered different types of gender-based violence, as is the case of non–heterosexual, trans and intersex individuals (Butler, 2006).

Furthermore, the educational field constitutes a space within which greater attention can be given to the minorities that have been traditionally excluded and discriminated, as is the case of the LGBTI community and the gender inequalities, for three main reasons (Britzman, 1995; Epstein & Johnson, 2000): 1) the thematic proximity of the content; 2) the fact that it is the educational space where discriminatory behaviours and values are most often exposed; 3) the involuntary nature of transmitted values, whether inclusive or discriminatory.

Methodology

To achieve our goal, we used the narrative literature review method (Grant & Booth, 2009), and a qualitative research perspective (Merriam, 2009; Stake, 2010).
The search was carried out between May and July 2020, consulting the following databases and scientific search engines: Google Académico, Dialnet, Web of Science, Research Gate, Teseo, Education Source EBSCO, CSIC, REDIB, OAIster, Redalyc, RCAAP, PudMed y Scopus.

The descriptors consulted in these databases were those relating to our object of study, i.e. affective-sexual adult learning and education (see Table 1).

Table 1. Descriptors used in the literature review

Education sector descriptors	**Education field descriptors**	**Education intervention descriptors**
Personas mayores	Educación sexual	Education intervention
Personas adultas	Educación afectivo-sexual	Workshop
Idosos	Educação sexual	
Pessoas adultas / adultos	Educação afetivo-sexual	
Adult	Sexual affective education	
Aged	Sexual affective educational gerontology	
Old	Sex Education	
Older	Sexual intercourse	
Senior	Sexual education	
Ancient	Sexual learning	
Elderly population	Environments	
	Sex talk	
	Sexuality education	
	Education for sexuality	
	Sexual health education	

The terms of the three columns in the table have been combined to try to achieve the maximum possible range of publications. Boolean operators were also used in the search for the same purpose. ("and", "e", “y”, "o" and “or”).

Freely available academic research papers written in English, Spanish and Portuguese were consulted. The criteria for selecting the analysed works were the following: 1) the articles had to report on practical experiences involving affective-sexual education with adults and elderly persons in an educational context; 2) they had to be written in English, Spanish or Portuguese. There was no specific timeframe for the search as the aim was to find as many experiences as possible that met the criteria.

Building on the interpretive approach of our research, we used coding as an analysis technique, which enabled us to conduct a thematic or sequential content analysis in various phases (see Table 2). To that end, we identified common key concepts that generated our research categories and later created clusters which would enable us to

examine the group meanings, the discrepancies and the interrelationships present in the data that could provide us with insights into, as well knowledge and a holistic understanding of, our object of study. (Simons, 2011). Some of the categories used were a priori categories (Cisterna Cabrera, 2005), that is to say, they were determined prior to the data collection and based on readings on the topic that sought to ascertain whether the issues and processes addressed therein were present in the experiences analysed. Others emerged from questions asked during the data collection or from the data analysis itself. These were called emergent categories (Cisterna Cabrera, 2005).

It should be stessed that investigator triangulation was used for evidence of coherence betweent the results and the information provided by the participants (Sandín, 2010).

Table 2. Categories used for analysis

Thematic axes (TA)	**Categories (C)**	**Subcategories (S)**
TA1-Sexual education model.	C1.1-Integrative model.	S1.1.1-Variety of purposes and dimensions, S1.1.2-Diversity of forms of being and desiring, S1.1.3-Diferents health dimensions, S1.1.4-spectrum of individuality, S1.1.5-Social vision.
	C1.2-Preventive model.	S1.2.1-Pathological risks, S1.2.2-Unwanted pregnancies, S1.2.3-Biologistic nature perspective.
	C1.3-Moral model.	S1.3.1-Marital relationships, S1.3.2-Heteronormativity, S1.3.3-Biologicism, S1.3.4-Monogamy, S1.3.5- Sexuality limited to reproduction.
TA2-Equality men and women.	C2.1-Traditional gender roles.	---
	C2.2-New masculinities and femininities.	---
TA3-Presence and treatment of LGBTI collective.	C3.1-Non-heterosexualities	---
	C3.2-Trans identities	S3.2.1-Ciscentrism, S3.2.2-Binarism.
	C3.3-Intersexualities	---

Results / Findings

Based on the defined criteria, 25 scientific and academic documents that reported on experiences pertaining to our object of study in different countries were selected (Table 3). In an initial selection, 91 studies were identified, of which 66 were discarded after a closer review and more thorough analysis of their content.

Table 3. Results obtained from the different experiences (in chronological order)

Reference	Country	Number (N) and age of participants	Type of education	Target group	Brief Description
O'Neil & Carroll (1988)	USA	N=84 Age: 30-38 years	Non formal	Healthcare staff	Workshop on gender roles and sexism to assist health professionals in their socialization and gender conflicts with the purpose of overcoming all possible gender-motivated barriers.
Goldman & Carroll (1990)	USA	N=20 Age: 55-75 years	Non formal	Couples	Intervention on physiological and psychological changes in sexual response during the ageing process and erectile dysfunction
Adams et al. (1990)	USA	N=10 Age: 60-91 years	Non formal	Elderly people	Educational intervention on the different aspects (myths and stereotypes about sexuality and aging, sexual attitudes, and expressions in later life and physiological and physical aspects of sexuality) connected with sexuality in elderly people
Pastor et al. (1992)	Spain	N=97 Average: 34.5 years	Non formal	Adult Students	An eight-hour affective-sexual education course that addressed different dimensions of sexuality was drawn up and implemented (psychosexual development and gender roles).
Risman (1993)	Brazil	N=128 Age: <60 years	Formal	third age Students	Sexuality education program with the third age student body of the Gama Filho University (UGF), which addressed social prejudices pertaining to gender, the understanding of one's own body and affective-sexual orientations.
Livni (1994)	outh Africa	N=183 Age: Not specified	Non formal	Healthcare staff	Experience developed to improve sexual health (healthy sexual behavior and sexual relationships) between elderly couples of whom one member had some kind of dementia.
Mayers & McBride (1998)	USA	N=27 Age: Not specified	Non formal	Healthcare staff	Programme aimed at changing the attitudes and prejudices of healthcare staff about the sexuality of the elderly, focusing on: attitude toward sexuality, terminology and communication and rights their sexuality rights.
Klein et al. (2005)	USA	N=174 Age: 19–77 years	Non formal	Parents	Intervention programme seeking to improve communication on sexuality between parents and children and to provide tools to further knowledge of sexuality, which focused on communication barriers, how to express emotions and feelings, anatomy and understanding the human body.
Nicols et al. (2007)	USA	N=37 Age: Not specified	Non formal	Mothers	Programme focused on providing mothers with the necessary tools and knowledge to become engaged in the sexuality education of their children. It focused on children's sex education needs at all developmental stages, selected sexuality information, and communication skills.
Rodríguez (2009)	Cuba	N=32 Average: 22 years	Formal	Young Adults	Affective-sexual education project carried out within the "Calixto García Iñiguez" Comprehensive Improvement Course for Young People. Issues covered included sexual reproduction, the risks and consequences of abortion, pregnancy and STDs.
Di Gioia (2011)	USA	Age: Not specified Age: <40 years	Non formal	Older adults	Experience intended to get the participants to reflect on the relationship between their sexuality and their religious beliefs. Among the issues covered, we highlight the following: attitudes and beliefs about sexual decisions, relationships, and feelings about one's sexuality
Cardoso (2012)	Brazil	N=20 Age: 48–90 years.	Formal	Elderly people	An experience with a group of elderly people from the Clínica Escola da Faculdade de Ciências Médicas de Campina Grande. STD prevention and healthy sexual practices were topics covered.
Baldissera, et al. (2012)	Brazil	N=20 Age: <60 years	Non formal	Women	The different ways women over the age of 60 experimented with their sexuality so as to improve it were examined through the lense of the emancipatpry educational approach as proposed by Freire. It focused on gender relations, family and social roles aiming to stimulate reflections about the experiences lived by the women.
Bauer et al. (2013)	Australia	N=112 Age: 18–51 years	Non formal	Healthcare staff	Educational intervention to train nursing staff. What is proposed is an improvement in the knowledge of and in attitudes towards the sexuality of the elderly in the context of old-age homes. It focused on barriers to the expression of sexuality in the elderly community and the role of the health professional
Colarossi et al. (2014)	USA	N=71 Age: Not specified	Non formal	Parents and legal guardians	Educational experience aimed at improving communication on sexuality between parents/legal guardians and their children to improve sexual health (STDs unwanted pregnancies and communication barriers,)
Gedin & Resnick (2014)	USA	N=21 Age: <55 years	Non formal	Elderly people	Intervention with the elderly to inform them on STDs and HIV due to their high prevalence among this sector of the population.
Ballester-Arnal et al. (2014)	Spain	N=120 Age: <55 years	Formal	Adult Students	Experience developed over 17 years as the Sexuality Education module of the "Education for Health" subject at the Universitat per a Majors (Universitat Jaume I de Castellón). Issues covered included: false beliefs and prejudices that hindered their enjoyment of sex, sexual anatomy and non-coital centered sexuality.
Jones & Moyle (2016)	Australia	N=42 Average: 38 years	Non formal	Healthcare staff	E-learning educational intervention to improve knowledge and attitudes of healthcare (healthy sexual behavior and sexual relationships) staff so they can be more attentive to elderly people who display signs of dementia.

After a content analysis of the various educational interventions, it was ascertained that the majority (n= 17), used active teaching-learning methods and belonged to the integrative model (Adams et al., 1990; Baldissera et al., 2012; Ballester-Arnal et al., 2016; Bauer et al., 2013; DiGioia, 2011; Feuz et al., 2019; Hernández Carrasco et al., 2019; Klein et al., 2005; Lee et al., 2020; Martin et al., 2018; Mayers & McBride, 1998; Nicols et al., 2007; O'Neil & Carroll, 1988; Opazo Pérez, 2018; Pastor et al., 1992; Risman, 2011; Vitória, 2019). A slightly lower number (n= 8) was consistent with the preventive model (Cardoso Junior, 2012; Colarossi et al., 2014; Gedin & Resnick, 2014; Goldberger, 2018; Goldman & Carroll, 1990; Jones & Moyle, 2016; Livni, 1994; Rodríguez Maresma, 2009) while none had the features of the moral model (n= 0).

The issue of equality between men and women was only addressed in three interventions (Ballester-Arnal et al., 2016; O'Neil & Carroll, 1988; Pastor et al., 1992). The experiences reported in O'Neil & Carroll (1988) and Pastor et al. (1992) focused on analysing the influence and sociocultural restrictions of the traditional gender roles, as well as the new forms of masculinities and femininities as opposed to the ways of being and feeling based on being either a man or a woman. In the case of Ballester-Arnal et al. (2016), equality between men and women takes on an essentially biologistic perspective by considering the importance of the clitoris in female pleasure and the marginal importance of the size of the penis in men.

Regarding issues pertaining to LGBTI identities and corporalities, the analysis reveals vast differences in the experiences. Based on a more quantitative analysis, it was found that six of the experiences (Ballester-Arnal et al., 2016; Bauer et al., 2013; Goldberger, 2018; Opazo Pérez, 2018; Pastor et al., 1992; Risman, 2011) addressed non-heterosexualities. From a qualitative perspective, it was observed that the possibilities of affective-sexual orientation were reduced to the most visible ones (heterosexuality, homosexuality, and bisexuality). As far as the trans identities are concerned, they were

only mentioned in two of the experiences (Lee et al., 2020; Martin et al., 2018). Finally, none of the studies conducted made any reference to intersexualities.

Going beyond the analysis of the presence of the LGBTI community, what was found was that some of the experiences replicated discriminatory aspects, even when using active teaching-learning methods. In this sense, the experiences (formal and non formal) laid out in Ballester-Arnal et al. (2016), Goldberg (2018) and Risman (2011) were based on a ciscentric perspective which linked sex characteristics to gender. To be a "woman" one had to have a vulva while the gender category of "man" was linked to the penis. Furthermore, in none of these experiences were trans identities addressed.

Discriminatory aspects regarding the diversity of gender were found in the content of the affective–sexual education (non-formal) implemented in Adams et al. (1990). It was based on a binary gender perspective in that it only made reference to the categories of "man "and "woman", thereby excluding non-binary gender individuals.

Concurrently, some of the studies analysed were not clear as: i) to whether it was concerned with student-centred approaches as well as collaborative and inquiry-based educational processes (to achieve critical thinking skills); ii) to whether it was equality between women and men that was addressed or the LGBTI community (Baldissera et al., 2012; Jones & Moyle, 2016; Lee et al., 2020; Vitòria de Almeida, 2019). For that reason, it was not possible to ascertain whether they were based on an ability to think critically and achieve an equality perspective between men and women and the LGBTI community.

Conclusion

The findings show the limited number of documented international experiences on affective-sexual education with adults and the elderly. Such scarcity underlines the need for a greater attention to be given by the scientific and academic community so that this education field involving this sector of the population can be further studied and rendered visible. Concurrently, it may be a reflection of the limited presence of sexuality in adult and elderly education.

When it comes to how gender is addressed, the results bring to light the limited number of experiences that deal with equality between women and men. One can thus state that gender equality is not a recurrent theme when addressing sexuality in ALE. Meanwhile, the number of experiences addressing non-heterosexualities exceeded those focusing on the equality between women and men. This notwithstanding, and based on a holistic analysis, the number of experiences addressing non-heterosexualities was still very limited bearing in mind the total number of experiences studied. At the same time, and regardless of the results on non-heterosexualities, trans identities were almost completely absent from these experiences. Finally, and in line with Granero Andújar and García Gómez (2020), intersexualities remain completely forgotten in educational realities as they were not addressed in any of the experiences studied. In this vein, Sherlock (2015) points out how LGTBI identities and corporalities have been silenced and rendered invisible by not being addressed in affective-sexual education as they are regarded as politically incorrect by the prevailing social views.

Drawing on different scientific contributions, one may consider that the LGTBI community is often not addressed due to fear of and resistance from the prevailing normative sociocultural views, as well as to the teaching staff's lack of knowledge (Franco-Morales, Correa-Molina, Venet & Pérez-Bedoya, 2016). The latter arises from the absence of non-hegemonic sexualities in initial and continuous teacher training (Sánchez Torrejón, 2021; Wynee, 2008). Thus, due to social pressure and internalized

hegemonic views, non-heterosexualities, trans identities and intersexualities have either become taboos or difficult topics to be addressed by teachers who, ultimately, opt to exclude them from the contents of their lessons and focus on socially accepted topics.

In addition to the limited presence of trans identities, some of the experiences replicated ciscentric values that deny the presence and social existence of these identities. Furthermore, this ciscentric perspective entails a biological deterministic concept based on which essentialist currents have historically associated the behaviours, desires and social roles of men and women to biological aspects. Thus, the sociocultural differences, inequalities and discriminations women have endured throughout times are underpinned by supposedly natural criteria based on a biological rationale that justifies the existence of the disparities while preventing them from being questioned from a sociocultural point of view (Camaraco Cuevas & Orm Saab, 2011). Similarly, a binary gender perspective was to be found in some of the experiences studied. This perspective entails the interiorization of a dichotomic view of the categories of "man" and "woman" as antagonic but complementary categories, legitimizing inequalities and gender-based violence, as well as heterocentrism as being socioculturally dominant. In their work, Grotz, Díaz, González & Plaza (2016) show how the implementation of a non-binary affective-sexual education allows for the socioeducational inclusion of more realities and identities. Furthermore, it is significant that most of the experiences that worked on non-heterosexual orientations replicated excluding and discriminatory content, which made trans identities invisible by omission.

This omission from the contents together with the replication of discriminatory aspects give rise to a feeling of exclusion among the members of this community (Hobaica & Kwon, 2017). This in turn means that affective-sexual education practices are of no use to them as they neither address their realities nor meet their needs (Estes, 2016). Another consequence is that their educational needs are not atended to, which forces LGTBI individuals to resort to informal education means that are of questionable accuracy (the internet, pornography…) to meet the learning needs and wants that have not been atended to (Currin et al., 2017).

The social repercussions this entails should also be highlighted. The omission of non-normative forms of sexuality, together with the existence of discriminatory values, replicates and legitimizes the "normalisation" and "naturalisation" of hegemonic sexualities, which then prevail within the *status quo* (Sánchez Sainz, 2009). Similarly, the replication of the perception of sexuality as confined to normativity contributes to the classification, hierarchisation and disciplining of desires, identities and bodies. Among the students, this generates and legitimises the formation of subjectivities that are naturalised through exclusions, discrimination and oppression against non-hegemonic identities and corporalities, contributing to the social censure they are subject to.

Regarding the model used and the age group, the results show that all the experiences undertaken with elderly persons used the integrative model. Also, the absence of the moral model, as well as the prevalence of the integrative model in relation to the preventive one, may be connected with the age of the target population. Promoting values and behaviours associated with those models, such as sexual abstinence to postponement of the start of sexual intercourse or the prevention of STDs and unwanted pregnancies, among adults and the elderly does not make sense due to the high level of experience and knowledge this sector of the population is expected to have when it comes to sexuality. In contrast, if one is to consider that children or the young population do not yet have affective and /or sexual relations or are beginning to have them, then educating them on the dangers and the traditional moral-related values advocating abstinence or delaying the start of sexual activity is a more widespread practice. It is also necessary to break down

the traditional sociocultural barriers regarding sexuality that have been strongly linked to the older generations (Goldberger, 2018; Hernández Carrasco et al., 2019).

On the other hand, there are correlations between the model used and the presence of the LGBTI community, in that most of the experiences in which non-heterosexualities are addressed involve the integrative model, while that is the case only once in the preventive model. Similarly, it is in the integrative model experiences that the scant presence of trans identities are to be felt. Likewise, all the experiences in which equality between women and men was addressed featured this model.

Today, people who question social mandates have been gaining increasing visibility, therefore the ways in which education is thought and discussed must be attentive to these realities and needs that are emerging and getting social visibility. In this sense, and considering the findings, it is necessary to undertake integral affective-sexual education experiences with the adult and elderly population, paying careful attention to possible discriminations and exclusions which, both explicitly and implicitly, may be replicated in those educational experiences. We should not forget that the field of affective-sexual education is regarded as the educational area with the greatest potential to work towards an education that allows for the principle of equal rights and opportunities in the field of sexuality (Epstein & Johnson, 2000). The perspective adopted should be transversal to all educational contents, processes, actions and discourses (Mezirow, 1991) to ensure it addresses all the dimensions and discriminations of the normative sexuality system to achieve an affective-sexual education that is deeply egalitarian and democratic.

To that end, and in line with what was set out in the previously mentioned conferences, ALE should review the purposes it serves and also how it is implemented so as to embrace a holistic approach which considers affective-sexual education with a critical focus that will allow for an empowering development of sexuality among the adult and elderly population. In these educational contexts it is therefore key that there is a questioning of the hegemonic sociocultural canons and concepts surrounding sexuality, which from a postfeminist point of view are considered as domination mechanisms (Butler, 2006), so as to dismantle the power mechanisms and contribute to the social emancipation of what is known as “sexual minorities”.

Notes

[1] Carried out in 1949, 1960, 1972, 1982, 1997 and 2009.

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The new feminist frontier on community-based learning: popular feminism, online misogyny, and toxic masculinities

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Abstract

Feminist activism has always promoted informal learning opportunities for men and women. Internet, along with ICTs, has expanded these opportunities by affording large-scale feminist mobilisation and connection. Yet, the digital environment is not only enhancing feminist campaigning but also facilitating the contexts for abusive behaviours to flourish. Departing from the concept of social movement learning, we examine the significance of the large-scale reinvigoration of feminist activism to adult education in tandem with the surge of anti-feminist and misogynist ideas in the digital environment. We argue that just as online social media brought unprecedented opportunities to provide social movement learning, it offered the same tools to misogynists groups, mostly led by a toxic understanding of masculinity. By co-opting the same online opportunities the feminist movement enjoys, individualised and collective toxic masculinity agency is a potential foe to match, not only adding advantage to feminist movements but reinventing the same struggle and demanding an ongoing battle towards deconstructing patriarchy.

