

# The digital divide in light of sustainable development: An approach through advanced machine learning techniques

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# 1. Introduction



# The Digital Divide



**digital divide;** *noun*  
the gulf between those who have ready access to computers and the Internet, and those who do not.

## Defining digital divide:

“Unequal access and use of Information and Communication Technologies (ICT)” (Castells, 2002)

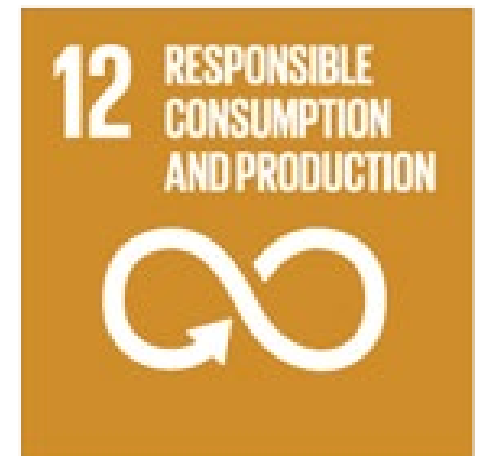
## Levels of the digital divide:

1st – Connectivity

2nd – Skills and abilities

3rd – Tangible results of the use of ICT

## Digital divide & sustainability



## 2. Theoretical review

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## Variety of existing approaches:

- ✓ Three dimensions to analyze the use of Internet: quantity, variety and types (Blank and Groselj, 2014).
- ✓ Inequalities in the digital competences (Hatlevik, Guðmundsdótti & Loi, 2015).
- ✓ Differences in Internet skills and uses (Hargittai, 2010).
- ✓ Gender perspective (Castaño, Martín & Martínez, 2011).
- ✓ Differences according to sociodemographic profiles (van Deursen & van Dijk 2014).



- Digital divide** → Social inequalities  
→ Lack of competitiveness

## **Important implications for policy makers**

### **Scope of the study**

Analysis of the digital skills of the Spanish population, moderated by their sociodemographic factors.

## 3. Methodology



## Sampling:

17,000 respondents of the Spanish survey of digital skills.

Based on the Global Index of Digital Skills.

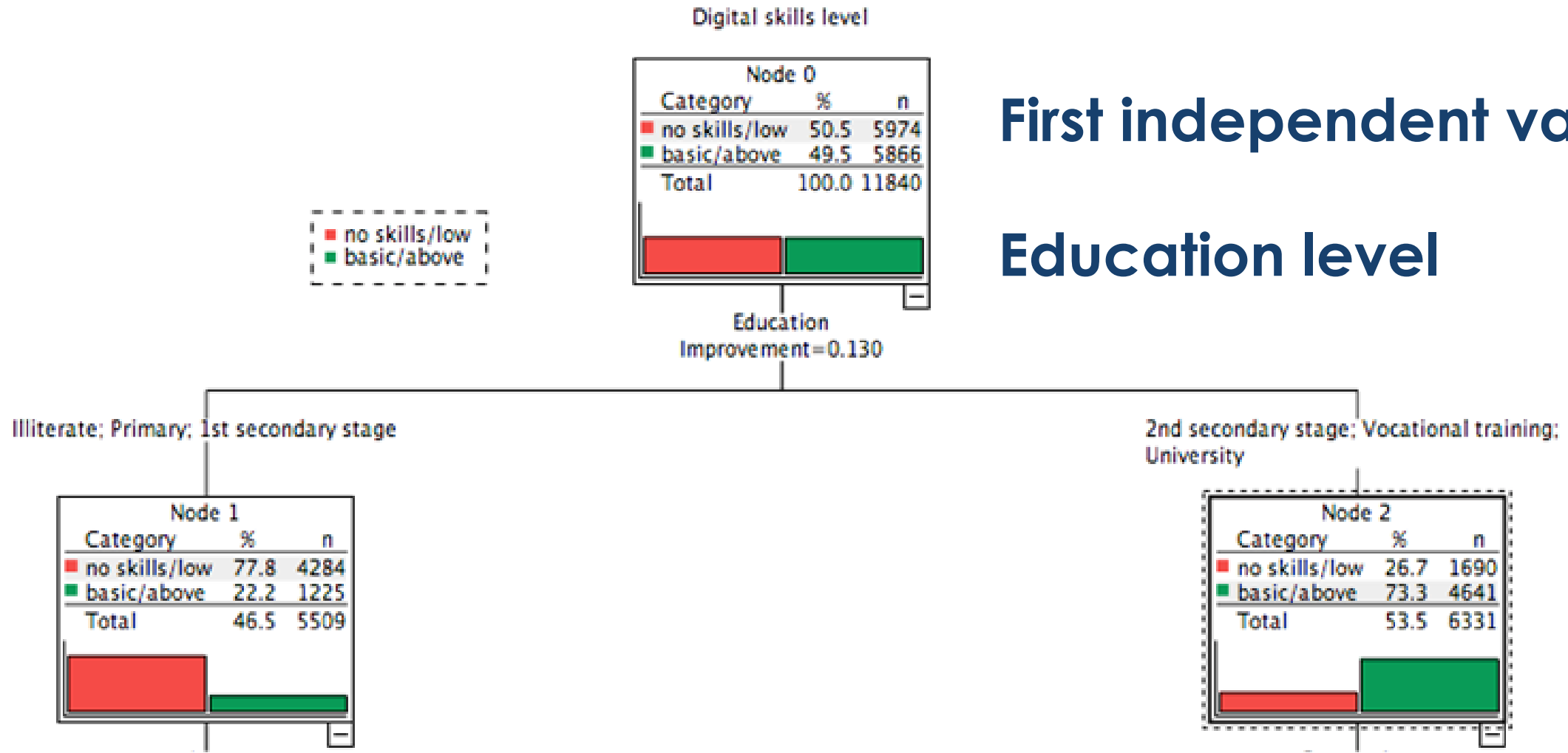
## Variables:

