3D Printing in VET

2019-1-EL01-KA202-062909

IO2

Need Analysis Report

Partners contribution:

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained there

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Introduction

This document presents the results of the questionnaire, within the 3D-Printing in VET project (project number: 2019-1-EL01-KA202-0062909) funded by the European Commission through the Erasmus+ programme.

The project is carried out by a consortium of partners composed by;

- Karlsruher Institut für Technologie (KIT) (Germany)
- European Education & Learning Institute (EELI) (Greece)
- Centro Internazionale Per La Promozione Dell'educazione E Lo Sviluppo Associazione (CEIPES) (Italy)
- Escola Técnica de Imagem e Comunicação Aplicada (ETIC) (Portugal)
- Universita Telematica Internazionaleuninettuno (UNINETTUNO) (Italy)
- Wyzsza Szkola Ekonomii I Innowacji W Lublinie (WSEI) (Poland)
- Inercia Digital Sl (INERCIA) (Spain)

3D Printing in VET project aims to provide a competitive training program that would support teachers and educators to gain the expertise and competence needed for the use of 3D Printers in VET sector. Even though the requirement for better practices and a sound procedure for 3D preparing for teachers is obvious, every community and context are unique, therefore has specific requirements. To understand these contextual needs, a questionnaire is prepared, interviewing experts across all partnering countries (Spain, Greece, Germany, Italy, Poland, Portugal) on the 3D Printing industry. This information is essential in order to get a better understanding about the habitat of the sector in their own context. The results of this questionnaire will present the “status quo” of 3D Printing practices across Europe and will serve to develop an innovative and internationally accepted 3D Printing education programme.

This questionnaire is a background research on the 3D Printing Skills and Competencies of Educators for whom we design and implement new training programs to facilitate the adoption of 3D printing in education.

The questionnaire was distributed by the project partners through an e-mail that contains the link to an online survey to the most appropriate target group users. The partners also contacted their appropriate associated members to share the survey. The survey was prepared in 6 different languages – German, Greek, Italian, Polish, Spanish and Portuguese, consisting of 14 simple, straightforward, practically oriented and easy to answer questions, that needed to be answered by simply selecting the most fitted of the predefined answers.

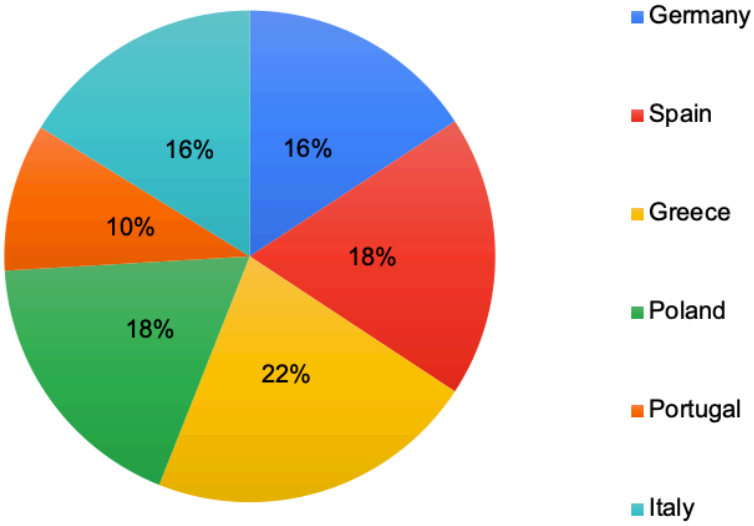
The aim of this survey is to gather real life input and experiences of the community, about personal knowledge and experience with educational training programs. The results are summarised to prepare a needs assessment of the demands on teachers who want to become active in the context of 3D printing technologies. The results will be evaluated to prepare a more comprehensive 3D Printing training materials.

Below we will present the obtained results. The study sample consists of answers given by 216 participants from all partner countries.