Keywords: Adult education, Digital feminist activism, Misogyny, Social movement learning, Toxic masculinities

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Introduction

By shedding light on unequal gender norms and the relational nature of gender while putting forward gender-equal agendas, women's movements on feminist issues have always promoted informal learning opportunities for adult people. Through campaigns on women's political rights or on the need to engage men in domestic work and caregiving, feminism has created numerous opportunities to share knowledge, give voice to the voiceless and encourage the engagement of the community towards gender equality. In a nutshell, feminist movements have provided what is widely coined as "Social movement learning". This non-formal education practice is key in fostering social change as people engage in social movement practices and learn with experience while fostering the causes that are promoted (Hall & Clover, 2005). From street protests on women's sexual and reproductive rights to media campaigns against domestic violence or sexual harassment, learning about gender inequality has always happened at the intersection between significant life experiences and the knowledge shared. This knowledge, encompassing the language and the imagery for expressing complaints, are no longer solely dependent of the mainstream media, with whom feminist movements have always had a tense relation (Thornham, 2007; Faludi, 1991; Hollows, 2000; Gill, 2007; 2016; McRobbie, 2009).

The Internet, along with information and communication technologies (ICTs), has expanded these opportunities greatly. Across digital platforms, individuals address experiences relating to sexism, misogyny, and violence, frequently "shouting back" in response to prejudice (Turley & Fisher, 2018), while organisations campaign against patriarchy and inequality in favour of women's rights (Matos, 2017). Digital media practices, which provide collective and connective feminist discussions, embody political and pedagogical tools (Fotopoulou, 2016). Academically, these trends invited scholars to rethink political feminist action (Mendes, Ringrose, & Keller, 2018; Mendes, 2019; Nuñez Puente, D'Antonio Maceiras, & Fernández Romero, 2019), mainly focusing upon how digital platforms may assist feminism and how power and resources may indeed be redistributed and balanced through digital platforms as new and accessible ways of political expression arise. However, on par with the possibilities the digital environment offers feminist action, digital platforms have also created new opportunities for sexism and misogynist ideas to spread outward across different platforms (Banet-Weiser, 2015). In point of fact, the articulation between easy access to the Internet, on the one hand, and smartphones equipped with different types of technological tools and social media applications, on the other, provided new online facilitating contexts to abusive behaviours, frequently in response to an ongoing conversation, causing harm, compromising feminist messages and fostering toxic environments (Citron, 2014; Banet-Weiser & Miltner, 2016; Turley & Fisher, 2018; Marwick & Caplan, 2018; Harrington, 2020).

Based upon this literature, this article focusses on the conditions the online enhances social movement learning for adult education in today's gender-based activism, specifically feminist online activism and "manospheres" collections of websites, blogs, and online forums promoting some forms of masculinity and hostility towards women.

The same strengths that make online feminism successful in social movement learning, i.e., connecting, giving account, making individual stories to become collective political action and providing alternative forms of justice is, we argue, the same ones that allow online misogyny to be effective concerning mobilisation and non-formal education. To advance this argument, this paper is structured into three sections. The first section is dedicated to feminism and social movement learning, exploring how feminism as a social

movement has, since its inception, mobilised, engaged and created collective action, while providing social movement learning. The second section is focused on how the digital realm provided unparalleled tools for feminism to expand and connect beyond core activists, setting in motion social movement learning. The third section explores how through co-opting the same online strategies that feminist movements use, individualised and collective toxic masculinity agencies are a potential foe to match, reinventing the same struggle - with different tools, but still equally accessible to both sides.

Feminism and social movement learning

Social movements tend to put forward political action towards social transformation through mobilisation, contestation, awareness-raising, and also informal learning. Feminism as a social movement is no exception to these trends. Social movements in structuralist and post-structuralist models (Polleta & Jasper, 2001) are conceptualised from a "collective identity" perspective, an approach intrinsically linked to the idea of "collective action" (Nunes, 2014). Melucci (1995, p. 43) considers 'collective action as the result of purposes, resources, and limits, as a purposive orientation constructed by means of social relationships within a system of opportunities and constraints'. Therefore, the author argues that:

> collective identity is an interactive and shared definition produced by several individuals (or groups at a more complex level) and concerned with the orientations of action and the field of opportunities and constraints in which the action takes place. By 'interactive and shared' I mean a definition that must be conceived as a process because it is constructed and negotiated through a repeated activation of the relationships that link individuals (or groups) (Melucci, 1995, p. 44).

Participation stems from civic agency, which involves the civic engagement of citizens in issues of public and political life (Dahlgren & Álvares, 2014). When theorising the notion of civic participation, several authors emphasise the emergence of individualised engagement actions and new styles of citizenship induced by technological, social and economic changes (Barnidge, Macafee, Alvarez, & Rojas, 2014; Bennett, 2008; Bennett & Segerberg, 2011). Citizenship and engagement are a direct consequence of different communication patterns (online and offline) that influence individuals to have specific behaviours concerning civic participation (Barnidge et al., 2014) within social movements and connective networks (Bennett & Segerberg, 2012).

Carpentier's (2011) definition of participation refers to an approach of minimalist and maximalist political-democratic models. The author argues that macro-participation refers to participation and political imagined communities, while micro-participation occurs in small spheres of everyday life (Carpentier, 2011). In this regard, Soon (2013, p. 200) observes that 'macro-level and micro-level approaches have been used to determine conditions that influence successful mobilisation, collective action participation and the threshold or tipping point when one crosses from non-participation to participation'.

Following critical adult education theory (Freire, 1970; Foley, 1999; Choudry, 2015; Choudry & Vally, 2017), this paper contends that adult education should attend to connections between education and learning, communities of practice, and emancipatory struggles (Choudry et al., 2017). Therefore, political and contentious action movements are spaces that promote informal and non-formal learning of knowledge produced from people's daily experience in collective and emancipatory struggles (Choudry et al., 2017).

A growing field of study in adult education, social movement learning, focuses on the 'learning that occurs *within* social movements and *because* of social movements' (Walker & Palacios, 2016, p. 176). As 'epistemic communities' (Eyerman & Jamison, 1991, p. 10), social movements are privileged sites for the promotion of new knowledge through new understandings of different issues (Hall et al., 2005, p. 584). Therefore, social movement learning offers the opportunity for non-formal and informal learning networks. As participation environments *par excellence*, social movements enhance learning by people who integrate them, as well as to external individuals as a result of the actions carried out or for the causes that they promote (Hall et al., 2005).

Formal learning focuses on individual subjects and takes place within an institutional environment credited by competent bodies. Non-formal education takes place outside the scope of formal learning and develops in a socio-educational way that considers problems and issues inserted in social, cultural and political contexts. In informal education, learning occurs spontaneously, not systematised and not organised.

Considering a neutralisation of the social aspects of learning (Cunningham, 1998), social movements promote a collective perspective of non-formal and informal learning. In fact, 'from the social movement perspective it is formal education that produces vague outcomes, because it rarely results in tangible collective action that seeks to make real differences in people's lives' (Zielińska, Kowzan, & Prusinowska, 2011, p. 252).

Traditionally, social movements have always been anchored to social struggles and a collective identity through which negotiation processes were designed (Melucci, 1995). In a different logic from unionised or rural movements, the 'new movements' are mainly urban and shape the reconfiguration of societies (Magalhães, Marôpo, & Amaral, 2018). The so-called "new social movements" are comprehensive and fit the pacifist, environmentalist, civil and women's rights movements, among others (Magalhães et al., 2018). These movements are presented as 'catalysts for personal transformation and the environment within which transformation occurs' (Hall et al., 2005, p. 585).

In the European tradition, adult education is linked to the emergence of the first social movements such as labour, the struggle for women's rights to vote or the fight against poverty (Hall et al., 2005). The learning theory of social movements considers that learning from its political dimension, allowing the democratic right of learning for everyone and the world (Finger & Asún, 2001). Furthermore, this theory focuses on the context of endogenous knowledge, as opposed to the perspectives of formal education as an exogenous knowledge transmission system (Finger et al., 2001). As Choudry and Vally (2017, p. 3) stated, 'movements are not only significant sites of social and political action, but also important, albeit contested and contradictory, terrains of learning and knowledge production'.

Engaging with Marxist, feminist, anti-racist and anti-colonial perspectives, Choudry (2015) states that activist research and anti-capitalist and anti-globalization movements are often mutually constitutive. The author contends a dialectical relationship between the knowledge produced in these movements and the material conditions experienced in social and economic justice struggles. Foley (1999) claims that informal learning occurs in social action. Welton (1993) argues that the 'new social movements' are privileged spaces for emancipatory and transformative teaching practices. It is from this perspective that feminism is interconnected with the theory of social movement learning, as the concept of resistance prevails and provides a point of engagement to learn (English & Irving, 2015).

Feminist organisations are places of informal and non-formal learning, where citizens learn advocacy, literacy and social democratic practices. As Irving and English (2011) emphasise, feminist social action groups of the 1970s have created well-

established community-based women's resource centres that promote learning through activism.

Feminist social movement learning promotes transformative learning. By taking into account the collective learning through social action, feminist social movement learning refers to a). women's non-formal and informal learning in women's movements and personal and social experience in that context; b). a reorientation of social action considering feminist ideals; c). learning pedagogies that are traditionally associated with the feminine (Walker & Butterwick, 2019).

As Walker and Butterwick (2019, p. 477) argue:

> A feminist social movement learning is about content and process. In content, it means learning about the various women's movements, and women activists, from today and from the feminist movements of eras past; it is about learning from those women activists who lived through these decades of activism of the latter part of the 20th century. In process, it is about paying conscious attention to the types of learning we undergo through involvement in all social movements, feminist and otherwise, that privilege both informal learning more generally, and the embodied, experiential, affective, and artistic ways of knowing, learning, and teaching more specifically.

Feminist social movement learning scholarship enhances the place of feminism in adult education by social struggle. The connection between adult education and feminist action has a long tradition that goes back to decades of struggles for equality and social justice. It is within this context of "feminist consciousness-raising circles" (Walker et al., 2019, p. 473) that the shared experience of women in activist movements becomes relevant. Women learnt from each other about human rights, gender equality and social justice. Adherence to the struggles for voting and emancipation results from these non-formal and informal learning promoted by early women's movements. Advances in women's sexual and reproductive rights derive from this link between feminist action and adult education. It is also in this context that decades of silence on sexual violence and sexual harassment begin to give rise to public complaints and the sharing of experiences in order to support and help victims.

The anti-racist feminist theory argues the need to politicise personal experience (Gouin, 2009), assuming itself as a criticism of Foley's (1999) that does ignore gender, race, class and sexual orientation. In fact, 'community-based feminist organisations represent socially and economically marginalised people and are often located in a marginalised space themselves within the nonprofit world' (Irving et al., 2011, p. 263). Gouin claims for a gendered and intersectional understanding of social movements learning.

Since the 1990s, feminist organisations and women's movements have focused on the use of ICTs to promote technology-mediated learning and intensify feminist activism.

Hoobs and Coiro (2016) argue that collaborative learning processes are crucial concerning the development of critical thinking. As Freire (1997, p. 50) argued:

> if it were clear to us that it was by learning that we learned that it was possible to teach, we would have easily understood the importance of informal experiences in the streets, in the squares, at work, in school classrooms, in the playgrounds […] in which various gestures […] intersect full of meaning.

Within communication for development (C4D), promotion of a critical reading of the world (Freire & Macedo, 2011) based on dialogue for social change is the basis to facilitate 'the functions of democratizing public opinion, empowering people and mobilizing for a common issue' (Brites, Amaral, & Catarino, 2018, p. 91).

Social change is anchored in a process in which technology is a cultural, economic and political instrument (Castells & Catterall, 2001). Media hybridization and technological innovations directly influence the social sphere (Amaral, 2019). Therefore, online environments allow the appropriation of affordances from different media and platforms, creating new spaces for formal, informal and non-formal learning for adults. Indeed, 'the potential of social media for C4D purposes is being increasingly recognized and explored since social networks have multiplied the diversity of communication channels and opportunities for the public' (Jenatsch & Bauer, 2016, p. 30). In this line of reasoning, digital skills are associated with civic competencies, which combines digital literacy with media literacy and citizen participation (Jover, Martín, & Fuentes, 2015).

Online activism and popular feminism

The online realm provides unparalleled conditions for feminism to put forward social movement learning. Social media allows individuals to give an account of their own stories and to make those stories connect with other similar ones, making individual stories to become a collective political agenda (Clark-Parsons, 2019) thereby providing a sense of restorative justice. As such, they provide social movement learning at different scales, engaging diverse audiences. Studies show that the digital environment has fundamentally increased the surge and widespread of activism as the interaction and dissemination logic of online media, particularly social media, has created unrivalled conditions to intensify the flow and efficiency of specific ideologies (Amaral, 2020). Based upon a "Facebook disclosure" logic (Rochlin, 2017), social media promote contents and information diets increasingly guided and endorsed by personal beliefs and emotions (Giuliani, Garraio, & Santos, 2019; Rochlin, 2017), and the feeling of belonging to a group with similar opinions appears as a mobilising element of collective actions (Bakardjieva, 2015). Each post constitutes an "individualised collective action" (Micheletti, 2003), which means a spontaneous action that may (or may not) fit, despite lacking any organisation, into wider connective actions (Bennett et al., 2011), contributing to the increasing of the flow and the political agenda endorsed by the flow (Amaral & Santos, 2019).

Social media platforms help to disseminate non-institutionalised versions of social reality, as users publicly disclose their ideas and everyday knowledge. Also, digital media practices can be, at the same time, political and pedagogical (Fotopoulou, 2016). Power and resources are symbolically redistributed and balanced through digital media as new ways of political expression, and news claims for recognition arise, pushing forward social change. But they also represent a materialist effect, empowering citizens to work together on networks of solidarity across national borders, affording them to experiment and learn with technologies and ideas.

Against the backdrop of the feminist backlash of the 1990s (Faludi, 1991), and the more recent thesis of the quasi-abandonment of feminist issues in the popular media (Gill, 2007; McRobbie, 2009), there has been a renewed interest in feminist politics across many countries worldwide, particularly in the last couple of years. Extensive prominence of feminism in an array of mainstream media has burgeoned as the movement succeeded in mobilising different audiences and encouraging women to focus on self-empowerment and personal aspirations (Banet-Weiser, 2018; Rottenberg, 2018). Transnational online feminist movements also became very visible and have brought into the spotlight different types of feminist activism and advocacy. Indeed, scholars have identified the potential of social media activism to raise and expand awareness about a myriad of issues related to

patriarchy, sexism, and gender-based violence along with the drawbacks that it presents (Citron, 2014; Banet-Weiser et al., 2016; Turley et al., 2018; Harrington, 2020). Some academic literature and opinion-editorials (Munro, 2013; Guillard, 2016) have seen these technology-based movements as enacting an authentic "fourth wave" of feminist practice. Others (Youngs, 2005) have equated the digital era as a mere new phase for feminism in theory and practice. Online horizontal networks and activities allow activists to directly enroll and extend knowledge, building across national boundaries. However, shortcomings and ongoing challenges prevent us from coining these technological movements as a fourth wave.

Digital technology has been indeed offering unprecedented possibilities for reimagining political engagement, given its potential to be immediate, intrinsically participatory (Dahlgren, 2009) and encompassing cross-border collaborative associations (Castells, 2000). As a result, this new environment has "disrupted historical masculinist constraints on women's political presence and engagement" (Youngs, 2015, p. 858) while allowing women's organisations and activists to enroll in non-established practices, communication strategies and repertoires of action (Fotopoulou, 2016; Mendes et al., 2018; Matos, 2019). It thus allowed for women to have space to give an account of their own stories without having to go through the mediation of mainstream media, where genderised harms are often contested (Silveirinha, Simões, & Filgueiras, 2019). It also allowed women to feed a collective political agenda (Clark-Parsons, 2019), creating the momentum and the tools to provide social movement learning reaching out to different audiences.

Social media platforms, in particular, have been described as playing essential roles in the domain of alternative politics. As the formal system appears to fail in preventing gender-based violence, protecting victims and overcome structural patriarchy, social media-based campaigns on violence, sexism and inequality emerge as an arena for groups and individuals to protest, mobilise for collective action, as well as for victims to share their personal experiences at different levels, find alternative forms of justice and different forms of educating for gender equality (Mendes, 2019; Núñez Puente, D'Antonio Maceiras & Fernández Romero, 2019). Innovative forms of transnational mobilisation, based on cross-border networks, have linked local, national, regional and international agendas (Harcourt, 2013), and helped as well to send the message out while also engaging and creating the platforms and means for social learning. By fostering to fight against different kinds of oppression, social media activist within the digital realm seem to be mobilising unprecedented practices even to overcome internal tensions as represented by the non-western-white-feminism (Brown, Ray, Summers, & Fraistat, 2017) or reaching out to those unfamiliar with feminism.

Facing drawbacks: sexism and misogyny

Online and offline realms are not detached one from the other but somewhat convergent and mutually reinforcing (Rogers, 2004). That is why, over the past decade – and somehow unsurprisingly, as the so-called "digital era" flourished and consolidated in everyday practices, and "cultural backlash" gained momentum –, expressions of misogynist beliefs started likewise to emerge in the online realm, providing, in turn, their own social movement learning. The popularisation of feminist critique of hegemonic discourses took advantage of digital platforms affordances but has met new encounters with anti-feminist positions which may be dismissing political feminist action. As feminism gained new visibility, online and offline (Gill, 2016), misogyny was also

brought into the spotlight, shouting back the need to challenge the patriarchal and societal systems. That is why, for Sarah Banet-Weiser (2015), "popular misogyny" embodies a "call and response" dynamic towards popular feminism.

Although sexist, misogyny is not a male-exclusive trait/phenomena. Much of this contempt against women and girls has been put forward by men and women, framed and legitimised by patriarchal frameworks and beliefs. However, misogyny, whenever led by men, is in part driven and sustained by a particular socially destructive embodiment of masculinity – "toxic masculinity" with particularly harmful consequences concerning social movement learning. This intensified harm has to do, we argue, with the exact same strengths that make online feminism effective in social movement learning, i.e., connecting, giving account, making individual stories to become collective political action.

Toxic masculinity is phrased as such so that both its violence-based features and harmful consequences are highlighted. Toxic masculinity is indeed built upon the specific elements of hegemonic masculinity 'that foster domination of others' (Kupers, 2005, p. 717). As behaviour and attitude, it is expressed through 'a strong need to dominate and control others', 'a readiness to resort to violence, and the stigmatisation and subjugation of women, gays, and men who exhibit feminine characteristics' (Kupers, 2005, p. 717). Domestic violence, harassment, gender-based rhetorical violence or sexual violence are a few concrete expressions of what can be perceived and labelled as toxic masculinity.

On par with male misogynist individualised agency, there has also been a growth of so-called "Men's movements", i.e., an informal and loose network of individuals and groups who share the belief that men are victims of women and need, therefore, to be rescued from an ongoing "feminist delusion" (Ging, 2019, p. 638). This collective online misogynist agency became increasingly present and visible in online blogs and social media constituting what the literature labels as the "manosphere" (Ribeiro et al*.,* 2020). Within the manosphere, newer communities, such as the Incels or Men Going Their Own 'are more toxic and misogynistic than the older ones', namely Pick Up Artists and Men's Rights Activists (Ribeiro et al., 2020, p. 10). Their motivation is based upon a need to account for their stories, to connect to other alleged victims of feminist beliefs and frameworks, and, hence, be given restorative justice and mobilise through social movement learning towards political action (Ribeiro et al., 2020; Ging, 2019) – formally and in everyday practices.

Misogynist rhetoric also normalises violence against women (Banet-Weiser et al., 2016). Feminist research has made it clear that digital platforms reproduce offline dominant gender norms and facilitate new ways of undertaking violence, in the process making it part of everyday practices (Sundén & Paasonen, 2018). From newspaper comment sections to social networking profiles, blogs and forum, women are repeatedly subjected to harassment, insults, and different kind of expressions of online abuse (Marwick & Miller, 2014; Ben-David & Matamoros-Fernández, 2016; Crawford & Gillespie, 2016; Jane, 2017; Massanari, 2017).

