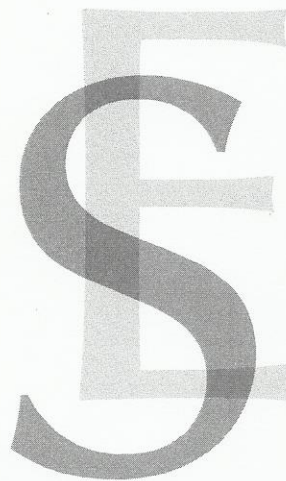


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- 7 *Introduzione*
di **Carla Xodo**
- 9 **Carla Xodo**
Merito, meritocrazia e pedagogia
Merit, meritocracy and pedagogy
- 37 **Giuseppe Spadafora**
Democracy and Education di John Dewey. Ricostruire l'educazione per ricostruire la democrazia
Democracy and Education by John Dewey. Rebuilding education to rebuild democracy.
- 53 **Dorota Siemieniecka**
Selected Polish e-learning initiatives popularising free access to knowledge
L'e-learning per l'accesso libero alla conoscenza. Esperienze in Polonia.
- 65 **Mirca Benetton**
Ragazzi dotati e scuola democratica: il risvolto etico-pedagogico del talento
Gifted children and democratic school: the ethical and pedagogical implication of talent
- 89 **Melania Bortolotto**
Adolescenti eccellenti a scuola: competitivi e/o solidali?
Excellent adolescents at school: competitive and /or supportive?
- 111 **Andrea Porcarelli**
La personalizzazione come "risposta democratica" alla domanda di educazione rivolta alla scuola
The personalization as democratic response to the demand for education addressed to school

129 Giuseppe Bertagna

La Costituzione e il diritto dovere al lavoro. Una rilettura in prospettiva formativa

The Italian Constitution and the right-duty to work. A reinterpretation in educational perspective

159 Andrea Cegolon

The effects of Adult Education-Training Programs on the skills of Older Adults: a Cross-National Comparison

Gli effetti dei programmi di educazione degli adulti sulle competenze della tarda adultità: un confronto internazionale

171 Recensioni

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SE

The effects of Adult Education-Training Programs on the skills of Older Adults: a Cross-National Comparison

Gli effetti dei programmi di educazione degli adulti
sulle competenze della tarda età:
un confronto internazionale

di Andrea Cegolon

Abstract

Lifelong learning is increasingly important in order to compete in a knowledge-based global economy. Adult education and Training (AET) are two possible strategies to adjust the skills of the adult population to the needs of either the changing occupational structure and aging societies. Nevertheless, despite the importance of AET, we are short of empirical evidence on the topic, particularly as regards the cross-national comparative research. In a way, as regards these studies the aim of this paper is to gain a better understanding of how AET can influence the level of skills in individuals. In view of this, data from Programme for the International Assessment of Adult Competencies (PIAAC) are used to investigate for four different countries – Italy, France, UK and Sweden – the effect of different types of AET on the skills (literacy and numeracy) of adult individuals. The results show that, on average, AET participation increases skills levels, although with interesting differences between countries.

Keywords:

**adult education and training, skills,
economics of education, human capital**

159

L'apprendimento permanente costituisce un fattore strategico per competere in un'economia globale e della conoscenza. In tale contesto, l'educazione degli adulti e la formazione professionale rappresentano due possibili strategie per adattare le competenze della popolazione adulta alle esigenze di un mercato del lavoro in continuo cambiamento ma anche ai bisogni di società che invecchiano. Nonostante l'indiscutibile importanza di questi percorsi formativi, ricerche empiriche sull'argomento sono ancora piuttosto carenti, specie per ciò che riguarda indagini comparative condotte a livello internazionale. Da questo punto di vista, quest'articolo intende fornire alcuni spunti di riflessione sul modo in cui l'educazione degli adulti e la formazione professionale riescono ad influenzare il livello delle competenze delle persone. Allo scopo questo studio utilizza i dati del Programme for the International Assessment of Adult Competencies (PIAAC) per investigare per quattro paesi – Italia, Francia, Regno Unito e Svezia – l'effetto di diverse tipologie di corsi di educazione degli adulti e di formazione professionale sulle competenze (numeracy e literacy) di individui adulti. I risultati dello studio mostrano come effettivamente la partecipazione a programmi di educazione degli adulti e di formazione professionale, in media, aumenta i livelli delle competenze dei partecipanti, sebbene con interessanti differenze tra paesi.