- Information related skills: search, compilation and handling of information, judgment of its relevance and purpose.
- Communication skills: communication in digital environments.
- Problem solving skills: identify needs and solve them through the appropriate digital tools.
- Software related skills: digital skills of the population according to their competences related to the creation and edition of new contents.

## Analyses with Machine Learning Decision Tree

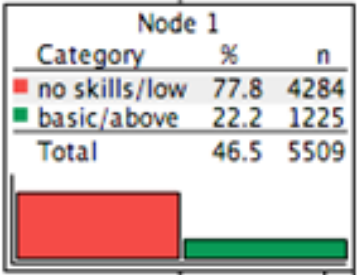
## 4. Results

First independent variable:  
Education level



# Branch of the lower education levels

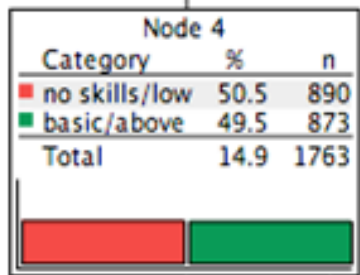
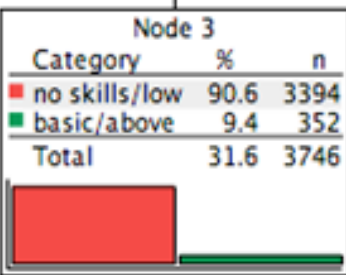
Illiterate; Primary; 1st secondary stage



Age  
Improvement=0.033

45-54; >64; 55-64

35-44; 16-24; 25-34

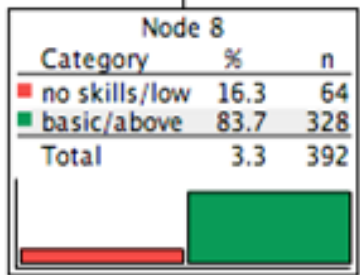
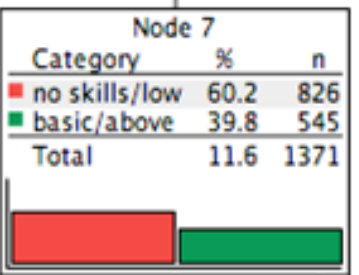


Occupation  
Improvement=0.010

Retired; Employed; Unemployed;  
Homemaker; Other

Student

2.5

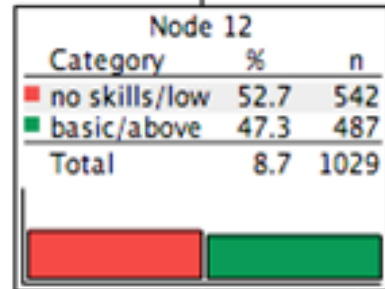
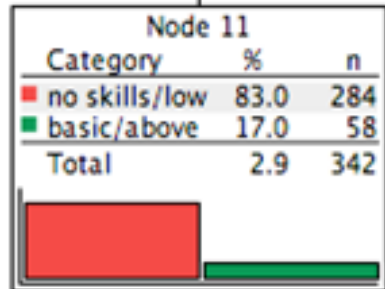