Different linguistic formulae are used to name the violent behaviours, such as "online sexist hate", "online misogyny", "gender trolling" or "online harassment". All of them correspond to constellations of offensive behaviour practised using digital platforms that involve 'the intentional imposition of substantial emotional suffering, through online discourse', which is never an isolated incident, but, rather, a persistent behaviour (Citron, 2014, p. 3). Attacks are amplified by the feeling of anonymity and impunity and are frequently directed to women airing their views and experiences relating to inequality and sexism or who identify as feminists (Jane, 2017). Defying the status quo is thus being placed in a risky position of suffering an online attack. Also, as the scrutiny of the female

body increases, so the abuse through the non-consensual sharing of sexual images has flourished, damaging not only the victims' rights to privacy but also the victims' sexual integrity (McGlynn, Rackley, & Houghton, 2017).
Online sexist and misogynistic behaviours can be thus viewed as part of the *continuum* of violence against women (Kelly, 1988). It stands for a larger culture that values men's sexually predatory behaviours and sexual assault against women, as well as women's subordination and marginalisation in sexual life as is key in the political, economic, and social fields (Simões & Silveirinha, 2019). These behaviours are, routinely trivialised in daily discourses and practices, which frequently blame the victims, excuse the perpetrators and naturalise violence as a normal practice online (Penny, 2013).

Sexist and misogynist rhetoric disclaims discourses of female empowerment as damaging to men's rights (Marwick & Caplan, 2018), alerting feminists to consider both the digital possibilities afforded by digital feminist activism as well as the challenges it faces. The role played by the term "misandry" in different online "manosphere spaces" exemplifies the problematic link between online misogyny and feminist advocacy. As Marwick and Caplan (2018, p. 544) contend, the term 'encapsulates a theory of feminism as intrinsically prejudicial and threatening toward men, which provides justification for networked harassment of those espousing feminist ideas'.

Conclusion: Ongoing social movement deconstruction, ongoing social movement learning

Celebratory perspectives on the role and opportunity of the digital environment for social movement learning concerning feminism was challenged by the emerging misogynists online movements, mostly led by men inspired by a toxic understanding of what it means to be and behave like a "real man". The conditions of vulnerability of women digital participation, which is also/still subject to misogynist rhetoric, gender trolling, offences and abuses, put into perspective the emancipatory promise of the new digital environment as a place of individual liberation and democratic renewal. At the same time, as the digital realm provides unparalleled opportunities to a horizontal and democratising social movement learning, it offers the exact same possibilities to misogynists groups. As such, online reinvents ongoing emancipatory potential and struggles, reinforcing the need for a continuous deconstruction of patriarchy.

This paper intended to explore how the online realm empowers feminism while at the same time giving misogynist movements the same conditions to thrive. As the paper discussed, the exact same strengths that make online feminism successful in social movement learning (i.e., connecting, giving account, making individual stories to become collective political action and providing restorative justice) is the one that allows online misogyny to be effective concerning mobilisation and subsequent social movement learning. Although the extent to which online misogyny is affecting digital platforms credibility as facilitators of learning requires further analysis, the dialectic nature of the digital realm expresses and sheds light on the need to envisage feminist struggle as an ongoing work concerning the deconstruction of patriarchy and the (re)construction and (re)negotiation of gender norms towards an emancipatory understanding and practice of gender roles and identities.

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Making a case for more feminist approaches in quantitative research: How commonly used quantitative approaches in adult education research marginalise and oversimplify diverse and intersectional populations

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Abstract

In contrast to qualitative and theoretical approaches, the mainstream of quantitative research often still finds it difficult to incorporate modern concepts of diversity and intersectionality into its work. This article aims to highlight various aspects in which large studies and their evaluations marginalise or ignore certain parts of the population. In surveying data, large-scale surveys like the Programme for the International Assessment of Adult Competencies (PIAAC) often not only operate on a binary gender concept but also do not differentiate between a person gender identity and their social gender. In addition, commonly used methods keep unequal distributions invisible. Non-binary people are virtually invisible, unequal benefits for women remain hidden and the intersectional diversity inside the broad gender categories poses challenges to the mainstream of quantitative research in adult education. Therefore, there is a need for a feminist approach to statistical methods and quantitative research and in particular a feminist approach to a careful and critical interpretation.

Keywords: gender equality; quantitative research; intersectionality

Introduction

From city planning to everyday working life to a more and more digitalised world, many elements of this world have been structured and implemented by the people in power and therefore were and are built to reflect their perspectives and to cater to their needs (Criado-Perez, 2019). Alas, adult education research has been no exception to this rule. In many

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fields of academia and live, mechanisms take effect that prioritise white middle-class men and their perspectives (c.f. Buvinic, Furst-Nichols, & Koolwal, 2014; Buvinic & Levine, 2016). Following Foucault and his concept of bio-power statistics themselves can be described as a part of neoliberal power mechanisms that hold great influence on societal structures and its subjects (Foucault, 2019). Women and other people who are not only under-represented amongst researchers, but also are their interests and needs marginalised in every step of the research process. While some progress has been made, especially in qualitative research, quantitative research still struggling to incorporate gender-sensitive or inclusive approaches (Else-Quest & Hyde, 2016, p. 319).

In this paper, I will highlight a few steps and aspects in which quantitative adult education research perspectives are gendered and would benefit from a broader variety of voices and approaches. Therefore, this paper will look more closely into two central aspects of quantitative research: The way we accumulate and survey data and how we subsequently handle and analyse the data. To demonstrate these steps, I will utilise the public use files of the *Programme for the International Assessment of Adult Competencies* (PIAAC). It is an international large-scale assessment, testing literacy, numeracy and technical problem-solving skills of adults (between the ages of 16 and 65) of the resident populations in 38 countries. It is conceptualised and conducted by the Organisation for Economic Co-operation and Development (OECD) and therefore focusses not only on the countries that are members of the OECD but also on their concepts and interpretations of adults competencies and their socio-cultural relevance (c.f. GESIS, 2020; OECD, 2013). While the survey offers broad and extensive data on the situation and circumstances of adult education in multiple countries, it has also been criticised for its singular Western and economic perspective (e.g. Addey, 2018; Duckworth & Smith, 2019, pp. 27f.; Allatt & Tett, 2019, pp. 41f.; Grotlüschen & Heilmann, 2021).

Other referenced large-scale assessments in adult education will be the European *Adult Education Survey* (AES; c.f. European Commission, 2013) and the German national survey *LEO 2018 – Living with Low Literacy* (LEO; Grotlüschen, Buddeberg, Dutz, Heilmann, & Stammer, 2020).

All are large-scale assessments that claim representativeness for their respective groups; PIAAC as well as LEO include a competence test as well as a comprehensive (background) questionnaire (Grotlüschen & Buddeberg, 2020; OECD, 2013b) and both are viewed as relevant quantitative research respectively in international discourse and in German adult basic education debates (e.g. Hoogland, Heinsmann, & Drijvers, 2019).

In this paper, I will look at these surveys and their analyses as representatives for mainstream approaches in quantitative research. After reasoning why visibility and representation in research are relevant for gender equality, this paper presents selected elements and aims to demonstrate aspects where gender in general and perspectives of the non-powerful are made invisible in common quantitative approaches. Many of the issues that will be raised in this paper have been voiced multiple times. They are often either used to point towards qualitative or mixed-method approaches, which have traditionally included more critical and feminist perspectives (Westmarland, 2001) or to push for alternative approaches towards quantitative methods and their interpretations. This paper follows the second line of argument and tries to reason and to demonstrate how well known criticism of supposedly objective approaches does apply to the field of adult education.

The necessity of visibility and representation

From different perspectives, the inclusion of women (and increasingly non-binary persons) in the scientific world seem relevant and necessary to further advance the gender equality. This includes diverse perspectives in the research teams and as the objects of research.

Diverse representation in research

Women are continuously described as underrepresented in sciences (Rossi, 1965; Sarseke, 2018). This might indicate mechanisms of exclusion that prevent women from pursuing careers in science. Sarseke (2018) finds 'that the subject 'gender and science' has been looked at for at least three decades, and the results obtained have not changed significantly.' (Sarseke, 2018, p. 98). An image of a 'leaky pipeline' has been used to illustrate the process of women and non-binary people slowly but consistently leaving certain professions or career trails (Buckles, 2019; Pell, 1996). While these effects are more visible in the STEM fields, the generally more diverse fields of adult education show similar distributions when it comes to statistical or quantitative research.

In addition to a less visible representation in research, women's achievements are often overshadowed, marginalised or re-attributed to men (Tsjeng, 2018). Their publications are less frequently consulted and cited (Knobloch-Westerwick, Glynn, & Huge, 2013; Rossiter, 1993). They often face different expectations regarding their competences, their appearance and achievements (Ranga, Gupta, & Etzkowitz, 2012, p. 15). The competences attributed to them seem to be inseparable from their invocation as (racialized, classified, etc.) women (c.f. Heilmann, 2021).

At the same time, women and non-binary people are not homogenous but rather highly diverse groups. The highly different experiences of people of different social classes, of racialized women and non-binary people, and of (non-)disabled individuals cannot be represented by a single *female* perspective (hooks, 1982; Merrill, 2005).

Not only do women face fundamental disadvantages in many areas of science, this unequal representation also has an impact on the questions asked and the methods used. Homogeneous scientific perspectives can lead to one-sided research questions and approaches, which lead to further stereotyping, discrimination or invisibility of population groups that were already hardly visible or marginalised.

Intersectionality in quantitative research

Following Crenshaw (2017), hooks (1982), and many others, the concept of *intersectionality* describes how the highly diverse and complex nature of different group memberships and forms of discriminations cannot be understood by looking at them separately. There is no consensus on what the terms "feminism or intersectionality" mean and they are defined in different ways for different research approaches (e.g. Bührmann, 2010; Degele & Winker, 2007). However, there can be found similarities and a common core of convictions, such as a fundamental belief in an equality of all people disregarding gender, class, language, the colour of their skin, their skills and abilities, and other characteristics.

Scott and Siltanen (2017) looked at common quantitative research methods and questioned how compatible they were with intersectional theoretical approaches. They found that the more complex the view of the diversity and intersectionality of the

examined group was, the more inadequate the usual applied methods became (Scott & Siltanen, 2017, p. 374). Combining an intersectional approach with quantitative methods poses a major challenge to researchers.

> [T]he methodological choices at our disposal […] are severely limited. Try as we might, it is virtually impossible to escape the additive assumption implicit in the questions we use to measure intersectionality and in our analysis of the phenomenon. (Bowleg, 2008, p. 322)

Surveying data on gender

In order to claim any correlation of any variable to gender, the assessment of a gender variable and the underlying construct is vital. While including a gender variable almost seems to be an automatism: In almost all assessments, gender is surveyed even when gender-related differences are neither part of the research question nor part of the theoretical framework (Magliozzi, Saperstein, & Westbrook, 2016). Instead, gender is often included as a standard variable, which is included anyway and without further thought to a theoretical basis or conceptualisation.

Social gender, sex and gender identity in large-scale assessments

When gender is seen as a complex social construct and gender identity as a non-visible trait of a person, one might take issue with the way gender is surveyed. More often than not, large-scale assessments do not ask for respondent's gender identity but instead ask the interviewer to assume and prescribe a social gender. For example, PIAAC's background questionnaire specifies, 'this question will be recorded by the interviewer through observation […] and only asked of the respondent if needed.' (OECD, 2010, p. 7). The interviewer instruction therefore reads 'Ask only if uncertain.' (OECD, 2010, p. 7) and allows for two valid responses: Male and Female. Similarly, also the AES and LEO left it to the interviewer to determine the participants gender (Eurostat, 2012, p. 2; Grotlüschen, Buddeberg, Dutz, Heilmann, & Stammer, 2019, p. 7).

This reveals a very restrictive view on gender and gender identity. Which is not reflected in more recent understandings of gender identity. Gender is instead viewed as binary (male/female) and as "readable", i.e. as a personal trait that is easily visible. Another person is expected to recognise somebody's gender "through observation" with the expectation of being "certain" in one's attribution most of the time. Besides the theoretical changes and critique, at least since the 1980s efforts have been made to point 'to the differences between personal perceptions of sexual identity and scientific evaluations by objective outsiders' (Stern, Barak, & Gould, 1987, p. 504), meaning that the inaccuracy of surveying gender this way is measurable (Stern et al., 1987).

Attempts to resolve this difference between the theoretical approach and the method of data collection are often met with doubts and hurdles.

> For example, there are concerns that in many surveys, expanded categorical measures will yield some populations that would be too small for statistical analysis. Improved categorical measures also do not allow for variation within gender categories; such questions continue to treat gender as a set of discrete attributes, each assumed to describe a relatively homogenous population. (Magliozzi et al., 2016)

During the 1970s and 80s, several attempts were made, to survey gender in different scales, for example by asking participants to indicate where they fell on a male/female

spectrum in regards to four categories: Feel, Look, Do, Interest (Stern et al., 1987). Such an 'bipolar biological continuum' (Stern et al., 1987, p. 508) of gender allowed for more differentiated analysis but was finally revised, as from a queer-feminist standpoint at least the attribution of acts and interests as being on a bipolar continuum are questionable. Figure 1 shows a different approach to surveying gender and sex by Magliozzi et al. (2016). They chose to survey how people see themselves, the gender that most people ascribe to them, their assigned sex and gender at birth and their current gender identification (Magliozzi et al., 2016).

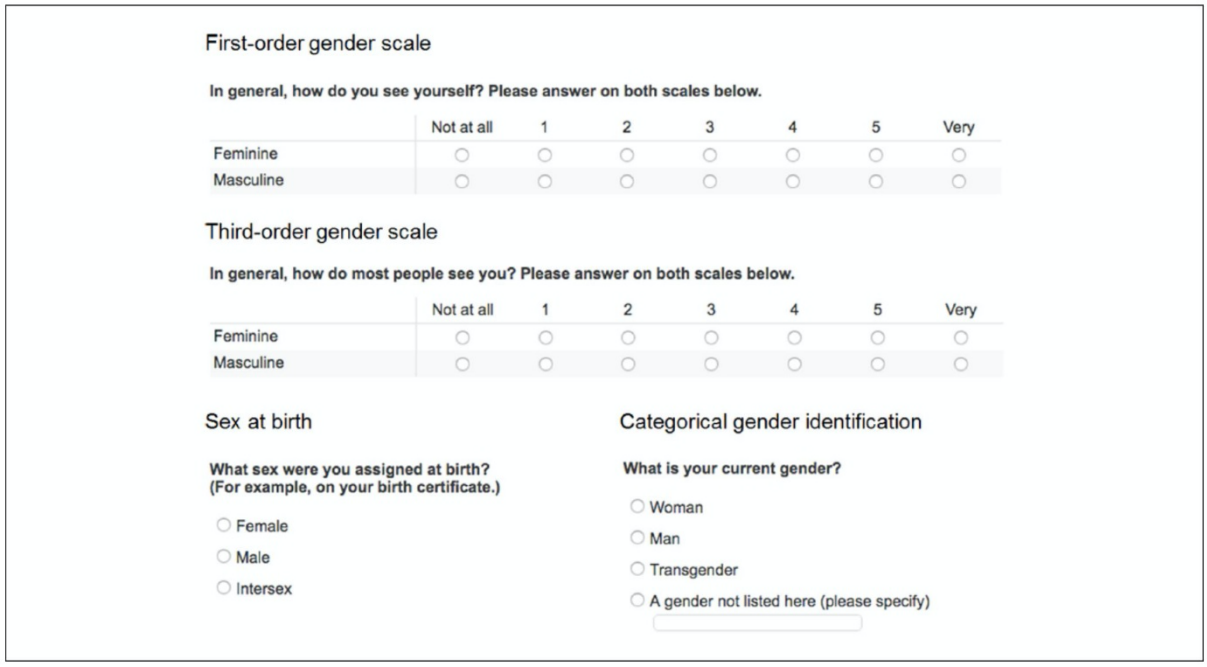

Figure 1: Sex and gender survey module; source: Magliozzi et al., 2016.

Researches might refrain from using more complex scales because they fear it would be too time-consuming or too difficult; or they worry that being asked for the gender assigned at birth might be uncomfortable for some people or that especially open-ended questions regarding gender might lead to 'potential mischievous responses' (Fraser, 2018, p. 350). However, as those responders who choose to give untruthful answers often do so in more than one question (Robinson-Cimpian, 2014), mischievous responses to open-ended items on gender and sex might be useful to identify and exclude cases that shouldn't have been used anyway (Fraser, 2018, p. 350).

Laurel Westbrook and Aliya Saperstein argue, that if we

> continue to both essentialize and dichotomize sex and gender, survey research will continue to produce findings and reproduce beliefs that are disconnected not only from current social science theory but also from the diversity of gendered experiences[1]. (Westbrook & Saperstein, 2015, p. 536)

At the same time, '[e]ven an innocently neutral question […] can prime gender' (Fine, 2011, p. 9): Reminding a respondent of their gender can lead to evoke gender-related assumptions and self-stereotyping (Sinclair, Hardin, & Lowery, 2006). Therefore, as with all survey items, gender-related questions, their relevance, their theoretical understanding

and their position in the survey need to be discussed and justified instead of being 'the default' (Magliozzi et al., 2016).

Biases in sampling and testing

Two further aspects where biases might be introduced are the methods on sampling and testing (Else-Quest & Hyde, 2016): For example might a random selection sample, while being 'often held up as the gold standard of sampling' (Else-Quest & Hyde, 2016, p. 325), might often underrepresent intersectional groups.

People with disabilities, homeless, those who are living in shelters, jail, prison or who do not speak the dominant language are often excluded from large-scale samples. We do know however, that people in these groups differ regarding social attributes. For example, is a higher percentage of men in prison – especially BIPoC men (Pettit, 2012). LGBTIQ youth, especially lesbian, bi and trans* youth, are more likely to live on the street or in shelters (Takács, 2006).

Furthermore, variables might be missing that would paint a more complete picture, e.g. regarding unpaid work of women (Aassve, Fuochi & Mencarini, 2014; Ferrant, Pesando & Nowacka, 2014; Harts, Lacy & Rodsky, 2020).

One of the main known biases we find in quantitative approaches is the so-called *test bias*.

> Test bias refers to the differential validity of test scores for groups (e.g., age, education, culture, race, sex). Bias is a systematic error in the measurement process that differentially influences scores for identified groups. Bias can be internal (psychometric properties, test structure) or external (differential prediction/selection) to the test. (French, 2014, p. 6619)

Silke Schreiber-Barsch et al. raise the question 'Whose voices matter' (Schreiber-Barsch, Curdt & Gundlach, 2020) regarding the inclusion of different voices, here especially the voices of people with learning difficulties, in large-scale assessments. This seems to be the essential question to ask and looking at the way data is survey and interpreted gives a clear indication whose voices appear to matter.

Carrying out calculations and making assumptions

After having surveyed the data, further decisions have to be made and many of them include a risk of further adding a bias.

In the following, I will illustrate the argument by using PIAAC data of six arbitrary European Countries (which included the income variables in the public use files and which share the Euro as currency): Poland, France, Germany, Greece, the Netherlands, and Spain.

Preparing Data

A common step in data preparation is to exclude certain groups from the data as they are either not relevant to the research question or they might introduce biases. When we, for example, try to determine a gender wage gap in relation to adult's competencies or educational attainments, we might exclude outliers regarding pay, i.e. those with such exceptionally high incomes that they tend to skew the results that are meant to indicate mean and average income (disparities). Regarding the monthly wages, studies might also exclude those without payed work or those who don't work full time as those appear to

be reasonable ground for lesser (or no) payment. Examples and further reasoning for these can be found in Polackek (2004), Auspurg, Hinz & Sauer (2017), OECD (2017), or Heilmann, Gal & Grotlüschen (2020).