Parole chiave:

**educazione degli adulti e formazione, competenze,
economia dell'istruzione, capitale umano**

The effects of Adult Education-Training Programs on the skills of Older Adults: a Cross-National Comparison

In many European countries, the population is aging rapidly as fertility rates drop and life expectancy rises. This occurrence is challenging the sustainability of pension systems and modifying the age structure of the workforce. Furthermore, the recent economic crisis has forced many older workers out of the labor market. Once older workers lose their job, it is very difficult for them to find a new one, mainly because of the gap between their pay and productivity which results from seniority rules and employment protection legislation (European Commission, 2014).

The stock of human capital in the labor market is therefore becoming more dependent on skill upgrading of the current workforce than on the up-to-date skills of new labor market entrants. On the one side, skill upgrading might enable the aging workforce to adapt to rapid technological and organisational changes, avoid skill obsolescence and help shape a workforce which is responsive in increasing skill demand and international trade. On the other side, according to several studies many cognitive skills, along with physical strength and health (Desjardins et al., 2012) decline with age. If cognitive decline threatens the productivity of adult workers, then as the average age of the workforce increases, we might expect to see a decline in the competitiveness of the economy at the macroeconomic level and a negative impact on adult workers' employability at the individual level (Picchio, 2015). Therefore it is relatively important to find some mechanisms to prevent skills deterioration.

In this context the prevailing point is that the success of a country largely depends on the possibility to rely upon higher levels of individual competences in the labour force. As a result, many governments aim at investing resources in order to increase the skill level of their citizens. Adult Education and Training (AET) are a possible way out in order to adjust the skills of the adult population to the needs of either the changing occupational structure and ageing societies (Cummins et al., 2015). AET also have important implications for social inequality. On the one hand, this objective is potentially promising in order to reduce inequalities emerging also in early life. Moreover, the mentioned macro-trends of globalisation and demographic changes are likely to have a strong impact on the need both for older and lower qualified people to take part in lifelong learning activities in order to update their skills to match labor market demands (Organisation for Economic Co-operation and Development, 2013). On the other hand, AET may actually increase existing inequalities if well-educated people are the primary group taking advantage of these opportunities (Kilpi-Jakonen et al., 2014).

1. Cross-National Comparisons

Despite the importance of AET, scarce is still the empirical evidence on the topic, particularly as regards the cross-national comparative research. In this sense, herewith our aim is to contribute to this field of studies by gaining a better understanding of how adult education and training can influence the level of skills of individuals. In view of this, the effect of different types of adult education and training on the skills of adults individuals in four different countries – Italy, France, UK (namely England and Northern Ireland) and Sweden – are here analysed on the basis of the data from *Programme for the International Assessment of Adult Competencies* (PIAAC).

In particular, this paper sets out the outcomes for the four countries aforementioned – included in the PIAAC survey – regarding individuals who participated in formal and non-formal AET. In addition, comparisons of country levels are made between Italy, Sweden, the UK, and France. The choice of these countries is based on the considerable differences among them with respect to three essential characteristics of their educational, training, and occupational system; their labour market regulations; the nature of their employment-sustaining policies; the level of the decommodification offered by their national welfare systems. My hypothesis, indeed, is that the national institutional setting plays an important role in influencing trajectories of continued learning participation. In particular, following the well-known welfare state typology (Esping-Andersen, 1990; Arts, Gellinsen, 2002; Fenfer, 2007), combined with participation rates in adult education and training (Dännrich et al., 2014), we are enabled to attribute each of these countries to a particular macro-group, presenting so broad common features, namely Social-Democratic/Nordic countries; the Central Conservative countries; Southern European countries and the Anglo-Saxon, liberal countries. I address each in turn.

