

# Technocreativity, Social Networks and Entrepreneurship: Diagnostics of Skills in University Students

<https://doi.org/10.3991/ijet.v17i05.28183>

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**Abstract**—This paper presents the first exploratory results of a research integrated in a more global project on digital and entrepreneurial skills of students at the University Europea del Atlantico. The study reveals gaps in professional skills such as problem solving, strategic thinking and creativity. For this reason, a pedagogical project is created integrating the use of social media in training (entrepreneurship), research (knowledge management) and university transfer. The aim is to develop skills in digital talent, (techno)creativity and to implement work methodologies, such as design thinking and growth hacking. In addition, it will encourage self-learning of the students, improve their e-competences, creative capacity and practical skills for a better adaptation to the needs of social demand, where knowledge transfer generates development and growth scenarios (startup) and fosters innovation (competitive capacity). This innovative initiative will enable Higher Education students to acquire the most demanded skills in a multidisciplinary labour market that also requires specific ones in creativity, strategic capacity, project management, product innovation, solution generation and entrepreneurship. This is what forms the basis of an integral project of triangular synergy between University, Business and Society.

**Keywords**—technocreativity, social media, design thinking, growth hacking, entrepreneurship.

## 1 Introduction

This study is framed within the field of research and teaching innovation in Higher Education centres. It is linked to professional activity and the acquisition of skills in a work environment globalised by social networks. Skills such as technocreativity, project management, problem solving, design thinking and growth hacking become an added value in the professional world in order to develop, promote and apply business management initiatives in this global, competitive and technological context, where the impulse of the digital environment and the new market needs have led to a transfor-

mation towards a new multidisciplinary techno-professional profile. In view of this reality, the quality of higher education must adapt academic programmes to the ICT Competence Framework. According to the Startup Europe programme, this helps to reduce the gap between labour supply and demand and to stimulate entrepreneurship [1].

This calls for a paradigm shift in the training of multi-skilled professionals with a technological profile who will necessarily be subject to an unstable context. Thus, they will need lifelong learning and agile adaptation to new digital tools. But to gain a real competitive advantages in all fields of knowledge and in all sectors of society, they must rely on creativity and innovation as key competences [2]. Technology influences creativity through different factors, generating higher motivation and interest of the students and an increased interaction for knowledge exchange [3].

The rise of digital technology has brought about changes in the acquisition of skills by students at the university level and a shift in the professional paradigm. Studies on the self-perception of transversal professional competences and digital skills among university students have shown a limited level of these emerging skills [4]. This reality creates deep concern among the generation considered digital natives, who are assumed to have acquired technological skills from an early age. However, these digital natives consume digital contents mainly through social media and various applications through digital devices. The existing dissonance between e-skills in the professional-academic sphere and the reality of a hyper-connected society, in which young people are particularly active, stresses the need to examine in depth training possibilities offered by digital media, specifically, by social media.

It is a fact that students spend a large part of their time connected to social media consuming content of a diverse nature (photos, videos y publications by influencers, celebrities and athletes). However, social media, beyond a mere recreational space, can become a powerful educational and research tool if it is managed correctly. They allow teachers and students to access an unlimited world of resources, graphic, audiovisual and multimedia content in specialised professional areas. At this point, creating innovation projects that allow these transversal competences to be acquired and taking advantage of the potential of social networks as an educational resource becomes an opportunity to generate collaborative training spaces.

For this reason, a preliminary study is carried out to determine the level of knowledge and acquisition of certain skills such as technocreativity, strategic vision, design thinking, growth hacking and entrepreneurial skills. This is what sets the basis for assessing the possibilities for design and implementation of a comprehensive educational innovation project that establishes a triangular synergy between University, Business and Society.