Questionnaire Addressed: 3D Printing Skills and Competencies of Educators

Collected results
Regarding Questions 1,4 and 5, across all partnering countries

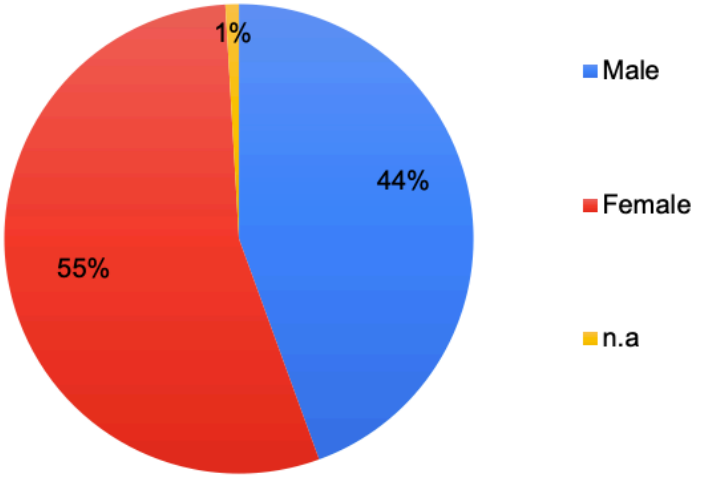
Question 1: Where are you from?



General Comment:

From the total of 216 people answering the questionnaire 16% are from Germany, 18% are from Spain, 22% are from Greece, 18% are from Poland, 10% are from Portugal and 16% are from Italy.

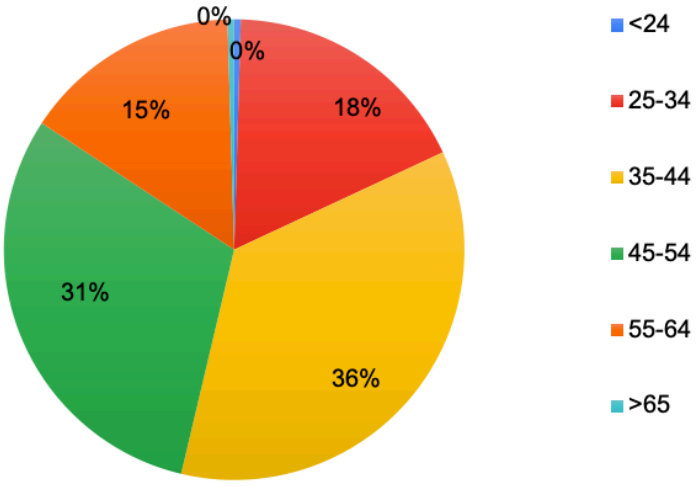
Question 4: What is your gender?



General Comment:

In terms of gender, this questionnaire is answered by, 55% female and 44% male participants. 1% chose not to give an answer.

Question 5: What is your age?



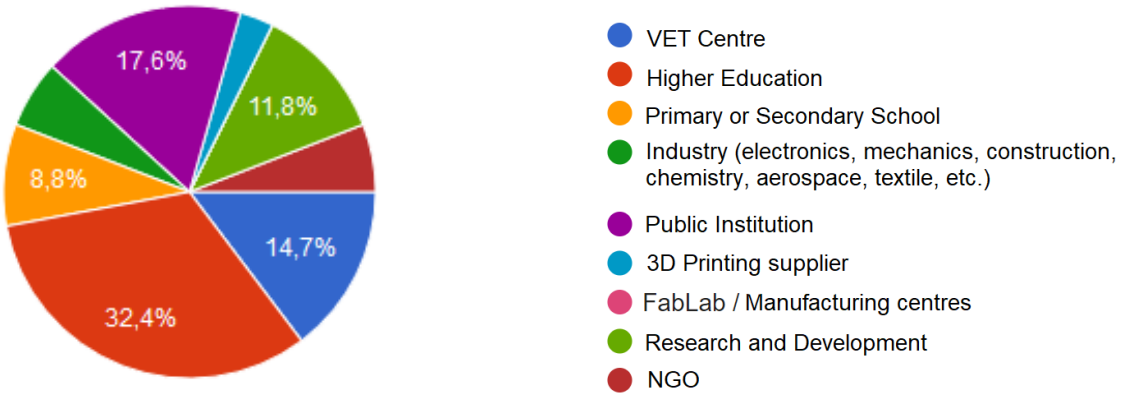
General Comment:

Regarding the age of our participants, 18% are between 25-34 years old, 36% between 35-44 years old, 31% between 45-54 years old and 15% between 55-64 years old.