The Social-Democratic/Nordic countries include *Sweden*, Denmark, Finland and Norway, which have high participation rates in AET (especially non-formal, with more than 60% on average). These countries invest a lot in lifelong learning programmes targeting low skilled-workers in order to ensure their employability. AET activities are largely founded by though government high taxes. Which also provide incentives for employers in view of training as a nontaxable benefit.

The Central-Conservative countries feature moderate participation rates in both type of AET (ranging between 34% of France and 48% of Germany). These countries – Austria, Germany, France – put less emphasis on active labor market programmes promoting the re-employment chances of persons with problems (i.e., low-skilled workers); on the contrary, they tend to use public expenditure on different types of intervention, mainly support out-of-work income maintenance (i.e., long-lasting unemployment benefit payments, generous maternity leave and early retirement payments).

The Southern European countries include Italy, Spain, and Portugal with low level of participation rates in all type of AET (ranging between 24% of

Italy and 47% of Spain). These countries share traditionally low employment rates and a closed employment system with very strong insider/outsider segmentation. The relative welfare state systems are characterized by high transfers to insiders. AET represent a very limited phenomenon even because only a few percentage of public expenditure is dedicated to training programmes aimed at improving individual employability.

The Anglo-Saxon/Liberal countries – such as the *UK* and Ireland – show high levels of participation in formal AET, but relatively low participation in non-formal lifelong learning activities. The main features of welfare systems are a low level both of total state spending and of expenditure on social protection, facing high level of inequality. The low level of employment protection means that the labour market turnover is high, which means that employers may be put off from investing in their employee due to the fear of poaching from competing firms. On the other hand, at an individual level, low employment protection gives individuals incentives to invest in their own skills in order to remain competitive in the labour market.

The four countries included in this study were selected on the basis of: firstly, their belonging to one of the four macro-groups; secondly, data available (i.e., least amount of missing values); third, personal interest.

In order to capture only learning activities taking place after the completion of initial education, the current research focuses on individuals aged 25–65. In this way I leave out from the sample individuals studying, for formal qualifications within the normal age range (18–24).

2. Research questions

- 1) Is participation in AET associated with an improvement in individual cognitive skills? Are there any differences between countries?
- 2) Do cognitive skills vary by age, gender and initial education? Are there any differences between countries?
- 3) Does the relationship between participation in different types of AET and skills differ across various points of the skill distribution? Are there any differences between countries?

3. Literature Review

Regarding the benefit of AET, there is a large international literature documenting empirical evidence that these learning activities improve labour market outcomes, such as employment and higher wages. Recent OECD analysis reveals a strong cross-country correlation at the aggregate level between labour force participation and employment on the one hand and both initial education and subsequent adult training on the other hand. At an in-

dividual level, there is a strong association between involvement in adult training participation and employment probability: on average, looking at individuals aged 25–54 years, an increase of 10% in the time spent in training is associated both with an increase in the probability of being economically active by 0.4% and a fall in the probability of being unemployed of almost 0.2% (OECD, 2004). Nevertheless, most of the research about AET focus on their benefits in terms of wage *premia*. This literature provides strong evidence of wage effects of training, especially in the US and in the UK: an individual undertaking non-formal AET earns, on average, just above 5–10% higher real earnings than one who has not undertaken such learning courses (Blundell et al., 1999; Leuven, 2004). Though, when we consider formal AET, Jenks et al. (2002) suggest that this type of lifelong learning has no measurable impact on individuals' wage. In other words, taking a qualification during early ages has a remarkable impact on the wage, while taking the same qualification later, for example after 30 age, has no actual consequence as regards the wage. A possible explanation of this pattern is that employers can assume that adult education is a signal of lower ability: a qualification achieved later in life proves less motivation or ability in people.

Another strand of literature shows a strong positive effect of training on firm productivity. The major study for the UK worked out an industry panel data between 1984 and 1996 containing training, wages, labour, capital and value-added. It found that training is associated with significantly higher productivity. In particular, raising the proportion of workers trained in an industry by 1% was associated with a 0.6% increase in productivity (value added per work) and a 0.3% increase in wages (Dearden et al., 2006). Similar positive effects have been found in other longitudinal surveys of firms in Mexico (Tan and Lopez-Acevedo, 2005) and Malaysia (Tan, 2001).