### **1.1 TechnoCreativity, digital ecosystem and entrepreneurship**

Today's technological society generates the need to introduce new concepts aligned with the digital universe and entrepreneurial culture. In this context technocreativity, as an element that unites these two spheres [5], acquires primordial relevance. It is also linked to other skills such as innovation, problem solving, strategic vision, design thinking and growth hacking, which form the pillars of a higher education that is committed

to a culture of entrepreneurship [6]. In a broader sense, establishing a synergy between technology and creativity makes it possible to stimulate the generation of applications in different social fields (education-training, economic-business, socio-cultural) of Research, Development and Innovation (R&D&i) and/or Educational Innovation and Entrepreneurship (R&D&e). Entrepreneurship requires a number of skills, one of which is the creativity to recognise a business opportunity and transform it into a profitable business [7]. For all these reasons, creativity is directly related to innovation and originality and should be encouraged through entrepreneurship education.

In this sense, it is observed that the students' perception of their level of creativity increases when they receive this type of training, which is reflected, for example, in a greater generation of business ideas [8]. It also improves design thinking skills, in the sense of being able to analyse a problem and come up with the best solution, strategically defining ideas and business models [9]. In addition, growth hacking skills are developed and consolidated to increase the impact and customer acquisition and increase the profitability of a company through creative actions [10]. Moreover, the skill of creativity, which future professionals should have developed during their higher education studies and which is actually taught in very few universities, is crucial not only to ensure a good start to entrepreneurial activity, but also for future business sustainability.

In fact, in companies already established and in full development of their economic activities, it is observed that creativity has a direct impact on quality levels and customer satisfaction [11]. In this techno-digital transformation, virtual interaction gives rise to new spaces for training, creativity, entrepreneurship and communication, where digital natives develop transmedia competences, generate social spaces for information exchange and new actors appear in the educational process [12]. Within the framework of a society characterised by unlimited connectivity and technological creativity, the use of social networks in the educational sphere has formed part of various training experiences at different educational levels. Social networks, as an example of social media applications, enhance creativity and innovation among university students and allow for greater interaction between them [13]. The outcomes are a better collaborative work [14] and access to an endless number of training resources to be promoted [15]. Thus, social media becomes an interesting tool to promote digital learning with students [16] and also as a pedagogical resource for teachers [17].

Studies on the use of social networks from different perspectives (educational, psychological, sociological, economic, technological, and marketing) in the university environment are quite common in the scientific literature [16]. However, it is less common to find analysis that deal with innovative experiences of integration of new social spaces in the higher education environment [18]. This gap opens up an interesting field for the production of materials of a scientific-pedagogical nature that will make it possible to generate new complementary learning methodologies. In the current context of globalisation and uncertainty and the impact of social networks on the growth of business projects [19], teaching of entrepreneurial culture has to be done with special emphasis on a greater inclusion of creativity linked to the digital sphere. It is considered absolutely fundamental for the acquisition of a differentiating competitive advantage and can be learned at any age [20]. In addition, their practice has to be supported by

new technologies, which would lead to the creation of comprehensive and effective educational systems [21]. In the field of Higher Education it is necessary to reinforce training in innovative entrepreneurship, focusing on the production of didactic resources and the use of specific methodologies for the development of creativity, innovation and entrepreneurship as some of the most demanded skills in today's labour market.

## **2 Materials and methods**

### **2.1 The context and the sample**

This research was conducted in February 2021, at the beginning of the second semester of the 2020-21 academic year. The sample included 162 university students, the majority of whom were female (62.3%), mainly in the 20-23 age group (79.6%). The students were in their 3rd and 4th year in different academic grades: Business Administration and Management (BAM), Industrial Organisation Engineering (IOE), IT Engineering (IT), Agro-Food Engineering (AFE), Audiovisual Communication (AC), Journalism (JOR), Advertising and Public Relations (APR), Psychology (PSY). Some of them were studying double degrees, such as the combination of engineering (AFE/IOE) and of multidisciplinary studies in communication, journalism and advertising (JOR/AC, APR/AC y APR/JOR).

The subjects, within which the use of social media is planned to be included, were the following: Press Design and Layout, Campaign Design and Planning, Project Management, Business Economics and Entrepreneurship and Final Degree Project (FDP). Every 4 out of 10 of this group of students have taken or are currently taking two of these subjects, mainly Business Economics and Entrepreneurship and FDP (35.2%). This is the same proportion of students, the majority of whom are engineering students, who have studied or are studying more than two subjects. Table 1 compiles the most relevant characteristics of the sample.