Table 1 demonstrates how different decisions influence gender disparities in terms of monthly income. While including all adults between the ages of 16 to 65 results in a pay gap of 72.9 percent, excluding those without payed work or with part-time payed work does leave out more women than men (OECD, 2017). At the same time, excluding outliers with more than 10 times the mean income (here: 2,960 EUR) does exclude few people with incomes that are not representative of the main population but has a major effect on the income averages and their gender disparity (c.f. Kwak & Kim, 2017).

	All	**Excluding those without payed work**	**Excluding non-fulltime (less than 38 hrs/week)**	**Excluding outliers (10 times the mean income)**
Weighted ratio				
Male	49.8 %	53.7 %	66.3 %	53.7 %
Female	50.2 %	46.3 %	33.6 %	45.3 %
Mean monthly income in EUR				
Male	1,990	3,180	3,570	2,750
Female	1,450	2,710	3,140	1,880
Relative difference	72.9 %	85.2 %	87.9 %	68.2 %

Table 1: Differences in monthly income for men and women depending on the sample composition. Basis: First round PIAAC data from Poland, Spain, France, Germany, Greece, the Netherlands. The EUR-values are rounded to the nearest ten.

With regard to the scientific treatment of data, this point to the need for transparency in these decisions and data manipulations. Even if in some cases the exclusion of populations can be justified objectively (e.g. to exclude groups without income from income calculations), it seems necessary to examine the way in which gender-specific differences are subject to preliminary marginalisation.

In addition, adult education research is often concerned with determining the (cor-)relations between educational qualifications or competence levels and their outcomes. The considerations so far often only prepare the ground for the further analytical steps – often linear regression models.

Assuming equal relations – Using mediators and moderators

Regression models are based on different fundamental assumptions. A often overlooked one is the homoscedasticity (Yang, Tu & Chen, 2019).

> Homoscedasticity refers to the distribution of the residuals or error terms. If this assumption holds then the error terms have constant variance – in other words, the error for each observation does not depend on any variable within the model. Another way of saying this is that the standard deviation of the error terms are constant and do not depend on the explanatory variable values. (Tranmer, Murphy, Elliot & Pampaka, 2020, p. 36)

Regarding gender, the concept of homoscedasticity can be used to describe how our models often overlook that the average relation between two variables might be distorted by gender. While for men, we can establish an average proportional relationship between their numeracy and literacy skills and their income and labour market position, this relation is not linear for women in the labour market (Heilmann et al., 2020). Additionally, the usual coding of gender as 0/1 (or 1/2) for 'male'/'female' (cf. ISO, 2004) and thus often handling 'female' as the deviation of the reference category leads to further invisibility of women in these analyses. To demonstrate this, table 2 compares different regression models.

Model 1	income ~ gender (i.e. being a women)
Model 2	income ~ gender + educational attainment (reference = none or low; medium; high)
Model 3	income ~ gender * educational attainment
Model 4a	(only women) income ~ educational attainment
Model 4b	(only men) income ~ educational attainment

The models in table 2 and their coefficients, predict very different incomes. How a regression analysis works, in basic terms, is to average out the different effects of variables. Therefore, the coefficients of model 1 equal the mean distributions. The intercept indicates the men's average income and the coefficient shows that people that are invocated as fulltime working women earn an average of € 430 less.

Model 2 shows that men with a low educational attainment earn an average of € 2520 (see intercept for model 2). The average men with medium or a high educational attainment earn on average € 670 and € 2040 more per month. Averaged over all the educational groups, women earn about € 570 less. While this gives us a first indication of how educational attainments might relate or even impact monthly income, this model assumes that this impact is the same for men and women (c.f. Wu & Zumbo, 2008).

Only when we add the mediator or interaction term in model 3 we can see that the monetary benefit that might come with higher education differs for men and women. While men seem to benefit from higher education, women seem gain a lesser average from medium education attainments and a higher average with a higher education. Highly educated women earn an average of € 4580[2] while highly educated men achieve an average of € 4200[3].

	Model 1	Model 2	Model 3	Model 4a	Model 4b
Reference value (Intercept): male with low ed.	3,570	2,520	2,700	1,470	2,700
Average differences (coefficients) compared to male with low ed.					
Female low ed.	-430	-570	-1,230		
medium ed.		670	700	720	700
high ed.		2,040	1,500	3,110	1,500
Female and medium ed.			20		
Female and high ed.			1,610		

Table 2: Coefficients of four regression analyses on monthly pre-tax income of full-time working men and women; Basis: First round PIAAC data from Poland, Spain, France, Germany, Greece, the Netherlands. The values are rounded to the nearest ten. Ed. = Educational attainment.

This demonstrates that the simple addition of a gender variable adds only little understanding of different life experiences of different groups of women.

Discussion

This paper looks at a few selected aspects of quantitative research in adult education and aims to demonstrate that common methods often marginalise women, keep non-binary people invisible, and disguise that in some cases men and women benefit disproportionally from factors like education. Neither gender group is as homogenous as simple averages suggest. A greater focus must be placed on alternative methods which offer a more diverse and intersectional view of different groups (for example on modelling of competence for gender and race: Hester, Payne, Brown-Iannuzzi & Gray, 2020; on intersectional effects of SES: Cascella, 2020).
Instead of trying to include a multitude of variables into one or as little as possible regression models, a more contexualised and intersectional approaches might provide further insight (Scott & Siltanen, 2017, p. 378).

By excluding vulnerable groups and assuming that different effects of education, race, etc. can be controlled for by averaging out their effects, we are compartmentalising gender disparities and therefore keeping them less visible as a whole.

Limitations

The arguments presented against the common regression models are neither new nor surprising. On the contrary, they are frequently cited, among other points, when fundamental arguments are made against quantitative approaches. There is no question

that in the development of many large-scale educational data sets, gender questions are usually either completely disregarded or addressed in a way that is difficult to reconcile with current theoretical conceptualisations of gender. These surveys often do not include the relevant gender variables (Bowleg, 2008, p. 322). Nevertheless, if they do include the variables needed for specific research questions, commonly used methods often misrepresent societal structures.

Among the central counter-arguments against the proposed ideas is the supposed *objectivity* of figures, numbers, and statistics. This assumption, however, has been refuted in various places – instead, its deep embedding in societal power relations has been shown (e.g. Addey, 2018; Foucault, 2019). Similarly, one might argue that a complex understand of gender might over-complicate quantitative approaches and limit their practicability. If, however, this practicability is shown to systematically marginalise groups, we might call into question the legitimacy of such an argument.

Implications

This paper argues for more awareness and more critical approaches in quantitative research and in its interpretations. A broader feminist approach to quantitative research could improve how gender is commonly conceptualised and operationalises gender and diversity. By normalising the following 3+1 steps in our quantitative research, the potential of large-scale surveys could be better exploited and be used as a tool for our own critical research on gender. (1) By being more reflective of data sampling and collection methods and potential biases and by articulating these reflections as a necessary part of research (instead of feigning that our research is universal and objective) the results can be better embedded and interpreted. At the same time, this could potentially contribute to the establishment of alternative survey methods in the future.

(2) The choices that we make in manipulating our data and the selection of variables could be made more transparent and be discussed at a greater depth than currently usual. The presentation of the used method could benefit from a more detailed discussion of which biases lead to decisions and thus may be further reproduced or made invisible.

(3) The more habitual use and incorporation of mediators and interaction terms might improve the precision of statistical findings. They reveal greater complexity and are capable of incorporating intersectional relations even in relatively simple models and methods. As long as we cannot show or soundly argue that a variable does not intersect with our independent variables, we need to include interaction terms (or mediators) or be transparent about not doing so.

In order to see more diversity reflected in the major surveys in the future, it seems important to include modern questions of gender, diversity and intersectionality in quantitative research. Above all, however, it is relevant to (4) strive to broaden the perspectives of quantitative researchers, work on more ways to combine diverse theoretical concepts with quantitative methods and to try to make research teams more diverse. In order to raise awareness to issues of inequality and to strengthen feminist approaches and interpretations of quantitative findings we need diverse perspectives included in every step of the process.

Notes

[1] This was aimed at US-american surveys and the US-american society, but I would argue that this holds probably true for any research.

[2] This is the sum of the intercept and the coefficients for female, high ed., and female high ed. Thus the sum of the average income of a male with low educational attainment (€2700) minus the average difference between them and women with low educational attainment (who on average earn €1230 less) plus the average difference between men with low educational attainment and men with high educational attainment (which is €1500) and finally a corrector (interaction term) indicating how this difference between low and high educational attainment differs for women (€20).
[3] Similarly to above, this is the sum of the intercept (€2700) and the coefficient for high educational attainment (€1500).

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Gender and Polish family discourse in adult education: Towards family informal learning of adults

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Abstract

The main aim of the paper is to reconstruct the family discourse in adult education in Poland in the context of gender research perspective. In reference to the latest literature, both international and Polish, the author analyzes a family as a place of adult learning and family learning/informal learning of adults as a process; reconstructs the examples of family research in adult education, as well as gender approach in adult education, gendered learning of adults, and examples of gender sensitive research in Polish family discourse in adult education. At the end the author presents a case of own biographical research on partnership in marital relations in dual-career families as an example of using gender filter in researching family life of adults. Concluding, the author underlines the role of gender sensitive approach in researching tacit knowledge of informal learning of adults. .

Keywords: Adult education, dual-career family, gender, gender equality, informal learning in a family

Introduction

Learning is integrally linked to the common life activities taking place in the professional, personal and social spheres. Adults learn not only to deepen or update their knowledge but also to redefine their roles and re-create their identity. Today, changes in the socio-cultural context of adult learning can be seen, as well as the expansion of the fields and areas in which they operate and in which they develop their daily experiences (Bron, Kurantowicz, Olesen & West, 2005). The andragogic discourse emphasises the shift in exploring the areas of adult education from the classroom dimension, contact with the book or the teacher to the 'person-world' system (Malewski, 1998, p. 113) and from teaching processes to learning processes, which Malewski (2010) describes as 'a

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paradigmatic change in andragogy'. One of the basic elements of this person-world relationship is the family.

Family and adult education

The family is one of the most natural and basic spaces to construct and experience everyday life. Przybylska and Wajsprych (2018) distinguished the most important aspects establishing the family as a place of lifelong learning. The family, in their view, implements different dimensions of learning – as a result of what we have learned within the family, as a mental process, as a social interaction between family members and the social environment, as an integrated process involving direct and indirect interactions and the processing of the knowledge acquired within the family. According to the authors, the family is an area of adult education practice in which different learning styles are revealed, e.g. reflexive learning through the experience of, for example, problem situations in the family, transformative and discursive learning, e.g. in a situation of change experienced by family members. The family is also a source of collective cognitive patterns and learning motivators, manifested, for example, in the meanings attributed to education by family members. Finally, the family is the space where learning lasts the longest, it takes part in every area and every form of adult education and different models of teaching work:

> It is a subject, a touchstone and a source of formal education understood as social development (technological model) and non-formal education as an individual consciousness (humanistic model), it can be a critical model in non-formal education in the case of, for example, oppressive living conditions (thinking, reflectiveness, intersubjectivity of meanings) (Przybylska & Wajsprych, 2018, p. 20)

Despite the natural predisposition of the family to form the space for adult education, until recently, as Nuissl states, it was not very often present in andragogical reflection, while at the same time posing the question of 'whether families are too complicated to be the subject and context of andragogy' (Nuissl, 2016, p. 200, for: Przybylska & Wajsprych, 2018). One of the reasons for this 'under-representation' of the family is that it is seen primarily as a space for children and young people, their development, socialisation and upbringing. Exploration of the meaning of the family as a space for adults to function has so far dominated mainly in sociology (e.g. analysis of lifestyles, health behaviours, pathologies, family roles), psychology (e.g. well-being, identity shaping, role strategies, marital selection), or social pedagogy (parenthood, family relations, intergenerational transmission of patterns in the family), i.e. using the theoretical achievements of these sciences. In recent years, however, there has been an increasing amount of research and reflection, internationally (e.g. Bodner-Johnson, 2001; Furedi, 2012; Gabb, 2010; Lićen, 2014; West, 2007) and in the Polish family discourse, where the analysis of, for example, the above-mentioned strategies of functioning in social roles or parenthood emphasizes the contexts of adult education, for instance, the role of the family in the education of adults, learning parental roles by parents (Jurgiel-Aleksander & Ilkiewicz, 2018), fulfilling the role of a parent as an opportunity to develop in the family as a space for adult learning (Kozubska, 2015) and being a parent as a teaching experience (Jurgiel-Aleksander, 2017), patterns and types of intergenerational relations between older parents and their adult children (Krzyżowski, 2013), learning between family generations (Aleksander, 2013), the role of intergenerational learning in the process of hominization (Jarosz, 2015), parentification (role reversal) in the family in the experience of young

adults (Sapia-Drewniak & Żarczyńska-Hyla, 2017), the importance of generativity in attaining adulthood by contemporary man (Wąsiński, 2015).

Adults in the family and their learning processes are therefore progressively becoming a subject of research both in the international and Polish areas of adult education, where the main focus is on adult learning strategies, biographical construction of family roles, development of one's own concepts of family and family life, and ways of experiencing change and conflict within the family in the context of their developmental potential. This has a very positive impact on the development of the Polish discourse of the family, complementing the hitherto existing prospects for family research with andragogic issues. It is worth emphasising that an increased interest in family explorations in the field of adult education was connected with the development of interest among adult education researchers in the issue concerning informal education and informal learning of adults which, as Livingstone (2001) states, 'have been relatively little explored to date and warrant much fuller attention from those interested in comprehending the nature and extent of adult learning' (p. 4).

(Informal) learning of adults in a family

The family as an educational environment is a culturally determined space with a partially stable but variable boundary; a space that is the source of the daily experience of individuals, which determines the conditions, causes and contexts of learning/activity; a space that is filled with permanent and impermanent as well as material and non-material results of learning and activity (Przybylska & Wajsprych, 2018; Ostrouch, 2005). The family is also a natural place of social life and a space of multifaceted relations, creating an 'interpersonal space' (Sztompka, 2016) – everyday life in the family is most often realised in close and immediate surroundings with other people and always in some kind of relationship. It is in these relationships that the experiences that form the basis of adult learning are created; learning directly 'in co-presence, co-participation and interaction: in events, in life situations, through contact and interaction at the same time and space, through meetings, conversations, dialogue, observation, action, etc.' (Dubas, 2011, p. 7).

This relational context of functioning in the family, as well as the fact that the family provides natural conditions for the daily activities of its members, means that adult learning in the family is carried out primarily in an informal way. Informal learning is connected with everyday routine and experience of everyday life, it is often unconscious, as it is not the aim of the activity, but accidental, and it contains a certain level of reflection and action (Livingstone, 1999). Its important feature is the independent assimilation of new meaningful beliefs, attitudes, values, knowledge and skills because it is based on working out one's own experiences through reflective activity. Informal learning is also an individual matter that can rarely be predicted in advance (Colleta, 1996; Kluzowicz, 2017). It is underlined in the discourse of andragogy that shaping behaviours and attitudes is a process that occurs more efficiently in the environment of informal education (Kurantowicz & Nizińska, 2012).

Informal education, like the family, is sensitive to the changes taking place in the world. It responds much faster to the problems and challenges of today's world than formal education and uses the experience of adults, which makes it easier to overcome life difficulties and promotes their personal development. Informal learning in the family is also known as 'family learning'. Lićen (2014) defines it as a process 'that takes place in all phases of the family life-course, where it is more intensive in some phases and less intensive in others' (p. 121). The author also describes the areas of family learning, which

are ‘relationships and communication, support and supervision, decision-making and ‘emotional management’ or affective strategies, conflicts, cohesiveness of the group or dyad and attachment, diet, finances’ (ibid.).

The primary objective of informal adult learning is to meet the demands of emerging situations and life problems. Since family life, although in different configurations, accompanies a person throughout his or her life, informal learning within the family is a lifelong process, an autocreative activity of people who reflectively organise their experiences which make up a coherent identity. They are characterised by the subjectivity of actions, a sense of causality and responsibility of learners for independently produced knowledge, which Malewski (2010) links with their proactivity. In this author’s opinion, it should be based on reflective criticism, which consists in adopting a cautious attitude towards recognised patterns of problem-solving and its own pre-courtesy shaped on its basis. This ‘reflexive criticism’ also becomes the basis for learning in family relationships, which are embedded in the experiences and biographies of individual family members. Learning from the biography of others, as well as from one’s own biography, is an example of biographical learning (Alheit, 2010; Dubas, 2017b) and is a practice which, according to Dubas (2017a), guarantees the dual subjectivity of relationships in the educational process, as well as the discovered field of non-formal learning of adults, who, strongly rooted in their often difficult and changeable family life, want to function better in it and discover new knowledge about themselves and about others (Usher, Bryant & Johnson, 1997).

The development of a learner’s biography is strongly intertwined with the biography of the family, which makes a universal reference point in everyday life, associated with a strong emotional bond, for a new identity. Informal learning, based on the impact exerted on the individual by the surrounding world, culture and the experience gained from intra-family relationships, also allows the individual to acquire information about gender constructs. Through all kinds of informal learning, whether is it self-directed learning, incidental learning or socialisation, following the typology proposed by Schugurensky (2000), people can construct tacit knowledge, including the learning of gender messages.

A discourse based on the socio-cultural background of gender differences emphasises the key role of education and socialisation in shaping female and male identity (Bradley, 2007), especially in the family. The socialisation messages received by learners include intellectual training to develop the intellectual qualities of women and men, emotional training to indicate the gender-approved expression and strength of emotions and social training to determine one’s place in society. Their content relates to gender-specific desirable personality attributes, characteristics and behavioural styles and the typical or expected types of activities and interests of each sex (Brannon, 1999). The sustainability of socialising messages about gender roles is also determined by their form, contained in the structure of family life, (social) relationships within the family, patterns of behaviour, control system, daily practice and interactions. This also applies to adult learning.

Gendered learning of adults and gender approach in adult education

In the late 1960s, searching for the answer to the question concerning the sources of male domination, researchers, influenced by women’s movements, rejected the understanding of gender as an unchangeable natural fact and defined it as a social fact, and as a process in which the meanings associated with it are created in personal, political, historical, cultural and linguistic contexts (Bradley, 2007). Gender pattern has become more a

feature of the interaction/situation than a feature of the individual. The subsequent stage was to challenge the homogeneity of the 'female' and 'male' categories and to explore their different social meanings. Acknowledging that the definitions change with the social context, they are no longer considered as universal categories on the basis of which specific gender relations are constructed, and the social processes that constitute them are considered to be identical to processes that produce differences between women and men (Bussey & Bandura, 1999).

Research shows that gender plays a major role in the ways that people function in adulthood and in the nature of the challenges undertaken by them (Bem, 1993; Johnson-Bailey, 2005; Oesterle et al., 2010; Schoon, 2015). The process of defining, constructing and conditioning education and learning is also gendered (Dybbroe & Ollagnier 2003; Merrill, 1999), as well as socially constructed developmental standards, strategies for dealing with crises, experiences and biographies (Brannon, 1999; Mandal, 2008; Ollagnier, 2013). As gender is an important perspective of understanding and giving meanings to everyday life by women and men, the research focused on the construction of gender could build a theory grounded in real men and women's experiences and their language.

However, until recently there have not been enough gender questions in most adult education discourses (Dybbroe & Ollagnier, 2003). As Ollagnier (2008) states,

> It is reasonable to ask to what extent learning, throughout childhood to adulthood and particularly when occurring in training programmes, can significantly change the way in which an adult is recognised by his or herself, by relatives and friends or by the society in which he or she evolves (p. 19-20).