But what do we know about the impact of AET on learning outcomes? Most policy-makers believe that training translates into higher productivity and therefore into higher incomes because individuals assume that the participation in these type of activities increases people's skills. However, a question sound logical: is this assumption consistent with the evidence?

AET broadly refers to participation in a range of learning activities taken at any stage after first exit from full-time education which might be accredited or not; part time or full time; academic, vocational or aimed at developing basic skills. There are diverse forms of courses taken at work; in basic skills courses (i.e., to enhance literacy or numeracy) and regarding mature participation in higher education and in family and community learning programs (Torgerson et al., 2003, 2005). Generally speaking, formal AET take place in education and training institutions and lead to recognised credentials and diplomas (Commission on European Communities, 2000). While, non-formal AET can take place both within or outside of educational and training settings (i.e., on-the-job training), but do not typically lead to formal credentials (*Ibidem*).

Unfortunately, information on the effectiveness of both formal and non-formal AET is very poor; the evaluation on whether learners acquire sub-

stantive skills is rather thin. In general, research from the UK and US tries to measure the effectiveness of adult basic skills – literacy and numeracy provision – but they deal with small-scale studies conducted over a short span of time (Brook et al., 2008, 2011; Torgerson et al., 2003, 2004, 2005; Wolf, Evans, 2011; Wolf, Jenkins, 2014). Furthermore, few of the surveys are high enough quality to capture the complexities of the connections between interventions and outcomes.

Altogether there is limited evidence of a significant association between participation in AET and proficiency (increased skills). This project might shed some light into this gap, examining, for the UK and other four European countries, the effectiveness of AET in improving the level of individuals' numeracy skills of adult individuals (25–65).

4. Data

I use data from the Programme for the International Assessment of Adult Competencies (PIAAC), a large-scale comparative survey conducted under the auspices of OECD. The survey directly assesses the skills of about 5,000 individuals per each country, aged 16–65 and representing the countries working age population. In this paper, I use data of the first round, carried out in 24 industrialised countries between 2011–2012. I analyse the public-use files as available on the OECD's PIAAC webpage. PIAAC builds on knowledge and experiences gained from previous international adult assessments – the International Adult Literacy Survey (IALS), conducted between 1994 and 1998 and the Adult Literacy and Lifeskills Survey (ALL), conducted between 2003 and 2008. I rely on the PIAAC because it is the only data source providing detailed information on adult learning experiences together with background variables and test scores on general cognitive skills for a large number of countries. PIAAC reports an assessment of the key cognitive and workplace skills needed for individuals to participate in advanced economies: literacy, numeracy and problem solving skills in technology-rich environments. Literacy and numeracy were assessed by administering either computer-delivered or paper-and-pencil delivered sets of tasks characterized by different degrees of difficulty. Problem solving capabilities in technology-rich environments were administered through interviewed individuals in 18 of the 22 countries involved in the first round of the Survey of Adult Skills (Cyprus, France, Italy, and Spain did not participate).

To reduce the time required by assessment tests while not compromising the coverage of the tested constructs, the Survey of Adult Skills resorts to a complex design strategy, assigning different assessment items to each respondent. This choice requires the implementation of specific procedures to produce comparable and reliable measures of individual performance. The PIAAC survey is based on the Item Response Theory (IRT) to calibrate item responses and obtain parameter estimates for the cognitive test items. These parameters were subsequently used in latent regression models to calculate

multiple 10 plausible values for each interviewed individual and each proficiency measure. Reliable estimates of performance in literacy, numeracy and problem solving at population or subpopulation levels are obtained as the weighted average of multiple plausible values. In addition, a replication approach to estimate the sampling variability allows a correct variance estimate of the proficiency means for each country (OECD, 2013).

The survey also contains a background questionnaire including basic demographic data along with information regarding the development and maintenance of skills, such as education, participation in various types of adult education and training programmes, the employment/labor market status and income (*Ibidem*). PIAAC data thus provide useful information to investigate either the determinants of the participation in AET and the relationship between participation in AET on individual proficiency (while controlling for additional variables that may significantly affect this relationship).