Within this context, students' consumption of traditional media as a source of information has been considered. Thus, more than half of the students in this sample do not consume print media or traditional radio as a source of information. However, the pattern of television consumption is slightly different, with most of them watching some news channel sporadically (from once to thrice a week). Furthermore, this study has taken into account the consumption of the main social media as another characteristic of young university students. The latest available statistics show that in Spain social networks are used by a high number of internet users between 16 and 70 years old (85%), according to the latest IAB report [22]. The same report cites that there is currently a wide variety of social media on the market and that the best known and most widely used are Facebook, Instagram, WhatsApp and YouTube. In addition, the average number of networks known and used by an individual is around 4.

**Table 1.** Sample distribution

| Gender                        | Students     | %     | Age                                  | Students                      | %     | Age          | Students | %     |
|-------------------------------|--------------|-------|--------------------------------------|-------------------------------|-------|--------------|----------|-------|
| Man                           | 60           | 37.0% | 20                                   | 14                            | 8.6 % | 25           | 5        | 3.1%  |
| Woman                         | 101          | 62.4% | 21                                   | 64                            | 39.5% | 26           | 3        | 1.9%  |
| Does not identify with either | 1            | .6%   | 22                                   | 42                            | 25.9% | 27           | 4        | 2.5%  |
|                               |              |       | 23                                   | 23                            | 14.2% | 29           | 1        | .6%   |
| Total                         | 162          | 100%  | 24                                   | 6                             | 3.7%  | Total        | 162      | 100 % |
| Academic grade                | Students, n° | %     | Subjects: concurrent number and name |                               |       | Students, n° | %        |       |
| BAM                           | 10           | 6.2%  | 1                                    | PD&L                          |       | 1            | .6%      |       |
| Subtotal BAM                  | 10           | 6.2%  | 1                                    | CD&L                          |       | 10           | 6.2%     |       |
| IT                            | 12           | 7.4%  | 1                                    | BE&E                          |       | 15           | 9.3%     |       |
| AFE                           | 1            | .6%   | 1                                    | FDP                           |       | 1            | .6%      |       |
| IOE                           | 13           | 8.0%  | 2                                    | PD&L + CD&P                   |       | 10           | 6.2%     |       |
| AFE/IOE                       | 1            | .6%   | 2                                    | CD&P + BE&E                   |       | 4            | 2.5%     |       |
| Subtotal Engineering          | 27           | 16.7% | 2                                    | PM + BE&E                     |       | 1            | .6%      |       |
| AC                            | 15           | 9.3%  | 2                                    | BE&E + FDP                    |       | 57           | 35.2 %   |       |
| JOR                           | 12           | 7.4%  | 3                                    | PD&L + BE&E + FDP             |       | 1            | .6%      |       |
| APR                           | 31           | 19.1% | 3                                    | CD&P + PM + BE&E              |       | 2            | 1.2%     |       |
| JOR/AC                        | 4            | 2.5%  | 3                                    | CD&P + BE&E + FDP             |       | 4            | 2.5%     |       |
| APR/AC                        | 2            | 1.2%  | 3                                    | PM + BE&E + FDP               |       | 19           | 11.7 %   |       |
| APR/JOR                       | 2            | 1.2%  | 4                                    | PD&L + PM + BE&E + FDP        |       | 9            | 5.6%     |       |
| Subtotal AC, APR, JOR         | 66           | 40.7% | 4                                    | CD&P + PM + BE&E + FDP        |       | 19           | 11.7 %   |       |
| PSY                           | 59           | 36.4% | 5                                    | PD&L + CD&P + PM + BE&E + FDP |       | 9            | 5.6%     |       |
| Subtotal PSY                  | 59           | 36.4% |                                      |                               |       |              |          |       |
| Subtotal double grades        | 9            | 5.6%  |                                      |                               |       |              |          |       |
| Total                         | 162          | 100   | Total                                |                               |       | 162          | 100      |       |

Note: Press Design and Layout (PD&L); Campaign Design and Planning (CD&P); Business Economics and Entrepreneurship (BE&E); Project Management (PM); Final Degree Project (FDP).