Following that statement, the situation has become to change in the late 1990s, especially in the English-speaking world research in which it was underlined not only the specificity of women in adult education but also gender differences in general in the elaboration of appropriate educative strategies (Leathwood & Francis, 2006; Ollagnier, 2008). The major themes relative to gender in adult education literature in the past years have been focused on feminist pedagogy, the hidden curriculum, the classroom climate, women´s silence, women´s voices and collaborative learning (e.g. Hayes & Flannery, 2000; Johnson-Bailey, 2005; Ostrouch-Kamińska & Vieira, 2016) as well as men´s learning (e.g. West, 2003, 2008; Foley et.al., 2014; Golding, 2015). According to Bron (2008), most methods which are used by gender researchers in adult education can be defined as ethnographical and interpretative – many of them especially use life history and biographical methods (e.g. Dybbroe & Ollagnier, 2003; Merrill, 2011; Ostrouch-Kamińska & Vieira, 2015). In this way, they can reveal the process of 'doing gender' (West & Zimmerman, 1987) to emphasise the different ways of experiencing the world by women and men. However, not only qualitative methods are used to explore the different worlds of adult women and men's education but in many quantitative studies, gender is treated mostly as a variable differentiating research results, which enable to catch the frame of the gendered world of education, but is not enough to better understand how adult women and men develop their relationships and biographies in the contemporary world (e.g. Maksimović et al., 2016; Ostrouch-Kamińska, Fontanini & Gaynard 2012; Endepohls-Ulpe & Ostrouch-Kamińska, 2019). This, of course, reflects the fundamental differences between the two types of research in social science in general and not just in gender research.

In Poland, as in Western adult education, research aimed at differentiating the educational experience of adult women and men began to appear in the late 1990s. Similar research approaches were also applied, in which gender was not treated as a variable in

statistical analyses but as a way of organising experience in the social world. Examples include international biographical studies – Gieseke, Siebers, Solarczyk and Wesołowska (2002) on women's educational experiences in Poland and Germany, Skibińska (2006) on the interpretation of individual micro-worlds of older women: education, work, family and leisure time, distinguished in narrative studies, Mazurek (2013) on educational biographies of women affected by breast cancer, Wojciechowska (2018) on female and male patterns of biography reconstruction in the perspective of professional change, on learning processes of the rebelling women by Szczygieł (2017) and Litawa and Sygulska (2017) on the ways women of different generations perceive and experience adulthood. What is specific about these and other studies in adult education in Poland, which analyse ways of experiencing the world on the basis of gender, is that it is difficult to find a feminist or gender approach as an interpretative perspective. This also applies to family discourse in adult education.

Researching gender in family spaces of adults

The main reason for that lack of gender interpretative perspective in the interdisciplinary field of family research in Poland is because it is dominated by the normative-ideological discourse of knowledge about the family (Nowak-Dziemianowicz, 2002). It reveals a valuation instead of a description, clearly defined objectives mainly concerning its duration, as well as educational functions, models and attitudes. Writing about the pedagogical discourse of the family, Smolińska-Theiss observes that it refers, 'on the one hand, to social reports and, on the other, to the social teaching of the Church' (Smolińska-Theiss, 2014, p. 184), where, in different perspectives, an 'academic description is mixed with religious values and duty' (ibid.). Any deviation or change in the area of family life is considered mainly in terms of dysfunctions, crises and pathologies. This discourse favours the traditional family model, with hierarchical gender- and age-based systems and complimentary roles assigned on a gender basis. This simplified, universal picture of the family avoids, according to the author, 'fundamental, controversial questions about the role and place of the family in the socialisation of children, about the transformations of the modern family, theories and the language used to describe these changes' (ibid.). It also avoids questions about the role and place of the family in the process of adult learning, especially in the emancipation of women and men from the imposed versions of social roles in the family, often based on gender stereotypes.

Meanwhile, in the modern world, a global lifestyle revolution is taking place with the epicentre in the area of privacy and intimacy (Giddens, 1992). The motives for family formation and its continuation are also changing – a transition from normative prescriptions to individual decisions of partners based on mutual attractiveness and emotional closeness, and from family roles, which were the result of assignments, to those resulting from achievement and negotiation, is evident (Beck & Beck-Gernscheim, 2002; Szlendak 2010). New dimensions of the dilemmas related to the disintegration of pre-existing reference systems and role models, as well as traditional determinants that help in the construction of a single biography, are also important for the shape of these roles and family relationships (Beck, 1992; Bauman 2000). As West writes (2008):

> Men and women, mothers and fathers, are renegotiating roles and relationships, at many levels. What it means to be a parent, or for that matter a man or woman, is contested and people are forced to make many more choices about how to raise children and about relationships (p. 70).

In the contemporary family discourse, also found in adult education, the family is not considered as an institution and a basic unit of the social system, but as a space of multifaceted relations, constantly constructed in everyday processes of interaction. In this way, what becomes the aim of the analyses is an understandable and reflective insight into 'the intersubjective experience that accompanies a human being in his or her family life' (Nowak-Dziemianowicz, 2002, p. 46). Examples of problems undertaken in the area of gender research in family spaces of adults in Poland are social micro-worlds of mothers and learning the role of a mother (Pryszmont-Ciesielska, 2013), women's biographical experiences related to motherhood (Sulik, 2017), daughter-mother relationships in biographical research from a feminist perspective (Ostrouch, 2004), intimate relationships of women of different sexual orientation (Grochalska, 2017), men from poor environments (Golczyńska-Grondas, 2004), men's way of experiencing the middle-life crisis and developmental tasks (Chmura-Rutkowska & Ostrouch, 2009), fatherhood in generational perspective (Sosnowski, 2018), a husband as an informal carer of his wife with breast cancer (Zierkiewicz, 2020), daughter-father relationships (Ostaszewska, 2017) and constructing gender equality in marital relation (Ostrouch-Kamińska, 2015).

Informal learning of spouses: An example of gender sensitive research

The above-mentioned research on constructing gender equality in marital relations provides an example of gender-sensitive biographical research in adult education, the aim of which was to find out how gender equality is constructed in everyday life becoming an individual project of a family, how the process of negotiating the shape of everyday life and marital relations is progressing. A dual-career family in the definition by Rapoport and Rapoport (1976) was the studied learning environment of the spouses. This model of a family was chosen on purpose, because in family discourse and research it is often identified with egalitarian type of a family/marriage (Gilbert 1993). Simultaneous engagement of spouses in family and professional life as well as their high and/or prestigious professional positions requires negotiations of the division of tasks and roles. So other working parents *can,* but dual-career spouses *have to* negotiate and (re)construct the shape of their relations within the family in the process of learning (from) each other.

Specifying the criteria of selection the interviewees I used the definition of abovmentioned dual-career family. During several meetings I conducted twenty in-depth biographic interviews separately with women and men, who were at the age of between thirty two and forty seven, highly educated and professionally active (full time job, high status: academics, lawyers, managers – executive officers, business owners, psychologists, doctors), who lived in cities, had been in relationship for minimum three years, had children and lived with them (Ostrouch-Kamińska, 2015). Trying to reach the understanding and reflective insight in intersubjective family experience, I refered to the foundations of phenomenology of the family (Klein & White, 1996, p. 106-109).

According to Kaufmann (2001), conducting research into the sociology of the couple, a contemporary couple (spouses) and the relationship between them are becoming increasingly important in human biography. Permanent and informal interactions in marriage lead to the third type of socialisation, apart from primary and secondary socialisation, which is marked by creating a part of identity in a collective form. Marriage proves to be a space of three spheres of influence concerning identity: her, his and a common identity – 'the marital self' (Kaufmann, 2001; Ostrouch-Kamińska, 2017).

Przybylska and Wajsprych (2018) or Petriglieri (2019) provide a similar description of marriage as a space for constructing a new 'self'. Berger and Kellner (1964), situate

such a process in a biographical experience. According to the authors, families generate their intimate, individual meanings, which usually do not reveal themselves outside the family, and which are built by family members based on their shared history, perspective and interpretation of events. Within each micro-world, which also includes the family, there are certain assumptions and constructions of meaning to control and build experiences. The family sphere includes the sense of sharing both history and the future, as well as the sense of 'having a biography'. Therefore, entering into marriage implies a process of 'fusion of biographies', in which not only are common experiences beginning to be shared, but also ways of their constructing, understanding and explaining (Klein & White, 1996). Here understanding is a particular form of experience in which, as Schütz (2008) wrote, 'common sense thinking gets to know the socio-cultural world' (p. 9) as a result of the learning process.

Gender equality and partnerships within the family, in different meanings and scopes, was such a 'result' of the learning process in my research. In this article it is not my intention to present the research results, but to emphasise the potential of using gender filter in researching family life of adults. When a woman and a man enter into the aforementioned marital, biographical fusion, they bring to the common relationship education, aroused cognitive curiosity, axiological capital in the form of the ethos of work and personal development and the conviction of the power of one's own actions. They also bring a specific concept of being a woman and a man in a relationship and in a role, which is established in the trajectory of life. In a process of learning gender equality and partnerships within the family, in their daily interactions, they modify them through participation in processes in which they together construct situational experience and transform it into knowledge, skills, attitudes, beliefs, values, emotions, senses and meanings and integrate it into their own biography (Gutowska, 2013; Ostrouch-Kamińska, 2017).

By adopting the gender filter, it was possible to grasp what a certain piece of reality (in this case gender equality) is for/in the experience of women and what it is for/in the experience of men. My research has shown that in dual-career family, women seem to go far beyond the generic, stereotypical pattern of female devotion to more subjective relationships, based on respect and dignity of both sides of the relationship, self-development and out-of-home activity, as compared to men – modifying it in the sphere of emotions and power relationships within the family. According to the results (Ostrouch-Kamińska, 2015), the partnership appears to be a highly complex construct reaching far beyond classifications related to power relations, domination, responsibility, role specialisation or emotional equality; a construct which seems to be a 'map' rather than a linear definition of gender equality; a construct based on the feeling of spouses' gender equality rather than its objective existing, and different for different interviewees. What is common to all spouses is the fact that it becomes a central part of the new, marital identity, which is constantly being constructed in the various dimensions of everyday life related to the professional sphere (and space of earnings, career, support, prestige and social recognition) and the sphere of private life (with spaces of sharing household duties, parenthood and marital relations). Its processual nature, its opposition to the dominant, stereotypical definitions of the roles of women and men in the family and also often to the individual, biographical achievements of the spouses, require them to develop reflective criticism and reflectiveness – a constant analysis of the reality of their own lives, initiating and deepening their self-understanding (Skolnick, 1992; Beck, 1992).

With reference to andragogical theories emphasizing the processional dimension of learning embedded in a broad socio-cultural context, family learning in the marital relation is related to everyday experience and the biographical formation of one's own

identity in the process of (self-)reflection. Reflection and self-reflection become the basis for biographical learning, which emphasises, as Alheit states, 'learning as a (trans)formation of structures of experience, knowledge and action in the context of all aspects of people's lives and the reality around them' (Alheit, 2002, p. 65). Biographical knowledge, i.e. knowledge that has been experienced and realised, here becomes transformative knowledge, turning individuals into the ones that are transformed, depending on the changing life situation (Solarczyk-Szwec, 2015). What makes it difficult for both women and men to redefine the concept of gender roles in the family and to turn to partnership are the gender-stereotyped culture and patterns of family of origin rooted in that culture that influence the petrification of generic dichotomies.

Conclusion

An indispensable element of modern human life that enables adaptation to changing living conditions is the constant negotiation of everyday reality, analysing the circumstances of one's own life and learning in the course of one's own experience in everyday interactions (Illeris, 2002; VanEvery, 1999). The studies cited above show that the existence of modern families, especially those attempting to build, on the everyday basis, their own relationships in a way differing from those experienced in the families from which they originate, is linked to a process of constantly negotiating the shape of the family everyday life; an elusive process, often impossible to settle within a specific framework, conditioned by the individual experience of family members.

The gender approach in family research on adult education makes gender not only a differentiating factor in the experiences and biographies of women and men but also an important filter of interpretation, defining the perspective of understanding and meaning. This provides an opportunity to capture the changes in modern societies. It is one of the available forms of deepening and broadening the knowledge about what has been established so far and the importance of gender for the social functioning of women and men. It can be a source of new research methods to analyse the role of cultural scripts determining the place of women and men, as well as to analyse socio-political phenomena, their transformation and the processes of adult learning inherent to them (Bron, 2008; Titkow, 2011).

The gender-specific way of experiencing the social world, reflecting not only the biological but, above all, the social and cultural nature of differences between men and women, is the main framework in gender-sensitive research for the analysis and interpretation of the data obtained. The meanings attributed by adult learners in research on the family environment, e.g. marriage, motherhood and fatherhood, relationship with parents and aging allow insights into tacit, 'hidden knowledge' (Gubrium & Holstein, 1990) concerning the family relations of women and men with a focus on a different perception and way of experiencing the same activities on the basis of gender; knowledge not available in direct experience but it is revealed in everyday activities and the structure of family relations. This shows that the gender approach in researching family life and (informal) learning in adult education represents an important perspective for constructing a better understanding of the surrounding world and its processes, including adult learning processes.

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The role of informal learning in adults' literacy proficiency

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Abstract

This study used the Programme for International Assessment of Adult Competencies (PIAAC) dataset to examine informal literacy learning's effects on adults' literacy proficiency. Also, the factors associated with informal literacy learning at and outside of work were studied. The study participants were Nordic adults aged 35–65 years. The statistical method was regression analysis, and the results indicate that informal literacy activities at work are associated primarily with occupation, and informal literacy activities outside of work with education, parents' education and gender. Initial education, occupation, language background and age exerted the strongest estimated associations with reading literacy proficiency. Informal learning, particularly reading outside of work, exerted a statistically significant effect independent of adults' backgrounds, indicating that it may offer all adults the opportunity to develop literacy proficiency.

Keywords: Adult literacy, informal learning, reading activities, work

Introduction

Literacy is one of the key competencies needed for lifelong learning; it is a significant component of personal development, employability, social inclusion and active citizenship throughout an individual's life. Moreover, literacy also contributes to active aging, which refers to aging individuals' autonomous and independent participation in

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social, economic, cultural and civic affairs (Barabasch, Dehmel, & van Loo, 2012; Council of the European Union, 2018; World Health Organisation [WHO], 2002). Particularly in modern knowledge societies, solid literacy skills are necessary in many situations related to education, work and citizenship. From a lifelong learning perspective, literacy can be viewed as an essential competency in such situations. However, literacy also needs to be conceptualised as a lifelong learning goal (e.g., Binkley, Erstad, Herman, Raizen, Ripley, Miller-Ricci & Rumble, 2012). Considering that the technologies related to literacy, as well as literacy requirements, constantly are changing, and given such technologies' rapid growth over the past two decades, lifelong literacy learning (Leu, Kinzer, Coiro, Castek & Henry, 2013) is a challenge that many adults and younger people face today. In many ways, digital literacy is different from traditional literacy and may challenge, and even reform, practices in many areas of life, including adult education (Wildemeersch & Jütte, 2017).

Adult literacy studies have shown that initial formal education is key to the development of reading skills, but that its role is difficult to compensate for (Desjardins, 2003; Green & Riddell, 2012; Organisation for Economic Co-operation and Development [OECD], 2000, 2013a; Sulkunen & Malin, 2018). Gustafsson (2016) concludes that many of the age differences in literacy proficiency derive from cohort effects related to schooling. Similarly, the positive association between parents' education and adults' literacy proficiency is suggested to be indicative of the home environment supporting individuals educating themselves (Desjardins, 2003; Green & Riddell, 2012). While early education provides adults with a foundation for lifelong learning of literacy, it is hardly possible for formal education alone to cater to changing literacy needs throughout an individual's life, as many adults face new literacy challenges decades after completing formal education. Lifelong learning complements early education (Desjardins, 2003, p. 237), as adults must update and develop their literacy skills continuously.

It often has been assumed that the main type of lifelong learning, whether related to literacy or other areas, is adult education and training. In its many forms, adult education can help adults maintain and develop skills, as well as delay age-related declines in proficiency (OECD, 2013a). However, even in countries with high participation in adult education, such as Nordic countries, the participation rate in formal adult education that leads to formal qualifications does not exceed 20% (Sulkunen & Malin, 2014). Nonformal adult education is also popular; it involves organised activities, but does not lead to a new qualification (OECD, 2005). This type of learning is not necessarily related to literacy and, thus, does not contribute to adults' literacy proficiency in general. Even literacy programmes may result in only limited proficiency gains (Alambrese, MacArthur, Price, & Knight, 2011; Reder, 2009; Sabatini, Shore, Holtzman, & Scarborough, 2011). However, some studies have discovered literacy gains attained from basic skills programmes implemented with the broader aims of social inclusion (de Greef, Segers & Verté, 2012; de Greef, Verté & Segers, 2015). These studies report improved reading and writing mastery, as well as engagement in literacy in everyday contexts. Thus, the results reflect increases not only in functional skills, but also in participation in adults' surroundings.

However, adults' literacy proficiency also develops outside formal and nonformal educational settings. Informal learning that occurs through daily activities at work and during leisure time (OECD, 2005) should be considered as well. Studies conducted with adolescents have shown that their use of literacy in various contexts offers them self-generated opportunities to practise and develop their proficiency, and that these opportunities may be equivalent to several years of formal education (Guthrie & Wigfield, 2000). Similarly, informal learning activities also may play a role in adults' literacy

learning, both at and outside of work (Australian Bureau of Statistics, 2007; Desjardins, 2003; Livingstone, 2000). Desjardins (2003) showed that although individually, activities at and outside of work make limited contributions to adults' reading literacy proficiency, when combined, these activities' impacts can outweigh those of formal education. In most countries, informal learning's total effect on reading literacy complements that of formal education (ibid.). Also, in a more recent study on problem solving in technology-rich environments, Desjardins and Ederer (2015) concluded that using skills in informal contexts is associated with proficiency, more so at work than outside the workplace, in Norway and Finland.

This study examines informal literacy learning's effect at and outside of work on adults' literacy proficiency using a dataset collected by the OECD's Programme for International Assessment of Adult Competencies (PIAAC), in which literacy assessment was limited to reading literacy and was defined as 'understanding, evaluating, using and engaging with written texts to participate in society, to achieve one's goals and to develop one's knowledge and potential' (OECD, 2012, p. 20). The definition suggests that using literacy, i.e., engaging with texts, is an essential part of reading literacy, as it provides opportunities to maintain and develop proficiency (ibid.). However, opportunities for using these skills are not the same for all adults, but rather depend on their social conditions, as discussed below. Related to this, we also examine which factors are associated with informal literacy learning.

In this study, we focus on adults in Denmark, Finland, Norway and Sweden, which have high average literacy proficiency levels (OECD, 2013a, 2015). Moreover, Nordic countries' societies and educational systems share numerous features (Mellander & Anderssen, 2015). This study examined adults aged 35–65 years, an age range that was chosen for two reasons. Adults within this age range are likely to have had opportunities to develop their literacy proficiency in informal and nonformal contexts after completing their initial formal education. Furthermore, they are in a phase of life during which maintaining competencies lays the foundation for active aging (WHO, 2002). The current study will contribute to an understanding of the factors affecting literacy proficiency, particularly informal learning's role in various contexts.

Reading activities as informal literacy learning

This study examines engagement in reading literacy activities as informal literacy learning. Informal (literacy) learning can be characterised as incidental learning. Marsick and Watkins (2001, pp. 25–28) state that informal learning occurs when people have 'the need, motivation and opportunity' to learn. However, informal learning is often unintentional (see also Eraut, 2000; Marsick, Watkins, Callahan & Volpe, 2008) or even unconscious; then it takes place without a learning goal (Tjepkema, 2002; see also Carliner, 2012). According to Schugurensky (2000), informal learning can be categorised into three types based on learning intention and consciousness levels: self-directed learning; incidental learning; and tacit learning. Self-directed learning is intentional and conscious; the participant wants to learn something and is aware of having learnt something. Incidental and tacit learning are unintentional, as no explicit learning goals exist. However, incidental learning is conscious as the learner is aware of having learnt something. Tacit learning is unconscious as the learner remains unaware of the learning.

According to current social theories on literacy (Barton, 2007), literacy activities are situated and embedded in larger social practices. Thus, multiple literacies exist, varying by life domains (Barton, 2007). Also Reder (1994) suggests that the situations in which

literacy is used shape literacy. While individual cognitive processes can be generalised across contexts, literacy activities at work differ from those outside of work. Thus, opportunities for informal literacy learning also vary by context. Informal learning during leisure time has been shown to play a role in the development of literacy proficiency, particularly among unemployed adults (Cameron & Harrison, 2012) who lack the opportunity to learn at work. Taylor (2006) also showed that work is only one context for informal literacy learning, as adults' literacy learning is situated in and driven by their other life roles (e.g., as parents or community volunteers), learning environments (e.g., home, library, church) and everyday literacy activities.