The current analysis includes only 4 of the 24 countries – Italy, Sweden, UK, and France – and considers for each of them the scores in literacy and numeracy. In order to capture lifelong learning activities taking place after the completion of initial education, I leave individuals aged 16-24 out of the analysis. Then, I focus on individuals aged 25- 65, the normal age range to enter in the labour market. Overall, the final sample covers four countries and includes 21,157 individuals.

5. Methods

The main interest of this paper is in the relationships between various types of learning activity on the one hand and a measure of skills on the other (namely literacy and numeracy). To address this issue (research questions 1 and 2) it's used multiple regression analysis (OLS). This is a standard way of examining how a set of explanatory variables are related to a quantitative response variable, such as a measure of skills. The main reason for using multiple regression is that it enables the researcher to control a range of variables when examining the key relationship of interest. After controlling lots of other factors which might influence cognitive abilities, is there a statistically significant relationship with participation in AET? A range of control variables were included in the multiple regression model to allow for other variables which may influence adult skills. In particular, the independent variables are gender, age, highest qualification, while the set of other control variables includes work status work condition, economic sector, type of contract, social class, parental education, a n household index, health status etc.

Then, to address question 3), I used quantile regression technique. OLS approach estimates average skills (numeracy or literacy) as a function of age, education and gender and other factors. It assumes that the average is a good representation of the overall distribution of skills. However, just as the average value can provide an incomplete picture of the skills distribution, so too can the regression results provide an incomplete picture of the relationships be-

tween the predictive variables and the outcome. One strategy for completing the picture is to use quantile regression (Koenker, Bassett, 1978; Angrist, Pischke, 2006). Quantile regression provides estimates for the relationships between variables and the outcome at different parts of the outcome distribution. It is useful both to explore changes in the shape of the distribution of skills and to control various factors. It helps in front of complex interactions – of which not everything can be measured – and where limiting factors may apply as constraints (Cade, Noon, 2003).

6. Limitations

In the current analysis, I have to rely on to the PIAAC cross-sectional data. This raises an issue: it is difficult to estimate the causal impact of AET on cognitive skills with cross-sectional data. The main problem is related to the potential endogeneity of AET, due to omitted variables. AET, indeed, is not randomly assigned to participants since individuals self-select themselves and/or are selected by firms. Indeed, on one side, for example, employers are likely to invest more in training employees they perceive to be more skillful; on the other side, individuals with higher skills levels might be more likely to participate in AET because of unobserved characteristics (i.e., motivation, flexibility, commitment) which also affect their skills. As a result, the positive relationship between AET and skills could not due solely to the effects of the learning activity itself, but rather to the characteristics of the participants – i.e., innate ability bias – (Bassanini et al., 2005; Albert et al., 2010). Since I did not find credible instruments variables (IV) and cannot rely on panel-data structure, it is impossible to make causal claims. Thus, I can only investigate whether AET participation are associated with high level of cognitive skills, conditional on a set of covariates.

166

7. Key finding

Based on OLS results, the estimated models show a positive association between both types of lifelong learning activities (formal and non-formal) and skills in all countries, with the exception of Sweden and Italy. In the former country, indeed, the relationship between literacy and formal AET turns out to be negative and non-significant; whereas in the latter the association between numeracy and formal AET is negative and non-significant as well. For both types of AET, the overall pattern suggests that the formal AET has a smaller impact on skills compared to non-formal AET. The only exception is literacy in France where, compared to people without any learning activity, the coefficient to formal AET is higher than the one of non-formal AET.

The results for age suggests a decreasing negative effects of age to adults' skills: the higher the age, the weaker the association with both literacy and numeracy. In particular, compared to the youngest individuals, the effect of

age on skills is negative for all countries and tends to increase in size, moving towards the older groups.

Furthermore the skills returns to prior education are positive and highly significant in all countries. While, regarding gender, it is possible to detect a gender gap in both type of skills: in both regressions, being female is negatively associated with the outcomes.

It is clear that the OLS technique really misleads relevant information about cross-countries differences in the impact of the independent variables on within group inequality at different points of the skills distribution. The quantile regression estimates, even if in most cases turn out to be non significant, provide a more complete pictures of the relationships between the predictive variables and the outcomes (literacy and numeracy test scores).