Taking these data into account, the aim of this research is to analyse whether university students are the major consumers of the aforementioned networks, to which others have been added such as Twitter, Tik Tok, LinkedIn, Pinterest and Twitch. In addition, two specific networks have also been considered: Vinted, with an average of 25 million Spanish users who buy or sell clothes and accessories and interact with each other, and Domestika, a creative network where users can share their knowledge and creative work. The results of the surveys show that 9 out of 10 students consult the social media on a daily basis and more than half of them have a presence on more than 4 networks (54%). 94% of students have a profile on Instagram, 79% have a presence on YouTube and 70% on Facebook. In addition, slightly more than half of the students combine the use of these networks with Pinterest and Twitter. On the other hand, the use of

WhatsApp, Vinted and Domestika is residual, at around 1%. The summary of this descriptive analysis is shown in Table 2.

**Table 2.** Consumption preferences of traditional media and social media

| Consumption of print media, radio and television  |                                     |                 |                                    |                |                     |                 |               |       |              |     |
|---|-------------------------------------|-----------------|------------------------------------|----------------|---------------------|-----------------|---------------|-------|--------------|-----|
|   | <i>Frecuency (4-7 times a week)</i> |                 | <i>Sporadic (1-3 times a week)</i> |                | <i>Never</i>        |                 |               |       |              |     |
|   |                                     | %               |                                    | %              |                     | %               |               |       |              |     |
| Print media                                       | 15                                  | 9.3             | 45                                 | 27.8           | 102                 | 63.0            |               |       |              |     |
| Radio   | 24                                  | 14.8            | 47                                 | 29.0           | 91                  | 56.2            |               |       |              |     |
| Televi-sion                                       | 65                                  | 40.1            | 74                                 | 45.7           | 23                  | 14.2            |               |       |              |     |
| Consumption of Social Media                       |                                     |                 |                                    |                |                     |                 |               |       |              |     |
|   | <i>Daily</i>                        | %               | <i>4-5 times</i>                   | %              | <i>2-3 times</i>    | %               | <i>1 time</i> | %     | <i>Never</i> | %   |
| Social Me-dia                                     | 151                                 | 93.2            | 6                                  | 3.7            | 2                   | 1.2             | 1             | 0.6   | 2            | 1.2 |
| Presence on Social Media                          |                                     |                 |                                    |                |                     |                 |               |       |              |     |
| On ≤ 4 Social Media                               | 74 students                         |                 | 45.7%                              |                | On > 4 Social Media | 88 students     |               | 54.3% |              |     |
| Social Media in which they have created a profile |                                     |                 |                                    |                |                     |                 |               |       |              |     |
| <i>Instagram</i>                                  | <i>Youtube</i>                      | <i>Facebook</i> | <i>Pinterest</i>                   | <i>Twitter</i> | <i>TikTok</i>       | <i>Linkedin</i> | <i>Other*</i> |       |              |     |
| 94.4%   | 79.6%                               | 70.4%           | 59.3%                              | 51.2%          | 45.7%               | 38.3%           | .8%           |       |              |     |

\* Other include WhatsApp, Domestika and Vinted, mean value is shown.

## 2.2 Methodology

This study used an online survey with several items, the same for all subjects, to assess skills and knowledge related to creativity, innovation, project management and solution generation. Students had to answer using a six-point Likert scale comprising the categories "strongly disagree" as 1 and "strongly agree" as 6. The purpose of using the even scale was to force students to define their position, avoiding the neutral one which is often adopted in this type of assessment. Below are the statements, through which the students' perception of the acquisition of specific skills and knowledge of terms related to creativity is measured:

- P19-1: Indicate if you have specific skills in Creativity.
- P19-2: Indicate if you have specific skills in Product Innovation.
- P19-3: Indicates if you have specific skills in Strategic Capacity.
- P19-4: Indicate if you have specific skills in Project Management.
- P19-5: Indicate if you have specific skills in Solution Generation.
- P19-6: Indicate if you have specific skills in Entrepreneurship.
- P27-1: I know the meaning of the term TechnoCreativity.
- P27-2: I know the meaning of the term Growth Hacking.
- P27-3: I know the meaning of the term Design Thinking.