According to studies on reading activities among US adults (Smith, 2000; White, Chen, & Forsyth, 2010), work provides more opportunities for reading than leisure time. Adults spent more time reading on workdays than on non-working days, although they engaged in the same number of reading activities at work as they did at home (Smith, 2000). These studies also found that reading activities at work and during leisure time differ: Prose dominated leisure reading, while work reading is dominated by quantitative literacy tasks and genres (e.g., lists, forms and tables) (White et al., 2010) or by functional, inspirational or miscellaneous materials (Smith, 2000). However, most reading activities at and outside of work do not challenge adults' proficiency levels. In Smith's study (2000), 89% of reading activities at home required little or no effort. Even at work, only 31% of reading required a high level of effort. This suggests that a majority of the participants' reading activities were routine.

However, work-related reading activities are associated with literacy proficiency. For example, Mellander (2014) showed that work experience has a relatively weak, but positive, relationship with literacy proficiency in Nordic countries. He concluded that the possibilities to make up for a lack of initial education through work experience (i.e., by learning at work) are limited, but not insignificant. Albaek, Fridberg and Rosdahl (2014) examined the relationship between occupation type, skill use at work and literacy proficiency, and found that the proficiency level was higher in the occupational groups that used their skills frequently – a finding that held across all age groups. However, it is evident that the relationship between literacy proficiency and occupation is not a simple, causal connection, but rather a more complex one. Different occupations have different literacy requirements, and it is likely that adults with low literacy proficiency only find employment in occupations with low requirement levels. Moreover, occupations differ in the frequency and diversity of literacy activities. Therefore, work-related informal literacy learning opportunities also tend to differ. For example, Athanasou (2012) examined blue-collar Australian adults who work with machinery; these adults had a lower modal level of literacy proficiency than adults in other professions. However, while the workers' literacy proficiency may have been low when entering the trade, it is possible that these occupations offer limited opportunities for literacy learning at work, as they involve mainly routine literacy tasks.

Varying literacy activities in different occupations highlight how adults' opportunities for informal literacy learning are not the same for all adults. These opportunities also vary by age, educational level and gender (Mellard, Becker, Patterson, & Prewett, 2007; Smith, 1996, 2000; Sulkunen, 2002). All these studies dealt with print reading activities, but adults' reading activities are likely to have changed in the past few decades due to technological developments (Leu et al., 2013). Since the turn of the millennium, the most notable change in literacy is the ubiquity of Internet-based and digital texts. The Internet has become the most popular form of media among 18- to 30-year-olds, who use it mainly to access social media, for entertainment outside of work and for information searches for school and work (Findahl, 2012; Herkman & Vainikka,

2012). Young adults actively use the Internet, and working-age adults access it frequently as well. For example, in Finland, Internet use is 90% or higher for all adults except those aged 65 and up (Statistics Finland, 2015). This suggests that a clear difference exists in digital literacy use between working-age adults and those in retirement. However, age has been shown to be a major contributor to skill development among working-age adults as well (Desjardins & Ederer, 2015; Sulkunen & Malin, 2018).

Generally, it appears that using these skills at and outside of work supports the acquisition of new literacy practices, especially considering that, up to now, Internet skills have not been taught in schools and usually have been learnt in informal contexts (Desjardins & Ederer, 2015; Leu et al., 2013). However, adults of all ages also must consider adapting to digital literacy, as governmental authorities, banks and other organisations increasingly are offering their services primarily online. This is important for active aging, i.e., elderly adults' autonomous participation in social, economic, cultural and civic life (WHO, 2002).

Research questions

This study aims to examine informal literacy learning's role in reading literacy proficiency among adults aged 35 to 65 years in Denmark, Finland, Norway and Sweden. Specifically, the study addresses the following questions:

- Which factors are associated with Nordic adults' informal literacy learning at and outside of work?
- What kind of association does informal literacy learning have with Nordic adults' literacy proficiency?

For the first research question, we hypothesised that adults' opportunities for informal literacy learning vary based on several factors related to their social conditions. At work, we expected that opportunities would be related primarily to occupation type (Albaek et al., 2014). Outside of work, we expected that education, gender and age would be associated with literacy activities (Mellard et al., 2007; Smith, 1996, 2000; Sulkunen, 2002). Regarding our second research question, we hypothesised that informal learning is associated positively with literacy proficiency (Desjardins, 2003; Livingstone, 2000; also Desjardins & Ederer, 2015). Moreover, we expected that informal literacy learning at work would have a stronger relationship with literacy proficiency than literacy learning outside of work, as the workplace offers more opportunities for reading than leisure time (Smith, 2000; White et al., 2010). In the context of problem solving in a technology-rich environment, Desjardins and Ederer (2015) have shown that informal learning's role at work has a stronger relationship with proficiency in Nordic countries than outside of work.

Method

Sample

Our study employs data from the OECD's Survey of Adult Skills (PIAAC) Round 1, which was conducted in 2011–2012 in 24 countries. The data comprise nationally representative samples of adult populations (aged 16–65 years) in the participating countries, with a total sample size of around 160,000. The samples include 7,328 adults

from Denmark, 5,464 from Finland, 5,128 from Norway and 4,469 from Sweden. Here, we focus on the subsample of 14,604 Nordic adults aged 35–65 years, comprising 64% of the total Nordic sample. The country-specific subsamples include 5,194 adults in Denmark, 3,525 in Finland, 3,061 in Norway and 2,824 in Sweden.

Procedures

In our analyses, we proceeded in two phases. First, we examined background factors that would explain the variation in individuals' informal learning activities. The statistical approach was linear regression analysis. Based on previous research (cited above), we included age, gender, education, occupation and parental education as explanatory variables in the analysis. In addition to these, we considered individuals' linguistic backgrounds (i.e., whether or not an individual is a native speaker of the PIAAC testing language), which are associated with reading literacy proficiency (OECD, 2013a).

Second, we examined the association between individuals' informal literacy learning activities at and outside of work, and their literacy proficiency, as measured in the PIAAC test, by fitting a linear regression model on PIAAC literacy scores. In this analysis, we controlled for the background variables mentioned above, as well as individuals' recent participation in formal or nonformal adult education or training (AET).

We employed pooled data from four Nordic countries in all analyses, i.e., we fitted regression models to explain variations in reading literacy proficiency to one four-country data set. However, because the average proficiency level varied among the countries, we also added the country effect in all models because omitting the mean differences among the countries might distort the estimated regression coefficients. We started analyses by testing the significance of interactions between these countries and all other explanatory variables in the models. Significant interactions would indicate that the regression models cannot be viewed as equivalent in all four countries. We observed a few significant interactions, but a closer examination showed that the differences between countries actually were small and gave no reason for fitting separate models for the four countries. The differences between countries appeared only in some estimates' magnitudes, and they were found to be statistically significant mainly due to the very large data set. As the model-effect interpretations remained similar in every country, despite the interactions, we decided to proceed with simple models without interaction effects.

Instruments

In PIAAC, adults' proficiency was measured through a non-timed reading test comprising various everyday texts and attached items. The test was implemented primarily as a computer-based assessment, but a paper-and-pen option was available for participants who were unable to take the test on a computer. The items in the computer-based test were coded automatically (OECD, 2013b).

The PIAAC data include two continuous indices measuring reading engagement: use of reading skills at and outside of work. We used these indices as measures of informal literacy learning. The latter includes non-work-related reading activities at home and in everyday life, including academic studies. Both indices comprise eight items. The respondents were asked how frequently they read different types of materials, including both print and digital formats. The choice options included directions or instructions; letters, memos or emails; articles in newspapers, magazines or newsletters; articles in professional journals or scholarly publications; books; reference manuals or materials; bills, invoices, bank statements or financial statements; or diagrams, maps and

schematics. The engagement frequency in each reading activity was rated on a five-point scale, ranging from 'never' (1) to 'every day' (5). Those who were unemployed at the time of data collection responded to the questions about reading at work on the basis of their most recent job. The items were combined into the indices using the item-response theory methodology (OECD 2013b, 41–43). The indices were transformed to have a common scale with a mean of 2 and a standard deviation of 1 across the 24 countries in PIAAC Round 1. In our Nordic subsample, reading at work registered a mean of 1.7 and a standard deviation of 1.5, and reading outside of work registered a mean of 2.2 and a standard deviation of 0.7. Their correlation was 0.29.

As a measure of respondents' formal and nonformal learning activities, respondents were asked whether they had participated in formal or nonformal AET during the 12 months preceding the survey. Thus, compared with PIAAC's measures of informal literacy learning, these measures are very simple.

The respondents' initial formal educational backgrounds were measured using the highest education level completed. Parental educational background was categorised into three groups: neither parent completing secondary education; at least one parent completing secondary education; or at least one parent completing tertiary education.

In considering occupational status, we used the following groups (based on the International Standard Classification of Occupations [ISCO]) in the analyses: skilled occupations (ISCO 1–3, e.g., legislators, senior officials and managers, professionals, technicians and associate professionals); semi-skilled white-collar occupations (ISCO 4–5, e.g., clerks, service workers, and shop and market sales workers); semi-skilled blue-collar occupations (ISCO 6–8, e.g., skilled agricultural and fishery workers, craft and related trade workers, and plant and machine operators and assemblers); and elementary occupations (ISCO 9, e.g., labourers).

Regarding age, we anticipated that the association between age and the response variables may not be linear, so we employed six age groups (35–39, 40–44, 45–49, 50–54, 55–59 and 60–65) as a categorical factor, which in our case is easier to interpret than continuous nonlinear age effect.

Analysis

We performed linear regression analyses for reading indices at and outside of work, as well as for literacy proficiency. In PIAAC, as in most large-scale educational assessments, individual proficiency is estimated using 'plausible values', which are numerical estimates of an individual's 'true' latent proficiency, obtained from a probability distribution estimated for each individual's proficiency based on his/her success on the PIAAC test items and background information (OECD, 2016; see also Rutkowski, Davier & Rutkowski, 2014). In PIAAC, 10 plausible reading literacy values per individual exist. The variation in individuals' plausible values reflects the uncertainty in estimating individuals' latent proficiency through a limited set of test items. To adequately account for this uncertainty, we followed the generally recommended approach to plausible-values data analysis, which is to perform a series of similar analyses with each plausible value as the dependent variable, then average the 10 analytical results using a multiple-imputation methodology to obtain the final result. In our case, this meant that we ran the same regression analysis for each plausible reading literacy value (i.e., only the dependent variable varied) – thereby obtaining 10 estimates of regression coefficients and their standard errors – and combined these into the final estimates to be reported. The standard error estimates were calculated using the design-based jack-knife method, which is used

commonly in analyses of large-scale assessment data sets collected by complex sampling designs. Survey weights were used in all calculations.
The approaches described above are outlined in the PIAAC Technical Report (OECD, 2016), and they are implemented in the SAS® macro-package PIAAC Tool (Denis, 2014) provided by the consortium to be applied specifically to analyses of PIAAC data. The package can be downloaded at no cost from the OECD's PIAAC website. We performed all statistical data analyses in this study using the PIAAC Tool.

Results

The first research question was addressed by fitting linear regression models for the indices measuring use of reading skills at and outside of work. The estimated models are presented in Table 1. We fitted the models to the pooled four-country data, controlling for the between-country mean differences in the dependent variables by having country as a categorical factor in the model.

Table 1. Regression models for reading at and outside of work in four Nordic countries. Beta = standardised regression coefficient

	Reading at work (n=12,130)				Reading outside work (n=12,218)			
R-squared	0.24				0.14			
	b	se(b)	p	beta	b	se(b)	p	beta
Intercept	0.08	0.11	.934		1.72	.05	<.001	
Country								
Denmark	-.17	.03	<.001	-.05	-.02	.02	.266	-.01
Finland	-.19	.04	<.001	-.05	.10	.02	<.001	.06
Norway	-.04	.03	.265	-.01	.21	.02	<.001	.11
Sweden (ref)								
Age								
35-39	.75	.05	<.001	.18	.00	.02	.881	.00
40-44	.76	.05	<.001	.19	-.04	.02	.054	-.02
45-49	.82	.05	<.001	.21	-.02	.02	.429	-.01
50-54	.81	.05	<.001	.20	-.01	.02	.764	-.00
55-59	.71	.05	<.001	.17	-.00	.02	.924	-.00
60-65 (ref)								
Female	-.21	.03	<.001	-.07	-.09	.01	<.001	-.06
Native language background	.23	.04	<.001	.05	.03	.02	.172	.01
Education								
Higher	.50	.05	<.001	.16	.47	.03	<.001	.31
General secondary	.36	.06	<.001	.08	.36	.03	<.001	.15
Vocational secondary	.31	.04	<.001	.09	.23	.03	<.001	.14
Basic (ref)								
Highest parental education								
Tertiary	.02	.03	.539	.01	.18	.02	<.001	.10
Secondary	.03	.03	.220	.01	.08	.02	<.001	.05
Below secondary (ref)								
Occupation								
Skilled	1.27	.07	<.001	.42	.22	.04	<.001	.15
Semi-skilled white-collar	.83	.06	<.001	.24	.15	.04	<.001	.09
Semi-skilled blue-collar	.51	.08	<.001	.14	.08	.04	.046	.04
Elementary (ref)								

Almost all model parameters in Table 1 were highly statistically significant, which is not surprising given the amount of data involved (more than 12,000 individuals, after excluding missing data). The examined variables' explanatory power was higher for reading at work (R-squared 24%) than for reading outside of work (R-squared 14%). Thus, it seems that there are more unobserved factors (e.g., personal characteristics) associated with reading outside of work than with reading at work, which depends more on background variables – age, gender, educational level and occupation in particular.

Skilled occupations were particularly strongly associated with reading activities at work. Educational background typically is correlated with occupation, but it is still worth noting that highly educated respondents tended to read at work more than others, even

when their occupation was controlled. The differences between age groups were minor, except for the oldest group, which was at a remarkably lower level than all others. With other variables controlled, male respondents read more than females on average, although the difference was small. The same goes for respondents tested in their native languages.

Regarding reading outside of work, respondents' educational level played a more important role than occupation, which is understandable considering that leisure-time reading is not determined directly by occupation. Consequently, cultural and educational background factors appeared to be more important determinants of reading engagement. This also can be seen with parental education, which was associated significantly with reading outside of work, but not with reading at work. The age group differences in reading outside of work were non-existent, i.e., no age group reads, on average, more actively during free time than other groups. Again, on average, males read slightly more than females to a statistically significant degree.

The estimated regression model for reading literacy proficiency is presented in Table 2. Again, almost all model parameters were highly significant. The model explained 37% of the variation in individuals' proficiency scores. According to the standardised regression coefficients, language background, high initial education and skilled occupation had the strongest estimated associations with reading literacy proficiency. There was also a tendency for average reading literacy level to decrease with age. Gender did not play any important role here.

Of the two indices measuring reading engagement, reading outside of work had a stronger association with proficiency than reading at work. The standardised coefficients of participation in formal and nonformal AET variables were smaller than those of informal literacy learning variables. However, the negative coefficient of formal AET (with other variables controlled) is worth noting.

Table 2. Regression model for reading literacy proficiency in four Nordic countries. Beta = standardised regression coefficient.

	Reading literacy proficiency (n=12,109)			
R-squared	0.372			
	b	se(b)	p	beta
Intercept	179.6	4.0	<.001	
Country				
Denmark	-11.0	1.2	<.001	-.09
Finland	3.0	1.2	.018	.03
Norway	-5.6	1.3	.<.001	-.04
Sweden (ref)				
Reading at work	2.4	0.4	<.001	.07
Reading outside work	9.4	0.8	<.001	.14
Participation in formal AET	-7.3	1.4	<.001	-.04
Participation in non-formal AET	3.6	1.2	.003	.04
Age				
35-39	25.8	1.8	<.001	.19
40-44	22.8	1.5	<.001	.17
45-49	17.9	1.4	<.001	.14
50-54	12.6	1.5	<.001	.09
55-59	6.5	1.5	<.001	.05
60-65 (ref)				
Female	-3.7	1.0	<.001	-.04
Native language background	33.9	3.2	<.001	.23
Education				
Higher	26.3	1.6	<.001	.26
General secondary	19.9	2.1	<.001	.13
Vocational secondary	7.8	1.4	<.001	.07
Basic (ref)				
Highest parental education				
Tertiary	10.7	1.3	<.001	.09
Secondary	4.2	1.1	<.001	.04
Below secondary (ref)				
Occupation				
Skilled	20.2	2.5	<.001	.20
Semi-skilled white-collar	10.7	2.4	<.001	.09
Semi-skilled blue-collar	4.1	2.4	.096	.03
Elementary (ref)				

On the whole, Table 2 suggests that the reading activities in informal contexts, particularly outside of work, can contribute to adults' literacy proficiency significantly, independent of educational level and occupational status. Still, background variables such as initial formal education, occupation type and language background are associated more strongly with proficiency. When we fitted a regression model with the background variables only (i.e., with no reading at and outside of work and participation in formal and nonformal AET), the model explained 35% of the variation. In other words, omitting these lifelong learning variables decreased the R-squared by only two percentage points. Of this decrease, reading outside of work alone contributed 1.9 percentage points. Thus, the importance of reading at work, as well as participating in formal or nonformal AET, is minimal, especially when individuals' educational, occupational and language backgrounds are controlled, along with their leisure-time reading activities.

Discussion

This study focussed on informal literacy learning's role in reading literacy proficiency. First, we started by examining factors associated with Nordic adults' informal literacy learning at and outside of work. As expected, Nordic adults' opportunities for informal literacy learning vary by their social conditions and individual experiences. These findings are consistent with earlier research, discussed in detail below, and with social theories that emphasise that literacies vary from one situation and context to the next (Barton, 2007). The explanatory power of the model for reading outside of work was smaller than for reading at work. Thus, informal literacy learning outside of work seems to depend less on an individual's background factors included in this study, such as age, education and occupation.

The relations between background factors and literacy learning were not exactly similar at and outside of work. As hypothesised, reading at work was related strongly to occupation type: Adults with skilled occupations seemed to read more at work than the others, which is consistent with previous research. For example, according to Albaek et al. (2014), Nordic adults working as legislators, senior officials, managers and professionals read at work more than those in sales, services and machinery. When other background factors were controlled, education and age still played an independent role in reading at work. Interestingly, adults aged 60−65 read less at work than younger adults.

However, for reading outside of work, adults' initial education was the main determinant of informal literacy activities. This finding also is consistent with earlier research showing that adults with more education engage in literacy tasks more frequently than less-educated adults (Desjardins, 2003; Smith, 1996). Education has been viewed as playing a role both as a socioeconomic factor affecting life experiences and as a practice-related factor affecting opportunities for developing cognitive skills (Desjardins & Ederer, 2015). However, parental education has been conceptualised as an indication of the home's socioeconomic status (Desjardins, 2003; also Desjardins & Ederer, 2015), which influences individuals' values and choices related to literacy and education, rather than literacy proficiency directly. Thus, it is understandable that parents' education had a significant association with reading outside of work, but not with reading at work.

Slightly unexpectedly, reading outside of work showed no association with age, and the association with gender revealed that men read more than women. In earlier studies (e.g., Smith, 1996; Sulkunen, 2002), older adults have been found to read more than younger adults, particularly newspapers, and women more than men, particularly fiction books. Our findings may result from the fact that in PIAAC indices, various kinds of

reading are combined. Regarding age, which in cross-sectional studies reflects differences between age cohorts (Gustafsson, 2016; Sulkunen & Malin, 2018), and gender, the differences between earlier studies and our results also may derive from changes in reading activities during the past two decades. Much of the earlier research was published near the turn of the millennium and focussed on reading certain print texts. However, due to technological developments, adults' reading activities have changed a great deal (Leu et al., 2013), as the Internet has become the most popular medium, particularly among young adults (Findahl, 2012; Herkman & Vainikka, 2012; Statistics Finland, 2015). These changes also have been reflected in current measures of reading activities; thus, PIAAC indices of reading represent more diverse reading materials than earlier studies – not only print books or newspapers, but also all kinds of print and digital texts, including emails, reference manuals and diagrams.