The effect of both learning activities takes different trajectories in every country. There is evidence that in France, moving from the bottom to the top of the skills distribution, the impact of the two types of AET shows an opposite path: decreasing for non-formal AET and increasing for formal AET. In Italy the effect of formal AET is more unequal compared to the other learning activities because it displays higher coefficients at the top of both the skills distributions. On the other hand, in Sweden and in the UK the percentiles difference are less marked across all distributions, suggesting a fairer effect of both types of AET.

With the only exception of Sweden, the relationship between years of formal education on literacy decreases across the distribution, resulting more efficient at the 5th percentiles. On the other hand, the relative coefficient tends to be statistically significant and stable across the numeracy distribution in every country.

The effect of age shows different patterns across both countries and different individuals. In France the beta coefficients constantly increase, moving from the 5th to the 95th percentile, for every age groups, suggesting a high inequality within groups. In Italy, on the contrary, the association between the middle aged groups (36-45 and 45-55) is positive at the bottom of the skills distributions, then it decreases steadily till the median, featuring negative values. Afterwards it increases smoothly until the top. The UK and Sweden showed more balanced paths with the lowest differences between percentiles.

The gender gap persists across all skills distributions, though it is more marked for numeracy. Overall in Italy, France and the UK it tends to remain enough stable across the distributions; while, surprisingly, in Sweden it raises dramatically at the top of literacy distribution.

Conclusions

The combination of two factors – the demographic aging of societies and a shift in the age distribution of labour force – results in the need for policies to encourage people to upgrade skills in order to remain at work. Policies providing opportunities for adult individuals to participate in AET pro-

grammes are necessary to ensure economic security in retirement, a competitive labour force and economic growth. The implementation of policies focusing on lower income groups and especially unemployed are crucial, as they are the most in need of skills upgrading and absolutely at risk for economic insecurity.

Despite widespread recognition that the investment in human capital for people of all ages is very important, little research has empirically examined the effects of participation in AET programmes on adult's skills. Gaining a better understanding of how adult individuals benefit from participating in AET is a very important area of study, thus providing policy-makers with informed decisions.

The key question of interest to policy-makers is as follows: whether these programmes are actually effective such as to justify the cost to the public (Lee, 2005). The evaluation of these programmes has been the aim of a large methodological literature in economics, with specific focus on the impact of AET on wages. However, this approach leaves open the question of whether AET is effective in raising individuals' skills. For AET programmes, indeed, to be truly effective they need to increase the human capital (skills) because only that can improve the productivity of individuals, which in turn can lead to a meaningful raise in their wages.

Despite the limitations of this research, the study may contribute to existing research by examining how AET participation benefits adults' skill. I found that participation in both types of AET, on average, increases skills levels. I also found that, for both literacy and numeracy, the overall pattern suggests that on average the formal AET has a smaller impact on skills compared to non-formal AET. Another important finding is the effect of learning activities: both of them take different trajectories across the skills distribution in every country selected. In conservative and southern European countries, such as Italy and France, the impact of AET tend to be a bit unequal, being more efficient for groups of people at the top of the skill distributions, whereas, in nordic and liberal countries, such as Sweden and the UK, the percentiles difference are less marked across all distributions, suggesting a fairer effect of both types of AET.

The combination of these findings makes an important contribution to the existing research by demonstrating the benefits of AET in terms of improved skills for adult people (especially low skilled), which will be essential to allocate funding for such programmes.

PIAAC, for example, is a rich cross sectional dataset, useful because it provides notable opportunities, on one side, to investigate how individuals benefit from participation in lifelong learning activities; on the other, to make comparison across countries. However, future analysis in this field could provide further information on how participation in lifelong activities can change literacy and numeracy skills, thanks to longitudinal datasets, in order to deal with potential endogeneity of these learning programmes.

Furthermore, future research could make use of qualitative research to gain a better understanding of how and where adults participate in AET.

Learning more about how individuals become aware of educational opportunities and difficulties to deal with would be useful in developing programmes and strategies to tackle social barriers. Lastly, future research could explore specific AET policies in some countries with the view to test the efficacy in a more timely way and develop a clear strategy by using best practice in the cultural context.

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