The validation of the construct was carried out through the Rasch model, framed within the Modern Test Theory, applied to the measurement of abstract concepts that are difficult to measure through an objective scale. The Rasch method allows to assess

these concepts indirectly through the items that include them. In addition, it takes into account that the assessment is done through an ordinal scale, which variables do not have additive characteristics. To this end, the application of this methodology allows the transformation of ordinal variables into interval variables, improving the precision of the construction of the instruments to be applied. The Rasch model meets certain requirements that are important in this type of assessment. On the one hand, it is unidimensionality, which means that all items are included in a single construct that can be represented in a linear continuum together with the subjects. On the other hand, invariance refers to the fact that the results obtained from the analysis are independent of the subjects or items in the sample [23].

The application of the Rasch model involves several stages of analysis, including reliability and validity of the measures, dimensionality of the construct, response categories, item hierarchy and differences between the different classification groups in the sample [24]. The software used to process the information was Winsteps, version 4.8.0.0. It is important to bear in mind that after applying the first tests of the overall reliability and validity of the measures, it became necessary to eliminate some subjects from the sample because they generated distortions in the measurement. This meant starting all the analyses again on more than one occasion from the beginning.

The first analysis shows optimal levels of subject and item reliability and validity, well above .7 [25]. The values of MNSQ of the indices INFIT and OUTFIT are between .5 and 1.5 and the fit statistic ZSTD tends to zero. This indicates an optimal fit between subjects and items [23], [26], [27] (Table 3).

**Table 3.** The results of the reliability and validity analysis of the construct

|          | INFIT |      | OUTFIT |      | Reliability | Correlation |
|----------|-------|------|--------|------|-------------|-------------|
|          | MNSQ  | ZSTD | MNSQ   | ZSTD |             |             |
| Subjects | .97   | -.04 | .93    | .02  | .90         | .97         |
| Items    | .99   | -.19 | .93    | -.48 | .99         | -1.00       |

To verify that the construct is unidimensional, a principal component analysis of the residual values of the items is performed [28]. The results show that the variance explained by items is greater than the variance of the first factor and the variance explained by the measures is greater than 50%. The eigenvalue of the unexplained variance of the first factor is slightly greater than 2, which would seem to indicate the presence of a second dimension (Table 4).

The items causing the second dimension could be P27-1 (“I know the meaning of the term TechnoCreativity”) y P19-3 (“Indicate if you have specific skills in Strategic Capacity”). However, it has been considered that these concepts are closely related to creativity and decision-making, skills that are currently in demand in the labour market, and should therefore be retained within the construct.

**Table 4.** Summary of construct dimensionality analysis

|  | Eigenvalue | Observed |        | Expected |
|--|------------|----------|--------|----------|
| Total variance of the observed values    | 33.93      | 100.0%   |        | 100.0%   |
| Explained variance of the measures       | 24.93      | 73.5%    |        | 73.0%    |
| Explained variance of the persons        | 10.48      | 30.9%    |        | 30.7%    |
| Explained variance of the items          | 14.44      | 42.6%    |        | 42.3%    |
| Total non-explained variance             | 9.00       | 26.5%    | 100.0% | 27.0%    |
| Non-explained variance in the 1st factor | 2.23       | 6.6%     | 24.9%  |          |

In addition, it is verified that the sample data fit the response categories defined in the questionnaire. It is observed that more than 10 responses are included in each category and the mean measures are increase and show values close to those expected. The MNSQ Infit and Outfit indices are close to 1, so the validity of the observations in the different categories is good. Finally, Andrich's thresholds, together with the category measures, grow (Table 5).