Second, we examined the relationship between adults' literacy proficiency and informal literacy learning at and outside of work, as well as other known determinants of literacy proficiency. The results showed − as we hypothesised − that informal literacy learning at and outside of work has a positive association with Nordic adults' literacy proficiency. They also showed that the main determinants of adults' literacy proficiency are education, language background, occupation and age. These findings are consistent with determinants of literacy and other cognitive skills reported in earlier studies (e.g., Desjardins, 2003; Desjardins & Ederer, 2015; Sulkunen & Malin, 2018). The independent role of age is in line with Sulkunen and Malin (2018), showing that age exerts a strong effect and exceeds even the role of a formal degree's recentness. Furthermore, parents' education had a positive association with literacy, as it has with other cognitive skills as well (Desjardins & Ederer, 2015). Notably, also in previous studies, informal literacy learning has played a small role in literacy, complementing other factors (Desjardins, 2003; Green & Riddell, 2012).

Previous research has shown that work provides more opportunities for literacy activities than leisure time (Smith, 2000; White et al., 2010), and that work-related reading activities have a stronger association with literacy proficiency than activities outside of work (Desjardins, 2003; Desjardins & Ederer, 2015). In light of these studies, we expected that reading at work would have a stronger association with reading proficiency than reading outside of work, but our results suggested the opposite. The differences between our findings and earlier research may result from different cultural contexts and different operationalisation of reading activities, but it is also worth noting that in our data, the respondents reported reading more frequently outside of work (mean 2.2) than at work (1.7). Here, the response scale was from 'never' (1) to 'every day' (5), offering fewer options than other studies. It is also noteworthy that cross-sectional and correlational studies do not reveal the direction of association causality between literacy proficiency and the factors in the model. For example, while we can assume that literacy activities during leisure time maintain and develop proficiency, the opposite likely also is true: Those who have high literacy proficiency find reading easy and enjoyable and, thus, read more (Guthrie & Wigfield, 2000).

Also, other types of lifelong learning opportunities were included in the study. Nonformal AET had a small positive relationship with literacy proficiency, albeit smaller than that of informal literacy learning, particularly outside of work. This is most likely due to the diverse nature of nonformal learning opportunities, which range from yoga classes to language courses, and have been measured as participation within 12 months prior to data collection. Participation in formal AET – measured in an equally simple way − elicited a small negative effect on the literacy proficiency of adults with similar backgrounds. One explanation may be that adults who participate in this type of education

have low skill levels and need more formal education (Sulkunen & Malin, 2014). As already pointed out, the current study cannot demonstrate any causal connections. Particularly with formal and nonformal adult education, the causal relationship is likely to be from literacy proficiency to participation (Desjardins, 2003), i.e., low-skilled adults participate in formal adult education, and highly skilled and educated adults participate in nonformal adult education (Sulkunen & Malin, 2014).

It appeared that all lifelong learning opportunities, i.e., informal learning, as well as nonformal and formal AET, play only a small role in maintaining and developing adults' literacy proficiency compared with other factors included in the study. Together they explained only 2 percent of the variation in adults' literacy proficiency, with other background variables controlled. The role of reading outside of work alone contributed most of this, emphasising the importance of reading outside of work among lifelong learning. However, comparisons should be made cautiously due to weak measures of nonformal and formal AET. After all, some studies show literacy gains in nonformal basic skill courses (de Greef, Segers & Verté, 2012; de Greef, Verté & Segers, 2015). Overall, this study confirms the results from previous research (e.g., Desjardins, 2003; Green & Riddell, 2012; OECD, 2013a), showing that informal literacy learning, particularly outside of work, complements initial education's effect on literacy proficiency, but does not outweigh its impact or that of other background variables.

This study has some methodological limitations due to data restrictions. First, the PIAAC data are correlational and, thus, do not warrant any causal interpretations. This is highlighted further in that many of the variables studied, such as reading at and outside of work, represent concepts that have a reciprocal relationship with literacy proficiency, i.e., proficient readers enjoy reading and, thus, engage in reading activities frequently, in which they develop their proficiency even further. Second, all measures in PIAAC data used in this study are not equally strong. While reading at and outside of work has been measured using indices summarising several (self-reported) items, measures of nonformal and formal AET merely include information about adults' recent participation in AET. This means that comparisons between informal and nonformal and formal education must be made cautiously. Third, PIAAC measures of reading at and outside of work lack data on time spent reading and the effort required for reading tasks, unlike many other studies (e.g., Smith, 2000; White et al. 2010). Since this information is missing from the PIAAC dataset, it is difficult to fully examine the effects from reading at and outside of work on literacy learning using these data.

Conclusions

The need for lifelong literacy learning currently is pronounced due to contextual changes, particularly the accelerating pace at which digital literacy has become ubiquitous (Leu et al., 2013). For example, in Finland, the most popular uses of the Internet include banking and searching for information on services (Statistics Finland, 2015), reflecting the trend of offering services primarily online. This trend is forcing all adults – including retired, unemployed and less-educated ones – to learn to master new literacy demands. Most adults have had to learn these new literacy skills in informal contexts (Leu et al., 2013; Herkman & Vainikka, 2012). For working adults, work supports and demands the acquisition of new literacies, but outside the workforce, leisure-time reading offers valuable learning opportunities as well. In our study, the less-educated and adults aged 60−65 had low literacy proficiency compared with other groups, reflecting a pronounced need for literacy learning. Lifelong learning also will support active aging, as elderly

adults are expected to live longer independently, which requires good literacy proficiency (Barabasch et al., 2012; WHO, 2002).

Our results suggest that opportunities for informal literacy learning outside of work in particular are associated positively with literacy proficiency. While we cannot draw any causal conclusions, literacy activities outside of work may offer meaningful opportunities for maintaining and developing literacy skills, particularly for adults who are not working, including unemployed (Cameron & Harrison, 2012) or retired adults, and for non-traditional participants in adult education, such as immigrants (Fragoso & Kurantowicz, 2016).

Although reading at work has a weaker association with literacy proficiency than reading outside of work, this study's results do not warrant underrating work-related literacy learning either, but rather indicate that opportunities for literacy learning at work are intertwined with occupation type. This is natural in light of literacy's situated nature (Barton, 2007; Reder, 1994). Different contexts – e.g., professions – offer a range of opportunities to engage in reading activities (Albaek et al., 2014). In some cases, reading activities at work may be frequent and demanding, while in other cases, they are routine, requiring little effort (Smith, 2000), thereby offering limited opportunities for informal learning. Another point to consider is that in many elementary occupations, employees have had low proficiency levels when entering the occupation. This may result in a cycle in which proficiency does not improve, even for those who are employed. Informal literacy activities outside of work also can offer these adults valuable learning opportunities.

Therefore, lifelong learning opportunities outside of work may offer all adults opportunities to complement literacy proficiency achieved earlier in life, but for many adults, a low proficiency level actually may hinder engagement in reading activities and, thus, limit opportunities for informal literacy learning. Thus, a need exists to develop innovative ways to initiate and support informal learning. For example, Schmidt-Hertha and Strobel-Dümer (2013) call for such support of learning processes for the elderly, but this could benefit all adult learners. Furthermore, self-directed informal learning (Schugurensky, 2000) in particular can be realised as self-organised groups for peer support.

Moreover, the boundaries between informal and other types of lifelong learning could be lowered to motivate adults – including non-traditional participants in adult education (Fragoso & Kurantowicz, 2016) – to engage in nonformal and formal learning. However, this also could be the other way around, as nonformal literacy programmes may motivate adults to engage in literacy activities in everyday contexts. For example, literacy programmes with the broader aim of social inclusion targeted at adults who are at risk of social exclusion (e.g., low-skilled workers, immigrants) offer basic skill training using authentic materials and content relevant to learners' daily lives. Studies on the results from these programmes show not only stronger mastery in reading and writing, but also engagement in literacy activities in everyday contexts relevant to adults (de Greef, Segers & Verté, 2012). This, in turn, encourages autonomous participation in social life, supporting the positive interplay between proficiency and engagement.

Digital technology and literacy not only have created the need for lifelong literacy learning (Leu et al., 2013), but also have provided a platform for new spaces and communities for learning (Wildemeersch & Jütte, 2017). Even educational institutions may develop more flexible and open structures to bring them closer to learners and their informal activities. They also could bring learners together and enable support from peers or literacy coaches. New types of structures and concepts that cross the boundaries of different types of lifelong learning would enhance literacy learning among all adults.

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Boosting adults' scientific literacy with experiential learning practices

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Abstract

Working as an interdisciplinary team, from the departments of Education and Biology we organized a short experiential learning seminar followed by a hands-on workshop for the promotion of citizen scientific literacy. Participants were adult lifelong learners enrolled in University programs, and others were adults interested in scientific activities without a motivation towards continuous learning. Through a teaching dynamic based on learning science by doing science, they could make close contact with the research procedures in scientific laboratories and learn about the use of DNA to identify unknown fish species. The data collected about their learning gains in this science literacy experience showed that elder lifelong learners found the basic scientific concepts more difficult to understand than the non-lifelong learners, but were more motivated to engage in science education activities than the latter, which makes them a very interesting potential group to recruit for citizen science initiatives..

Keywords: Citizen science, hands-on lab practice, lifelong learning, science literacy, volunteering engagement

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Introduction

Nowadays, we live in a globalized environment subject to permanent changes. Science describes, interprets, and sometimes drives those changes. In different educational environments, experiential education (Beard, 2018; Lowery & Jenlink, 2019) tries to encourage scientific literacy by relating science to the student's life experiences (Aikenhead, 2006), favoring their active participation in scientific inquiry (Waldrop, 2015), learning science by doing science. In schools or socio-educational spaces, in formal or non-formal education settings, through scientific and informative publications or through digital platforms, what really matters is to design and carry out learning experiences and opportunities to develop the scientific literacy of the population (Cronin & Messemer, 2013; Roth & Lee, 2016). Bypassing the difficulties of managing a shared definition (Liu, 2009), what does seem clear is that scientific literacy focuses on providing scientific knowledge to people, for them to acquire basic skills to understand the progress and impacts that science has on their lives and on the environment, and to develop positive attitudes towards it. It also has the aim of equipping them with the competences necessary to critically analyze science's relationships with their own life experience (Croce & Firestone, 2020; Sharon & Baram-Tsabari, 2020). The very idea of scientific literacy involves teaching science to everyone, without exclusion, so that citizens can build their own opinions based on objective facts and participate responsibly in decision-making processes on issues that affect their lives (Croce & Watson-Vandiver, 2020). The point is that, to solve current social and environmental problems (Hodson, 2003), we need a generation of scientifically literate citizens capable of identifying misinformation, developing inquiry-based habits, feeding curiosity about what happens in social dynamics, and being open-minded (Sharon & Baram-Tsabari, 2020). This, in no case, excludes the educational responsibility of also promoting the scientific literacy of the adult population (Falk, Dierking, Swanger, Staus, Back, Barriault, Catalao, Chambers, Chew, Dahl, Falla, Gorecki, Lau, Lloyd, Martin, Santer, Singer, Solli, Trepanier, Tyystjarvi, & Verheyden, 2016).

Citizen Science is a generic concept that defines the active involvement of the general public in scientific research (Phillips, Ballard, Lewenstein, & Bonney, 2019). Its work dynamics describes the altruistic collaboration of citizens, interested in the most varied aspects of science, around scientific projects (Bonney, Cooper, Dickinson, Kelling, Phillips, Rosenberg, & Shirk, 2009; Miralles, Dopico, Devlo-Delva, & Garcia-Vazquez, 2016; Dopico, Ardura, & Garcia-Vazquez, 2017). Citizen scientists are usually ordinary people with little or none scientific experience, expert amateurs, or retired professionals (Groom, Weatherdon, & Geijzendorffer, 2016). Their previous training does not matter as much as their motivation. In this sense, a good recruitment strategy contributes to create a stable group of motivated and committed citizen scientists (Lee, Crowston, Harandi, Østerlund, & Miller, 2018). Motivation, patience, and – let's be honest – some resistance to frustration will be necessary for Citizen Science programs. A research process takes a lot of time and effort to be carried out (Walliman, 2017). The results in science do not appear suddenly. Sometimes it takes a long time before having solid elements that provide evidence or that make a difference. Then, motivated citizens recruited by scientists, following scientific methods, not only collaborate in finding research results, but they also acquire scientific knowledge by developing the research process. As a practical training activity, Citizen Science could be a good resource to boost science literacy.

Mumby, Harborne, Raines and Ridley (1995) pointed out that, despite the lack of scientific training, most citizen scientists obtain satisfactory data sets. However, the

scientific community sometimes challenges the results of Citizen Science, for possible gaps in the accuracy, reliability, and validation of the data (Jiménez, Triguero, & John, 2019). If they rely on the mere collection of samples or data, Citizen Science projects may show some weakness in their contribution to science literacy (Mueller, Tippins, & Bryan, 2011). If citizen participation is limited to data collection (Lukyanenko, Parsons, & Wiersma, 2016), their scientific knowledge does not progress. Citizen Science projects are somewhat more. They become a collaborative work environment between scientists and citizens following a research process in which knowledge is generated and learning skills are implemented. Citizens acting like scientists (proceeding according to the experimental design, contrasting the apparent with the demonstrable...) have stronger positive attitudes toward science literacy. However, if a shared common space of interests and meanings between scientists and citizens is not established, citizens will not find their engagement meaningful or necessary in true research contexts, and their learning potential could be compromised.

In socio-educational environments, Citizen Science experiences obtain good results in terms of improving participants' science literacy (Ballard, Dixon, & Harris, 2017; Saunders, Roger, Geary, Meredith, Welbourne, Bako, & Kunstler, 2018). To citizen scientists, science literacy plays a key role because it enables volunteers to participate in one way or another in the whole research process, in a rich and fluent interchange of open views and opinions with the project researchers (Cooper, 2016). It seems that, when volunteers contribute with valuable information on biodiversity, their science literacy increases at the same time (Cohn, 2008). For Brossard, Lewenstein and Bonney (2005), disclosing information about scientific procedures promotes the scientific understanding of the general public. Even a short training period serves to improve science literacy and self-reported engagement in pro-environmental activities (Kvanvig, 2003; Crall, Jordan, Holfeder, Newman, Graham, & Wallar, 2013). Moreover, the volunteers can transfer the knowledge acquired during Citizen Science projects to other contexts (Jordan, Ehrenfeld, Gray, Brooks, Howe, & Hmelo-Silver, 2012).

The European Commission (EC) framed all intentional learning activities aimed at improving knowledge, skills, and competences within the concept of lifelong learning (EC, 2000). Lifelong learning programs for adults try to satisfy their educational needs by providing learning opportunities that meet their training needs. Although the correlation between age and a decreased motivation to learn has been identified (Marcaletti, Iñiguez Berrozpe, & Koutra, 2018), adults involved in lifelong learning (LL) programs are highly motivated for other activities (Merriam & Kee, 2014), and could be excellent candidates to develop Citizen Science experiences. In the last decades, *mid-lifers* have been increasingly involved in LL initiatives (Davey, 2002; Volles, 2016). Adults join lifelong learning programs because they want to keep on learning (Head, Van Hoeck, & Garson, 2015), and at the same time they receive other benefits, as LL brings along significant improvements to the participants' quality of life and wellbeing (Cooper, Field, Goswami, Jenkins, & Sahakhian, 2010; Field, 2012; Boeren, 2016). In this sense, we wanted to explore the possible advantages of crossing over LL and Citizen Science dynamics.

Understanding science learning as a tool to improve communities (Roth & Barton, 2004), that drives reasoning, critical thinking, and inquiry-based knowledge, the present study is part of a broader multidisciplinary research project in which the aim is to develop tools for the sustainable use of marine resources. The purpose in this part of that larger project was the formation of a Coastal Observation Network of citizens, where occasional help in laboratory tasks for marine species identification would be needed. We therefore wanted to know if LL – here, in the sense of Faure report, lifelong learning is understood

as personal development and fulfillment (Faure, Herrera, Kaddoura, Lopez, Petrovsky, Rahnema, & Ward, 1972) – could facilitate scientific literacy and the transfer of scientific knowledge to other contexts; and if it may serve as a platform for successful recruitment in Citizen Science initiatives. For this purpose, we created two groups of volunteers. In one of them, the participants were involved in the LL program of the University of Oviedo aimed at the general university education of people over 50 (http://www.uniovi.es/en/estudios/pumuo). In the other, the participants were from the general public, not involved in said program. Placing the educational focus on an adult population requires the understanding of how adults approach learning and how they find meaning in new knowledge. This way, we designed a didactic plan in which the main objective was placed on science literacy practices, adjusted to the profile of adult participants (Hippel & Tippelt, 2010; Tsai, Li, & Cheng, 2017). Consequently, we developed a methodology based on experiential learning (Morris, 2019), linked to their own experiences and focused on the environment (Lucio-Villegas, 2016). Thus, an initial short seminar about aquatic biodiversity was followed by a hands-on lab workshop based on Kolb's *here and now* model (Miettinen, 2000), that took advantage of what the participants had already learned about DNA-based species identification in the previous short seminar. That is, the learning experience provided by the previous seminar facilitates the acquisition of new knowledge. In the continuum of the theoretical contents offered in the seminar and the practical activities developed in the workshop, keeping the key concepts fresh could contribute to the success of experiential learning.

Materials and methods

Sociological data and samples

This experience was carried out in Asturias (Europe-Northwestern Spain). The call for participation was opened in six cities/villages of the region. Announcements, explaining the nature and purposes of the project to form a Coastal Observation Network of volunteers to develop a Citizen Science initiative, were published on media and regional fisher associations, diving clubs, and environmental agencies. The adults enrolled in LL programs of the University of Oviedo were directly invited to join the activity. The University of Oviedo offers two different lifelong learning programs in Asturias: one based on trimestral courses in different cities of the region, and one two-term (year-long) Program for Mature Students. Both programs publicized the call to this Lifelong Education initiative. The call was specifically addressed to persons without experience in molecular biology.

The first phase of the Citizen Science recruitment was a short open seminar about aquatic biodiversity. In the second phase, the participants were invited to attend a free 4-hour laboratory workshop in the University of Oviedo. They were informed about the workshop content: practical lab work on DNA and its use for distinguishing between similar species, which is very important in natural sciences. The names and contact emails of potential participants in the workshop were collected *in situ*. The participants were contacted via e-email and assigned to one of the three workshop editions organized. In each edition, we gathered the same amount of lifelong learners and general public, trying to distribute the participants in three similar groups in terms of diversity of age, sex, and previous scientific knowledge.

Short seminar/Concrete Experience

The duration of the seminar was one hour. First, a short presentation supported by PowerPoint slides took place for approximately 15-20 minutes (*circa* one slide/minute). To make it easier for the participants to balance their experience and their understanding of the didactic contents, these were presented in a sequenced way: I) Introduction to the biodiversity, focused on aquatic ecosystems; II) Local fishing resources; III) Difficulties of distinguishing fish *de visu*; and IV) Use of DNA to identify the species in unclear cases. The examples were focused on fish because fishing is an important resource in the region, and because many new fish species that do not appear in nature guides are being introduced in Spain (e.g. Leunda, 2010).

Laboratory workshop

Taking into account the attributes of adult learning assigned by Knowles, Holton III, and Swanson (2015), the experiential learning (Kolb, Boyatzis, & Mainemelis, 2001) driven in the lab workshop of the second phase was based on active experimentation. It was organized in groups of a maximum of 14 participants, in the area of Genetics of the University of Oviedo, at no cost for the participants. In the first part (30 min), an introduction to basic concepts of molecular biology was taught. These were: I) Introduction to DNA, i.e. DNA structure, its location within a cell, its function in inheritance, and its unique sequences that can identify a species and distinguish it from the rest of species; II) Introduction to DNA manipulation, i.e. the rationale for DNA extraction (breaking cells, precipitating DNA in ethanol), and separation of DNA molecules by gel electrophoresis (DNA molecules migrate to the positive pole at different speed depending on their size); III) Introduction to PCR (multiplication of DNA copies by polymerase chain reaction); and IV) Basic safety rules in a laboratory of molecular biology, i.e. equipment and chemicals employed, protection and sterility measures.