Education

Education  
Improvement=0.004

Illiterate; Primary

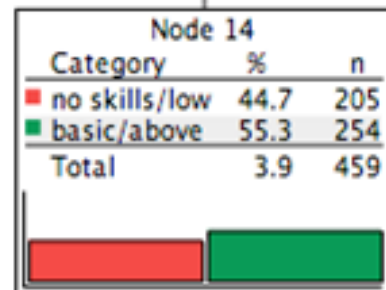
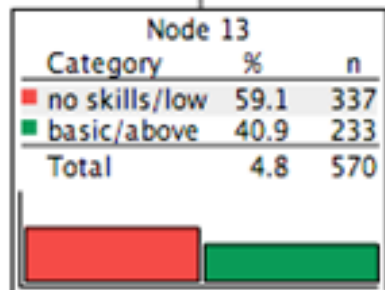
1st secondary stage



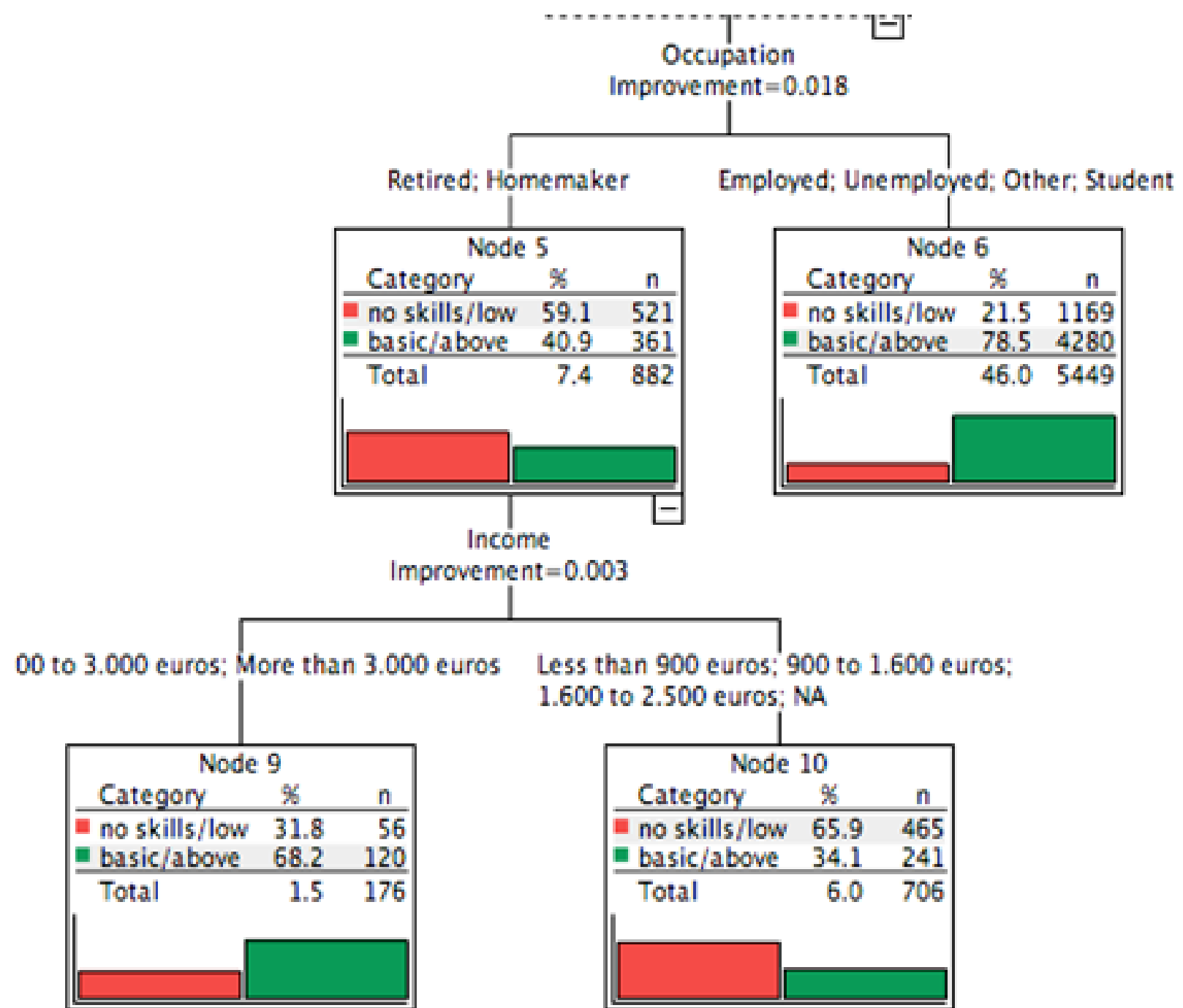
Age  
Improvement=0.001

35-44

16-24; 25-34

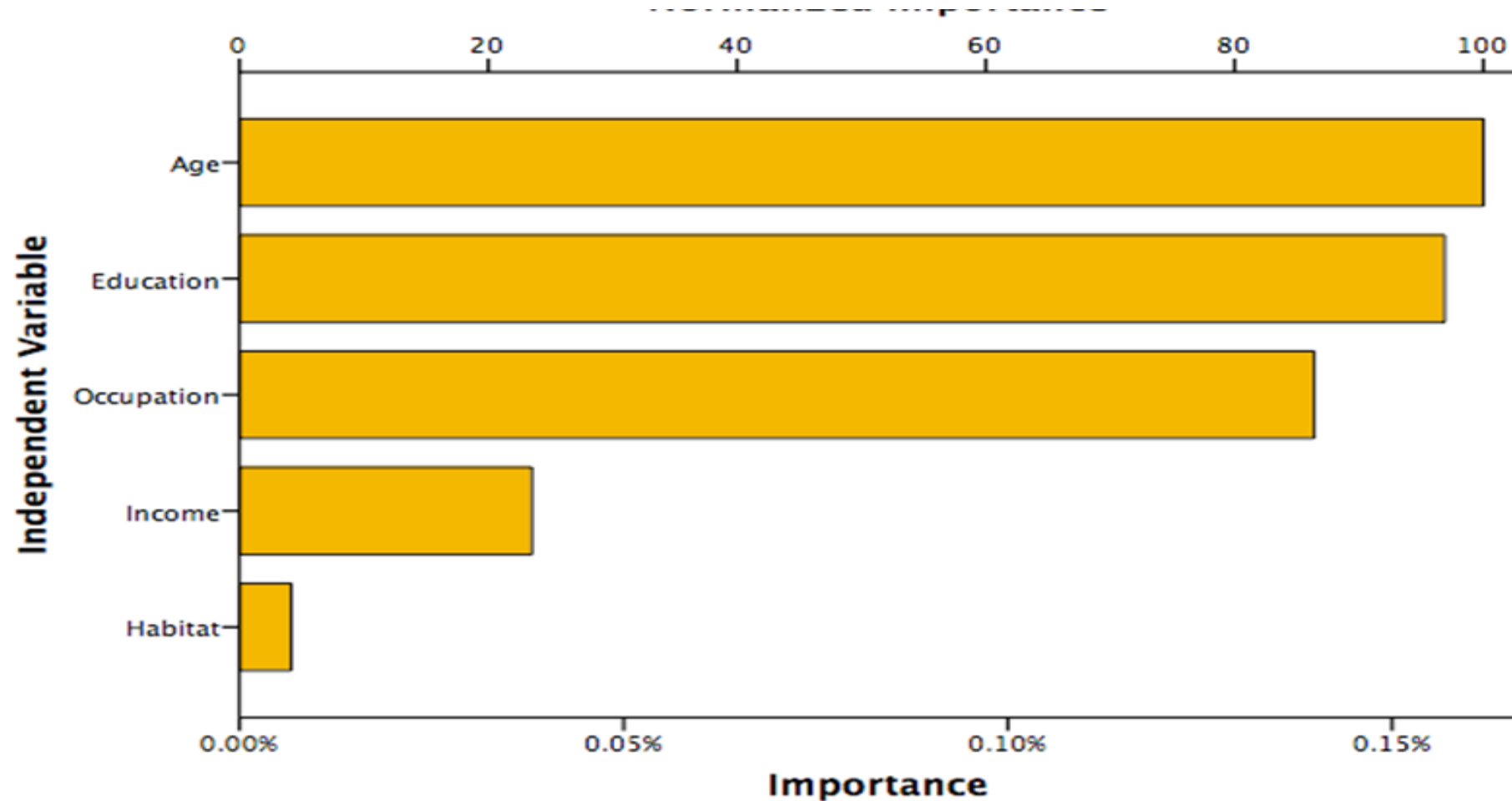


# Branch of the higher education levels





## Relative importance of socioeconomic factors for the digital skills level prediction.



## 5. Conclusions

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Digital inequality could lead to economic inequality, in particular for the younger groups of population, that could be excluded from the labor market and lack the education opportunities to access to an increasingly digitalized business world.

## **Variables predicting the digital divide:**

- Education level
- Age
- Occupation and
- Household income

Findings could be used by policy makers to foster policies aimed at favoring digital inclusion in the information society.

These policies should incorporate the digital competences that, according to the **World Economic Forum (2016)**, citizens must have in order to be able to work with dexterity in the digital environment: digital identity, digital rights, literacy, communication, emotional intelligence, prevention, security, and use of digital devices and media, including the control of their use.

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