**Table 5.** The results of the reliability and validity analysis of the construct

| Category | Distribution number | Distribution % | Observed, % | Expected, % | Infit MNSQ | Outfit MNSQ | Andrich's thresholds | Category measurement |
|----------|---------------------|----------------|-------------|-------------|------------|-------------|----------------------|----------------------|
| 1        | 279                 | 27             | -3.05       | -3.00       | .85        | .87         | NONE                 | (-3.11)              |
| 2        | 138                 | 14             | -1.55       | -1.58       | .88        | .74         | -1.66                | -1.71                |
| 3        | 168                 | 17             | -.61        | -.63        | 1.00       | .92         | -1.28                | -.74                 |
| 4        | 208                 | 20             | .24         | .21         | .96        | .93         | -.43                 | .33                  |
| 5        | 160                 | 16             | 1.19        | 1.10        | 1.02       | 1.04        | .90                  | 1.79                 |
| 6        | 64                  | 6              | 1.73        | 2.00        | 1.32       | 1.24        | 2.47                 | (3.70)               |

### 3 Results

#### 3.1 Technocreative knowledge and skills among university students

In this study we have obtained the information that is reflected in the joint scaling map of item difficulty and subject ability, the graphical representation of which is shown in Figure 1.



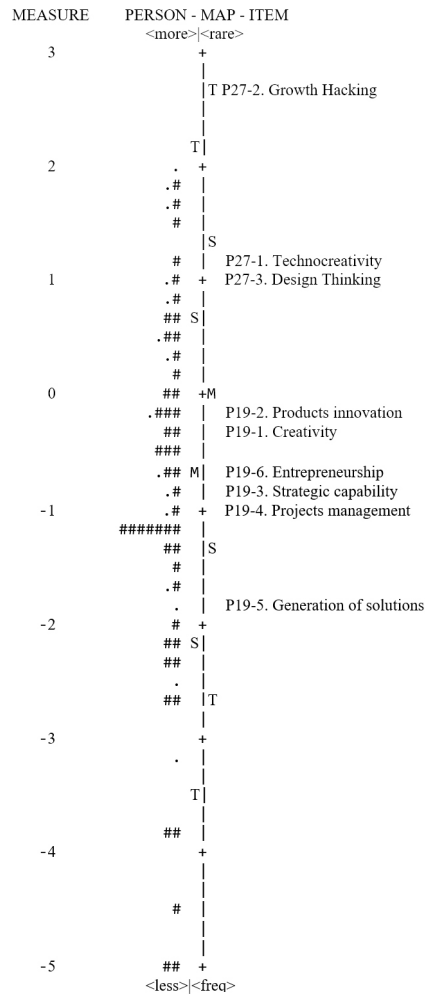


Fig. 1. Wright map of the distribution of items and persons

The left side of the map shows the distribution of the students represented by the "#" and "." signs. Each "#" sign equals 2 subjects and each "." sign equals 1 person. The persons shown at the top of the map are the most skilled and those at the bottom are the least skilled. The items are on the right side of the map, with the most difficult items at the top of the map and the easiest items at the bottom. Students placed at the same level as the item have a 50% chance of solving it successfully. Items above the subjects' abilities are considered to be more difficult for them to solve. That is, they have less than a 50% chance of doing so. In contrast, items below the subjects' abilities indicate that these people have more than 50% chance of solving the item, so they are not so difficult for them [27]. The linear continuum also indicates that the means ("M") of the subjects and the items are separated and the mean of the items is above the mean of the subjects. It means that, in general, the items present an added difficulty for the students

in the sample. It is also observed that the dispersion ("S" and "T") of item difficulty and subject ability is similar.

According to these results, students know how to generate solutions as well as how to manage projects. On the other hand, specific knowledge related to creativity and new technologies is rather scarce. It can also be seen that items P27-2, P27-1 and P27-3 are above the average of the items. Therefore, the vast majority of students find it very difficult to achieve them. In fact, none of them would manage to solve item P27-2 ("I know the meaning of the term Growth Hacking") and there are only a few students who could affirm that they really know what the terms such as Technocreativity (item P27-1) and Design Thinking (item P27-3) refer to.