Laboratory coats and gloves were worn at all times within the lab. In the first hands-on minutes, the participants explored freely a set of pipettes, tubes, Petri plates, and small materials required for DNA extraction. Only harmless non-toxic products were used for DNA extraction. For the sake of simplicity and to make molecular procedures more familiar to first-time laboratory users, we employed a protocol based on common domestic products: salt, kitchen detergent, and ethanol (Britos, Goyenola, & Oroño, 2004). DNA was extracted from different species of well-known fish in the region: whiting, sardines, brown trout, and rainbow trout. It took approximately 30 minutes.

After DNA extraction, a 1% agarose gel was prepared, adding SimplySafe^{TM} (EURx) for non-toxic DNA staining. DNA aliquots were loaded on the gel by each participant, using micropipettes, and were run by electrophoresis at 100V for 20 minutes. Then, DNA was visualized on the gel in a UV chamber with adequate safety measures. Photographs of the gel were taken, and copies were printed out for the participants. At the end, there was a short computer session dedicated to see chromatograms representing real DNA sequences of a species-specific gene (cytochrome oxidase I, COI), downloading the sequences in FASTA format, and uploading them in a public database (Barcoding of Life Diversity, BOLD (http://www.boldsystems.org/index.php/IDS_OpenIdEngine) to retrieve the closest match reference sequence of a known species. This last part (online matching a DNA sequence from an unknown species with a reference sequence of a known species) is the basis of the species determination based on DNA.

Table 1. Schedule of the laboratory workshop, and educational levels where these contents (or equivalent theory and practice) are taught in formal education in Europe.

Section	Contents	Level	Time
Introduction to the DNA	Explanation with visual support about the location, structure, function and basic properties of DNA, representation of sequences in chromatograms and FASTA format.	***Secondary education to undergraduate***	20 min
Laboratory safety	Safety measures for working in a molecular lab.	***Secondary education***	10 min
Handling of lab material	Practical use of pipettes, centrifuge, tubes, vortex.	***Secondary education***	20 min
DNA extraction	DNA extraction from fish using a protocol based on common products: salt, bicarbonate, ethanol and water. Explanation of the process (dissolving cell membranes, chemical affinity of DNA).	***Primary to secondary education***	30 min
Electrophoresis	Loading an agarose gel with DNA extracted by the participants.	***Secondary education***	20 min
	Setting the voltage and running the gel; explaining again the principles of electrophoresis.	***Secondary education***	20 min
	Stopping the electrophoresis and removing the gel from the cuvette.	***Secondary education***	5 min
DNA visualization	DNA visualization on the gel under UV light with proper safety measures; taking and printing pictures of the gel.	***Secondary education***	10 min
DNA for species identification	Uploading COI sequences on the BOLD database and checking the species.	***Undergraduate***	30 min

The teaching contents of the DNA workshop were based on the common contents of the European science curriculum at the different educational levels. (Forsthuber, Motiejunaite, & de Almeida Coutinho, 2011).

Post-workshop questionnaire

Learning rarely occurs immediately. It requires time, reflection and integration in previous knowledge (Kostiainen, Ukskoski, Ruohotie-Lyhty, Kauppinen, Kainulainen, & Mäkinen, 2018). The most consistent teaching practice points out that meaningful learning cannot be produced without meaningful teaching. So, to measure what was learned from the experience and to get references about the effects of the teaching process in the participants' construction of knowledge, they were passed an online questionnaire two weeks after the workshop.

Table 2. Questionnaire used in this study with the specific and general topics treated in each group of questions.

Item	Specific topic	General topic
After the workshop I know better where DNA is located in cells and tissues	*DNA location*	***DNA properties***
In the workshop I have learned about the main DNA features	*DNA structure*	
I understand now how to use DNA for species identification	*DNA specificity*	
I have learned here how to use a pipette	*Equipment*	***DNA manipulation***
I know how electrophoresis works and what it serves for	*Process*	
I know security measures that are necessary in molecular labs	*Laboratory security*	
I have learned many new things in this activity	*Formative value*	***Workshop evaluation***
I have enjoyed the workshop	*Enjoyment*	
I understood what was explained in the workshop	*Understanding achievement*	
I will recommend this workshop to my friends	*Recommendable activity*	
I intend to enroll again for other similar activities	*Learning motivation*	***Engagement***
I intend to volunteer for the Coastal Observation Network to be launched within one year from now	*Recruitment*	

The items were organized in four groups to measure the perceived learning gains, attitudes towards the workshop, and motivation to continue learning or to keep engaged. For the perceived learning gains, we asked about their self-perception of achievement, i.e. how much they felt they had learned about the properties of DNA (three questions) and laboratory procedures (three questions). With regard to attitudes, what interested us was to know the behavioral variability on the proposed tasks and, therefore, we asked about their overall assessment of the workshop (four questions). Finally, the motivation through self-reported intention to engage in other activities (two questions) could also offer us information on whether this educational experience had met their expectations/needs. The questionnaire was organized as a rating scale (1, lowest score; 5, highest score, for least to most agreement).

The principles of anonymity and ethical rules for social studies (Ferreira & Serpa, 2018), and the normative approved by the Committee of Ethics of the University of Oviedo were followed. The participants provided, together with the answers, the following information: sex, age, group (lifelong learners or general public), occupation, and educational level as the highest diploma obtained (Primary, Secondary, Higher education).

Statistical analysis

Two-factor ANOVA was employed for the comparison of the perceived learning gains and attitudes to keep learning among groups. Factor **A** was the enrollment in Lifelong Learning programs (*Yes* versus *No*), and Factor **B** was the occupation as a proxy for general availability (from least to most expected free time: *Employed*, *Unemployed and Retirees*. A posteriori pairwise comparisons were carried out with Student-t tests, and variance equality was checked with F-tests. A comparison between groups for other characteristics such as sex composition and educational level was done with contingency Chi-Square tests, with Yates correction whenever necessary. For correlations, we

employed parametric Pearson's r after checking the required conditions (sample size, data normality). The software PAST3 version 3.01 (Hammer, Harper, & Ryan, 2001) was employed for statistical analysis.

Results

In total, 277 persons attended the seminars: 157 of the group of general public and 120 lifelong learners. Although everyone was interested in scientific matters, 41 of them freely applied to participate in the laboratory workshop. A successful teaching dynamic requires a smooth collaboration and interaction between teachers and students (Merriam & Baumgartner, 2020). So, to trigger an adequate teaching-learning process we adjusted the teacher/students ratio.

Participants results

The recruitment for the second phase (workshop) was 18 persons from the first group (11.5%) and 23 (19.2%) from the second one (lifelong learners). Since the proportion of the groups in the final sample is equivalent to the proportion of the groups in the original sample, the difference between the two groups for the second-phase recruitment was not statistically significant (Chi-square=3.219, 1 degree of freedom, P>0.05). A global 14.8% of the participants in the first phase participated also in the second phase.

Table 3. Characteristics of the participants in this study.

Participants	**Lifelong learners**			**Non-lifelong learners**		
Average age	57.1 (SD 11.9)			47.6 (SD 14.6)		
Gender	***Females***	***Males***		***Females***	***Males***	
	69.5%	30.5%		44.4%	55.6%	
Educational qualifications	***Primary Education***	***Secondary Education***	***Higher Education***	***Primary Education***	***Secondary Education***	***Higher Education***
	23%	36%	41%	11%	39%	50%
Socio-economic status	***Retirees***	***Unemployed***	***Employed***	***Retirees***	***Unemployed***	***Employed***
	26%	26%	48%	11%	33%	56%

Considering the participants that completed the two phases of the activity [Table 3 near here], lifelong and non-lifelong learners were not significantly different in sex ratio and level of studies (Chi-square of 2.627 and 0.487 respectively for 1 and 2 degrees of freedom, both not significant), with 44.4% females and 50% graduates in non-lifelong learners (general public) versus 69.5% females and 41% graduates for lifelong learners respectively.

The two groups were however significantly different in age, lifelong learners being older (57.1 versus 47.6 mean age with standard deviations of 11.9 and 14.6 respectively, P=0.040 for a two-tailed t-test for samples with different variance). Regarding the occupational status (indicator of availability), a significant difference was logically found among the groups with a higher proportion of retirees in the lifelong learning group (P=0.0007), because, generally, retirees have more free time to engage in diverse activities. The mean age of employed and unemployed participants (excluding retirees from the analysis) was not significantly different between lifelong and non-lifelong learners (F=3.686 in a two-way ANOVA, not significant).

Perceived learning gains

Regarding the perceived knowledge acquired during the DNA workshop, lifelong learners understood less than non-lifelong learners the use of DNA for species identification (P-value=0.04), as well as the process of electrophoresis (P=0.004).

Table 4. Left: Mean age and score of each item of the questionnaire (SD in parenthesis), per group of participants classed by lifelong learning and occupation status. Right: F-values for each factor and their interaction in two-way analysis of variance. Significant p-values <0.05, <0.01 and <0.001 as one, two and three asterisks respectively.

		Mean scores						Two-way ANOVA F-values		
		Lifelong learners			Non-lifelong learners			Lifelong learning	Occupation	Interaction
		Retirees	Unemployed	Employed	Retirees	Unemployed	Employed			
	Age	66.2 (0.8)	49.5 (19.7)	57.2 (6.0)	68 (2.8)	38.8 (16.7)	48.5 (10.7)	7.557 **	8.921***	0.96
DNA characteristics	*Location*	4.33 (0.82)	4 (0.89)	4.55 (0.82)	5 (0)	4.5 (0.84)	4.5 (1.27)	0.476	0.332	0.504
	Structure	3.5 (1.05)	3.7 (0.82)	4.64 (0.67)	4.5 (0.7)	4.8 (0.41)	4.4 (0.7)	4.06	3.205	4.182*
	Specificity	3.2 (0.75)	3.3 (0.82)	3 (1.26)	3.5 (0.7)	4 (0.89)	3.8 (1.23)	4.336*	0.425	0.189
DNA manipulation	*Equipment*	4.3 (0.82)	4.2 (0.75)	4.8 (0.6)	5 (0)	4.8 (0.41)	4.4 (0.7)	0.188	0.169	3.319
	Process	2.5 (0.84)	3.2 (0.98)	3.1 (0.94)	3.5 (0.7)	3.8 (0.75)	3.8 (0.79)	9.106**	2.163	0.286
	Lab security	4.2 (0.98)	4.3 (0.82)	4.1 (0.94)	4.5 (0.7)	4 (1.26)	4.3 (1.16)	0.022	0..016	0.323
Workshop evaluation	*Formative*	5 (0)	5 (0)	5 (0)	5 (0)	4.8 (0.41)	4.8 (0.42)	4.034	0.391	0.413
	Enjoyable	5 (0)	5 (0)	5 (0)	5 (0)	4.8 (0.41)	4.9 (0.32)	2.517	0.332	0.332
	Understandable	4.7 (0.82)	4.7 (0.81)	4.9 (0.3)	5 (0)	5 (0)	4.8 (0.42)	0.435	0.127	0.914
	Recommendable	5 (0)	5 (0)	5 (0)	5 (0)	5 (0)	5 (0)	-	-	-
Post-workshop attitude	*More activities*	4.8 (0.41)	5 (0)	5 (0)	5 (0)	5 (0)	5 (0)	0.802	2.113	0.819
	Engagement	4.8 (0.41)	4.8 (0.41)	4.9 (0.3)	4.5 (0.7)	4.7 (0.52)	4.1 (1.2)	5.871**	0.529	0.975

Significant differences regarding occupational status did not appear for any item of the questionnaire. Significant interaction between lifelong learning motivation and occupational status was obtained for the understanding of DNA structure.

The possible effect of age on the understanding of molecular biology was checked by Pearson correlation r tests between age and the questions related with molecular biology.

Negative r-values were found for the two items that provided significant F-values in the ANOVA, Process (electrophoresis) and Species (use of DNA for species identification): r= -0.364 and -0.463, with $p<0.05$ and 0.01 respectively. This indicates that older participants found more difficult to understand these concepts than younger participants. Other significant r-values between age and questionnaire items were not found.

Attitudes and motivation

For the global evaluation of the workshop, the factors considered did not contribute significantly to the ANOVA in any case. On a scale 1-5, with 5 being the highest score, the workshop was judged formative, enjoyable, understandable, and recommendable, with scores close to 5 in all cases.

The groups of participants did not differ in their intention to participate in further activities of science education. Significant differences between lifelong and non-lifelong learners were found, however, for engagement in the Network of Coastal Observation (item "Engagement", P=0.021) because lifelong learners self-reported more intention to engage. No significant correlation with age was found for this item (r=0.296, not significant). If retirees are excluded from the analysis, the ANOVA is still significant for lifelong learning status (F=4.859 with P=0.03). Self-reported engagement scores for lifelong and non-lifelong learners (all ages and occupational groups included) were 4.33 and 4.87 respectively, significantly different in a two-tailed test (t=2.237, P=0.036.)

When the participants were asked to enroll in the Network of Coastal Surveillance, all except one (40/41, 97.5%) accepted engaging in the Citizen Science action. This number corresponds to 14.4% of the 277 participants in Phase-1. The engagement of Spanish citizens in volunteering ranges 0.4-5.0% and is 2.5% in environmental activities (5.8% if past and sporadic activities are considered). A 14.4% is more than double of the percentage of Spaniards engaged any time in environmental actions. The difference is indeed statistically significant ($P=4.04x10^{-5}$ in a z-test).

Discussion

The promotion of citizen scientific literacy is the main pedagogical purpose of this study. On the methodological framework of experiential learning, and considering both the characteristics of the participants and those of the learning process itself (Yin & Lim, 2020), a short experiential learning seminar followed by a hands-on workshop was designed for adults. The results obtained regarding the participants' perceived learning gains, their attitudes towards this educational experience, and their motivation to continue involved in similar dynamics, suggest that mature lifelong learners are more motivated to engage in activities of science education than non-lifelong learners. Although based on limited sample size, robust statistical significance supports the idea that lifelong learning groups could be a very good target group to recruit as citizen scientists. Higher motivation for engaging was self-reported by lifelong learners, in spite of the fact that their science

understanding was not better than that of the general public – rather the opposite –, as can be deduced from their lower scores in the items about DNA characteristics and manipulation. The cause of the lifelong learners' less perceived learning gains could be their age (Glendenning & Stuart-Hamilton, 2017) or their greater ability to cope with uncertainty (Nassar, Bruckner, Gold, Li, Heekeren, & Eppinger, 2016). It is also possible that they measure their expectations of achievement with greater self-criticism derived from their role as LL students. Lifelong learners in our sample were older than non-lifelong learners, and, although older lifelong learners learn better with practical tasks (Simone & Scuilli, 2006), in our research, age was negatively correlated with the perceived understanding of molecular processes and DNA uses. This could be explained by the changes in science education programs occurred in Europe during the last decades. Currently, science is taught through a meaningful combination of lectures and lab practices (Vazquez, 2006; Karakasi, 2018). Although a poor genetic literacy has been revealed (Chapman, Likhanov, Selita, Zakharov, Smith-Woolley, & Kovas, 2019), molecular biology and DNA are included in all curricula in secondary education for the younger European generations. (e.g. Martinez-Gracia, Gil-Quilez, & Osada 2006; Leaton Gray, Scott, & Mehisto, 2018). Thus, learning about DNA uses and analytical processes was probably easier for the younger participants than for the older ones. In this sense, future research to analyze the study programs aimed at adults would be appropriate.

Learning does not happen instantly. Understood as a purpose-oriented mental process, it requires conscious reflection (Dantas & Cunha, 2020). Here, the learning gains of the participants in the workshops were evaluated from a questionnaire after their experience in labs. For Crall et al., (2013), survey instruments should be calibrated to a series of factors such as the pre-existing attitudes, behavior, and levels of knowledge; hence the need to thoroughly reflect at the design of the items in the questionnaire, as the questions asked may or may not reveal adequate information for the investigation. Since our work is about an educational intervention, it is also important to measure the learning experience (Barry & Egan, 2018). The sample of our study has certain limitations, but still, our results suggest that age should be added to this list of factors, since it may affect the understanding of science at least in some topics (molecular biology could be one of them), likely as a consequence of the previous level of knowledge. However, despite their lower understanding of science, older participants were not discouraged to keep involved in this informal context of hands-on experiential learning. On the contrary, as in other studies (Manninen & Meriläinen, 2014; Retzbach, Otto, & Maier, 2015; Jones, Corin, Andre, Childers, & Stevens, 2017; Bjursell, 2019), they showed a greater motivation to learn and greater social interaction initiatives with the group. Boosting research on learning in adulthood (Schmidt-Hertha, Formosa & Fragoso, 2019), in an increasingly aging Europe, is a stimulus and a challenge for pedagogy aimed at adults.

Volunteering is an expression of citizenship for the elderly (Lie, Baines, & Wheelock, 2009), and one could wonder if the self-reported intention to engage in future environmental surveillance is associated with age. This has not been found in our study ($r = 0.29$ with 40 degrees of freedom, not significant). It seems that it is not the age *per se*; but instead lifelong learning what really motivates participants to undertake other activities, in this case Citizen Science for environmental monitoring. When we talk about the scientific literacy of the citizenship, there are some doubts about the long-term impact that science communication activities can have on inexpert public (Bucchi, 2013), but we think that the two-phase pre-recruitment activity here conducted could be considered motivational for environmental and science education. The intention to enroll in similar workshops on molecular biology was almost 5 over 5 in all cases. In Phase-1, participants were informed about the importance of DNA to identify species, so they had a view of

potential applications of DNA science in the real world, which is a great motivation for science learning (Braund & Reiss, 2006; Taconis & den Brok, 2016), and a clear reflection of the transfer of learning beyond these teaching-learning events (Roumell, 2019). It seems that the ecological message has engaged the audience, which is one of the challenges for scientists to communicate with society (Groffman, Stylinski, Nisbet, Duarte, Jordan, Burgin, Previtali, & Coloso, 2010).

In Spain, the active participation of citizens in volunteering is unfortunately weak (Spanish Ministry of the Presidency, 2015). However, and saving the proportions between the whole population of the country and the number of participants in this adult education experience, our results also show a much higher engagement of participants involved in this two-phase recruitment activity than the average for Spain (14% versus 5.8%). This suggests that including an experiential hands-on scientific practice in the recruitment process does not only act in boosting scientific literacy, but it may also be a motivation to participate in the process of a science research. We have tried to show how ordinary citizens can participate in scientific processes and at the same time increase their science literacy, or at least their curiosity for science. This seems to serve to enhance Citizen Science recruits as well. We are enthusiastic supporters of lifelong educational initiatives like these workshops we develop, that try to promote science literacy for everyone everywhere. The teachers are committed to knowledge and must choose and propose the best methods (Malach, 2020) to facilitate it. So, we need to open the doors of the Faculties and laboratories to the citizens, not just the students who pay their registration fees.

An essential objective in this socio-educational initiative was to design a didactic planning directed to the common people in Dewey's experiential learning way (1938). This involved: providing scientific literacy by participating in scientific learning activities; overcoming the recruitment of volunteers as simple collectors of samples and data in research; and opening spaces where they also could contribute to data analysis and into the science outreach. We think that the direct contact of researchers with citizen scientists involves not only a motivation towards learning, but also the active involvement of citizens in all research processes. In the near future, a wider participation of formed and informed citizens in environmental issues will be a priority in conservation sciences. That's why we would suggest coordinating Citizen Science and Lifelong Learning programs, because both can benefit a lot from mutual interaction.

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Ethical statement

The normative framework followed as ethical code of good practices in this research, where there are human beings involved, is based on the recommendations made by intergovernmental institutions such as the Council of Europe, UNESCO, or the European Science Foundation (ESF). The research ethics committee of the Principality of Asturias has reviewed, evaluated, and approved the research project with the reference number 99/16.

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