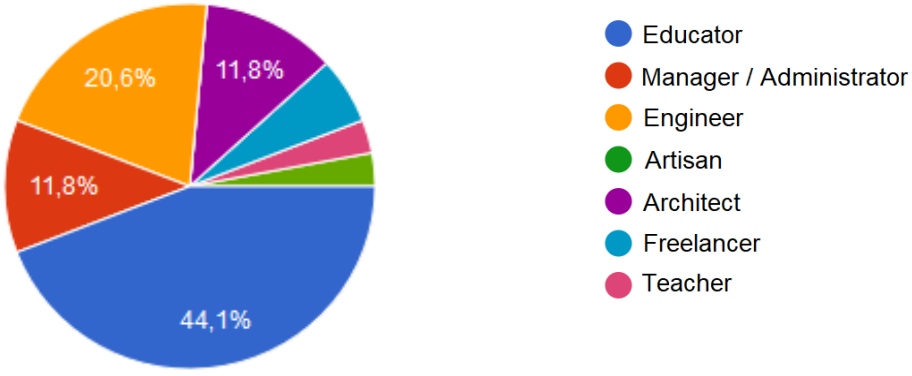
National Reports
National Report, Germany
Partner contribution: Karlsruhe Institute of Technology (KIT) Germany

- Institution and job position (Question 2 and 3)
    a. What kind of institution do you work for?
    b. What is your job position?

a. *From Germany we had a total of 34 responses from a mix of universities (the majority of respondents, 32,4 % of them), public institutes (the second biggest participating group with 17,6 %) and VET centres (14,7 %), industry (11,8 %) and a minority of NGOS, primary schools and 3D print providers.*

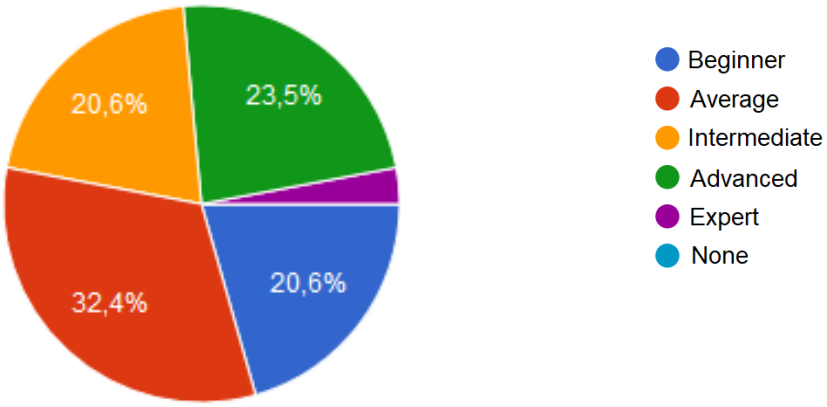


b. *In terms of profession, the majority of respondents are made up of educators (44.1%), while the second largest group is made up of engineers (20.6%), managers (11.8%) and architects (11.8%).*

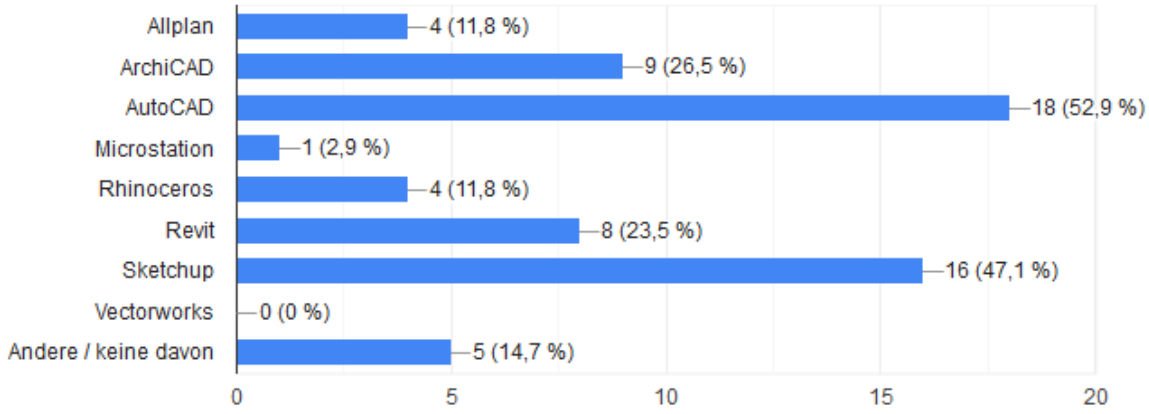


- Knowledge and experience (Questions 6 and 7)
    a. Please rate your level of knowledge in information technologies in general
    b. Do you have knowledge or experience in one or more of the modelling tools listed below?