The item P19-5 ("Indicate if you have specific skills in Solution Generation") is below all subjects, but not at the bottom of the map. This indicates that it is the least difficult of all. However, there are quite a few students who have less than a 50% chance of solving it correctly, as the item is located above them. Items P19-2, P19-1, P19-6, P19-3 and P19-4 are concentrated in a small space between the mean and the spread of the scale measuring the difficulty of the items, with a number of students being placed at approximately the same level. It means that the above-mentioned items are relatively easy for all of them and somewhat difficult for those below these items.

To summarise, the hierarchy of items, from the easiest to the most difficult for the students, is as follows:

- P19-5: Indicate if you have specific skills in Solution Generation.
- P19-4: Indicate if you have specific skills in Project Management.
- P19-3: Indicate if you have specific skills in Strategic Capacity.
- P19-6: Indicate if you have specific skills in Entrepreneurship.
- P19-1: Indicate if you have specific skills in Creativity.
- P19-2: Indicate if you have specific skills in Product Innovation.
- P27-3: I know the meaning of the term Design Thinking.
- P27-1: I know the meaning of the term Technocreativity.
- P27-2: I know the meaning of the term Growth Hacking.

### **3.2 Additional analysis, according to academic degree, digital and print media consumption habits and presence on social media**

An additional DIF analysis (Differential Item Functioning) was applied to the sample to assess whether there were significant differences in item difficulty among the different groups of subjects. To this end, the sample was classified according to several criteria: by (1) gender, (2) age, (3) academic degree, (4) print/digital media consumption habits and (5) being active in few/many social networks.

In the analysis of the groups created according to criteria (1), (4) and (5), pairwise analysis was used, in which the null hypothesis is that the items have the same difficulty for both groups [28]. In order to avoid the DIF effect being a mere coincidence, the null hypothesis is rejected if the contrast  $\geq .5$ , the probability  $<.05$  and  $|t| > 1.98$ . Significant differences have been detected in the groups formed under criteria (4) and (5), but there is nothing conclusive in the analysis according to criterion (1). That is, on the one hand,

students who consult the print media (newspapers and magazines) on a weekly basis and those who do not consume it at any time assess the item 19-5 differently (“Indicate if you have specific skills in Solution Generation”). On the other hand, those who are active in some social networks (equal to or less than 4) and in many of them (more than 4) show a different perception regarding the items 19-4 (“Indicate if you have specific skills in Project Management”) and 27-3 (“I know the meaning of the term Design Thinking”).

In the analysis with the application of criteria (2) -age- and (3) -academic degree- the null hypothesis is that each item has the same difficulty as the mean for all groups [29]. The same parameters are estimated as previously when deciding whether or not to reject the null hypothesis. The results show the significant differences between the diverse groups of students classified only according to their grade (criterion 3). Thus, the Industrial Organisation Engineering group assesses the item 19-1 differently (“Indicate if you have specific skills in Creativity”); the group studying Psychology, the item 19-4 (“Indicate if you have specific skills in Project Management”); and the group studying Audiovisual Communication, the item 19-6 (“Indicate if you have specific skills in Entrepreneurship”).

#### **4 Conclusions and discussion**

This study contributes to the literature with the analysis of university students' perception of certain specific skills and knowledge related to creativity, innovation, entrepreneurship and the use of social networks. The research was carried out on the sample of students of the University Europea del Atlántico who in the last two or three years took at least one of the subjects that have a creative focus. For this analysis the survey was applied, through which a sample of 162 students enrolled in different academic degrees of the University was formed.