a. *The half of survey respondents from Germany had a good level of IT in general, with the majority rating their IT skills as average. The beginner level (20,6%), the well-founded level (20.6%) and the advanced level (23.5%) were almost equally represented.*



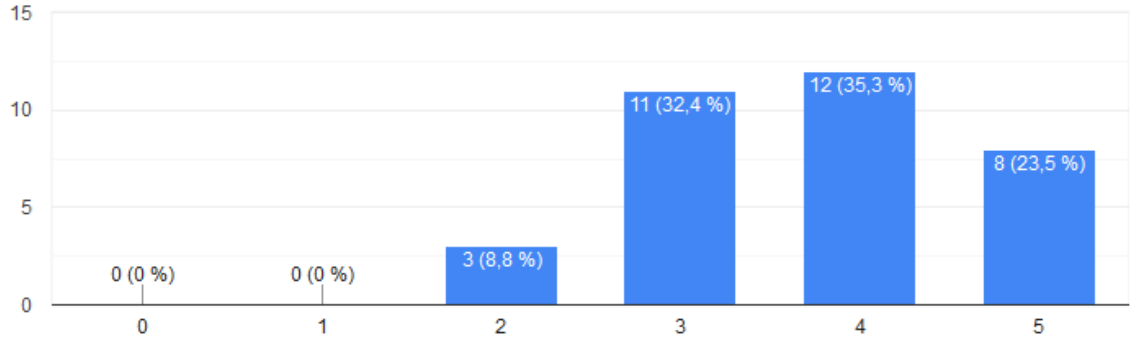
b. *Regarding their experience or knowledge of the modelling tools listed in the survey, a significant percentage of them are familiar with AutoCAD (52.9%) and Sketchup (47,1%). The level of knowledge was balanced for ArchiCad (26,5%) and Revit (both 23,5%), as well as for Allplan and Rhinoceros (both 11,8%). Only five of the respondents stated that they were familiar with other or none of these programmes.*



- How do you rate your creativity and willingness to experiment in general?

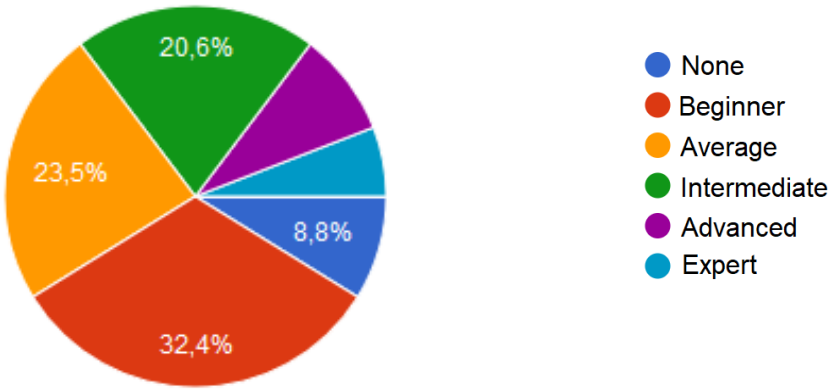
  (Question 8)

In the evaluation of their creativity and willingness to experiment in general, the German respondents are clearly in the upper range with an average rating of 3.7 overall. The majority ticked off their creativity and willingness to experiment with 4, as well as 3. A minority of 8 participants gave the highest score of 5, and a smaller minority of 3 respondents gave a score of 2. As can be seen in the graph below no one ranked their creativity in the 0 to 1 score category.

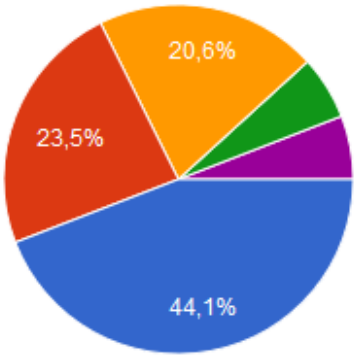


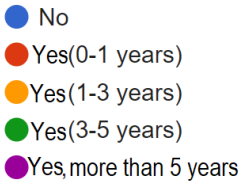
- Knowledge about and experiences in 3D Printing (Questions 9, 11 and 12a/b)
    a. Please rate your level of knowledge about 3D printing in general
    b. Have you been involved in the usage of 3D printing technologies before?
    c. Have you already attended any kind of education and training program (e.g. classroom course, seminar, workshop, e-learning, webinar, on-site education, etc.) on 3D printing?
        i. If yes: What kind of institution was the education and training program provider?
        ii. If yes, how long did it last?

a. *Regarding to the knowledge of 3D Printing, German respondents gave a balanced result in the area of initial knowledge. Only a small part (8,8%) has no knowledge at all. The majority (32,4%) see themselves as beginners, while 23.5% would rate their knowledge as average and 20.6% said they had an intermediate knowledge. The minority sees their level of knowledge in 3D printing at an advanced or expert level.*

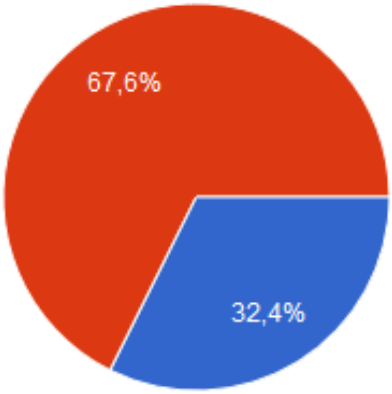


b. *Most of the German respondents indicated that they have little experience with the use of 3D printing technologies. Close to half of the respondents (15 out of 34) said they didn't have any experience in the use with 3D Printing at all, while the other half have less than one year (8 out of 34) or between one and three years' experience (7 out of 34). Only two stated that they have between three and five years of experience, as well as two others who have more than five years' experience.*

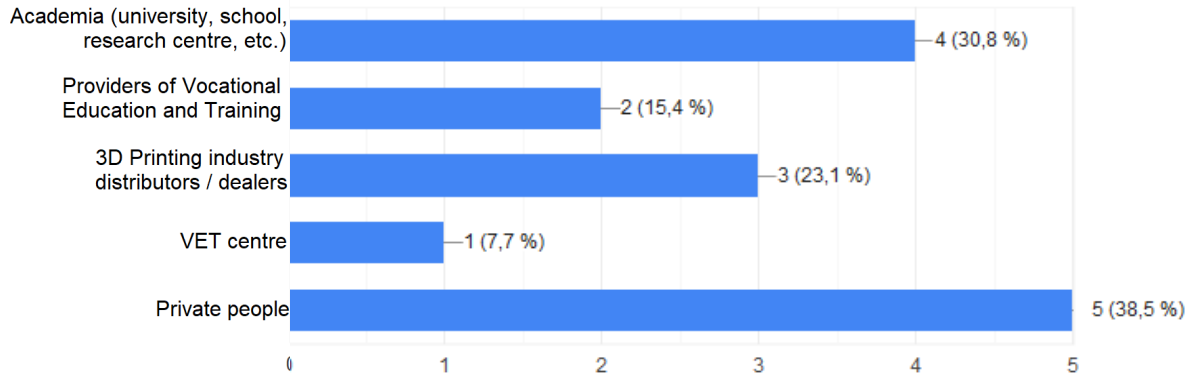




c. *When asked if they have ever attended any training (e.g. seminar, workshop, e-learning, web seminar, on-site training, etc.) on 3D printing, the majority of Germans (67.6%) answered no. Almost a third (32,4%) answered yes to the question.*

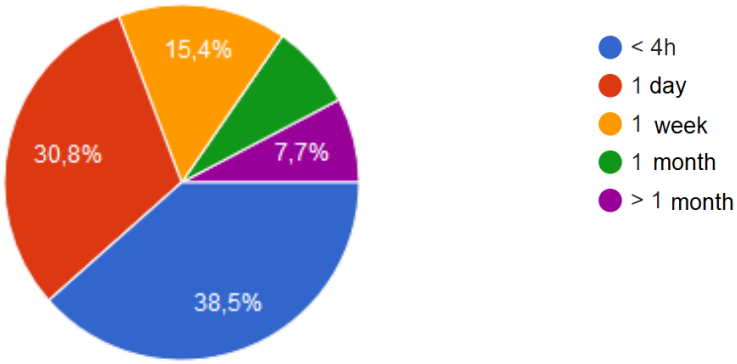


i. *Of those respondents that said they had participated in 3D Printing activities (13 respondents), the majority said these were offered by private persons followed by academic centre like a university, school or research centre, as well as 3D Printing Industry.*