This analysis shows that all students, even those taking the degrees most closely related to creativity, such as Advertising or Audiovisual Communication, lack knowledge of specific terms such as design thinking, technocreativity or growth hacking. It is true that this is not something that is specifically included in any of the subjects in the academic plan. But neither is there any interest on behalf of the students to explore in depth and learn about the reality of the sector. There is only a difference in this perception between students who are active in few ( $\leq 4$ ) or many social networks ( $> 4$ ) and only in relation to the term Growth Hacking. This knowledge corresponds to the reality of young people who identify themselves as being part of a community to which they try to attract their friends, family and simply like-minded people [29]. However, it is only one of the applications of this term. So it would be necessary to find out if students know that growth hacking also refers to the business world since in companies, especially in start-ups, it is a creative online marketing technique that allows them to adapt quickly to the market and helps to build customer loyalty in a more effective way [30], [31].

Regarding the development of skills that in one way or another indicate the preparation of students for the generation of innovative and creative solutions and project management from a more global and strategic approach, most of them show certain skills for the generation of solutions. However, only a few of them developed specific skills in product innovation. Surprisingly, creativity skills are other ones that require further development as most of the students have not mastered them [1]. It is also evident that students, in general, do not rely on creativity and innovation when generating solutions, what reduces the quality of these proposals, leaving them incomplete. In reality, generating a solution is part of the creative process [32], which includes different phases supported by creative and critical thinking [33], [34].

However, it is observed that students in some academic grades, those who do or do not consume print media and those who are active in fewer or many social networks, show different levels of skills development, such as project management, solution generation, entrepreneurship and creativity. This is significant, as it shows that young people are increasingly distancing themselves from the analogue world and print media. They do not read paper magazines and newspapers, do not listen to traditional radio and consume less television. Their main sources of consultation and entertainment are digital media [35]. This causes difficulties in the learning and assimilation of basic skills.

In view of the results, the need to explore in greater depth the educational possibilities offered by digital media, specifically in social media, is accentuated. It is a fact that students spend a large part of their time connected to social networks consuming content of diverse nature. However, social media, beyond a mere leisure space, can become a powerful training and research tool if managed correctly, as it allows both teachers and students to access an unlimited world of resources and graphic, audiovisual and multimedia content in highly specialised professional areas. To this end, it is proposed to activate an R&D&e Research Project (Innovation + Teaching + Entrepreneurship) with reference code CEI-23/2020. Its objective is to promote innovative-creative thinking and to integrate collaborative intelligence, demonstrating that proposals that stimulate participation between students and teachers increase motivation, generate greater autonomy and facilitate the acquisition of multidisciplinary competences [36].

At this point, the designed pedagogical proposal integrates audiovisual social media as a collaborative learning tool to promote teamwork and achieve a comprehensive knowledge that motivates students to share experiences and improve the teaching-learning-entrepreneurship process. In addition, the use of social networks is implemented as a digital space for learning and information exchange, as well as an instrument of interest for entrepreneurship and the creation of contact networks that promote networking between graduates and employers. Likewise, the use of social tools as a graphic-conceptual-creative documentation resource is increased in the subjects selected in this project-on-project management and entrepreneurship in order to take advantage of the technical characteristics and contents of the networks (Pinterest, Instagram, YouTube and LinkedIn) as didactic and entrepreneurial devices.

These results, taken as a sample prior to the implementation of the innovation project, present certain limitations when it comes to their interpretation, due to the size of the population. They should, therefore, be contrasted with those of samples taken from

other universities and professional environments, where the knowledge and skills mentioned in the study are required. It would also be important to carry out a comparative study in a second phase, after the implementation of the educational project, to verify the level and increase of competences by the students, as well as the acceptance of the integration of social media as an educational resource in the university environment. This research project on educational innovation and entrepreneurship marks a horizon of study on the interest of social networks as a new field of formal and informal learning.

## 5 Acknowledgment

This study is confined to the research project (research code CEI-23/2020), attached to the Universidad Europea del Atlántico (UNEATLANTICO-CITICAN, Santander, Cantabria) and Group R&D Group I+D CS2 (UVigo). Spain.

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Article submitted 2021-11-09. Resubmitted 2021-12-20. Final acceptance 2021-12-21. Final version published as submitted by the authors.