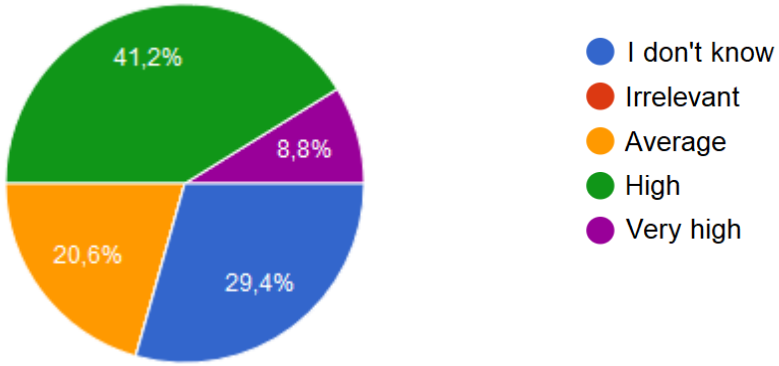
ii. If yes, how long did it last? (13 respondents)

When asked about how long the training lasted more than a third respondents said less than 4 hours and almost a third said more than 1 day. Another third split into two persons who said the training lasted one week, and one person each who indicated one month and more than one month.



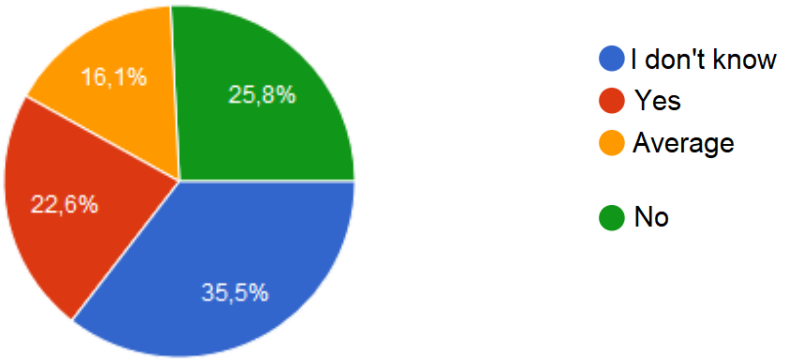
- What do you think about the importance of 3D printing technologies? (Question 10)

When asked what they think about the importance of 3D printing technologies, the German respondents split into almost a half who said that they consider the topic to be very important (41.2%) and almost another half, which in turn split into some who considered the topic to be of average importance (20.6%) and some who aren't sure about the importance of 3D printing technologies. Only three of the participants said the topic is highly important.

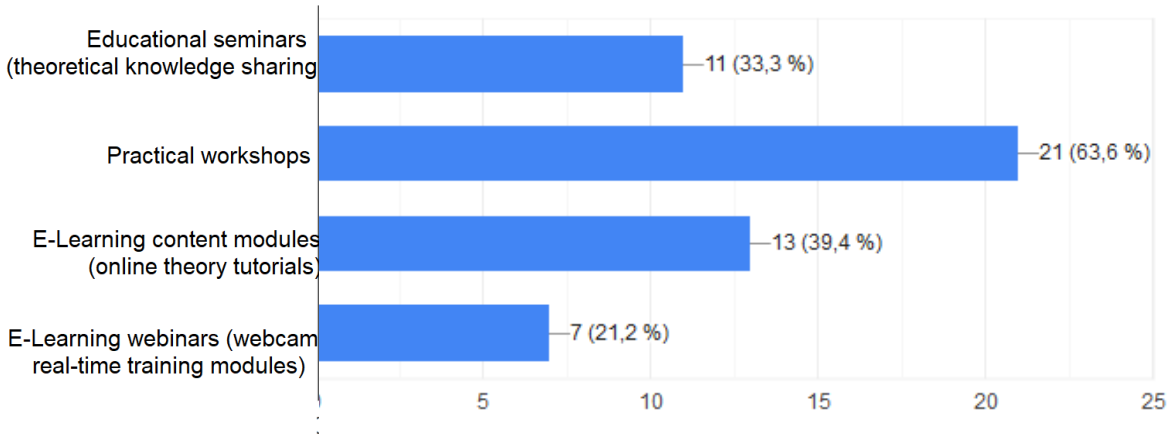


- Necessary and meaningful courses and further education (Question 13 and 14)
    a. Do you think there are enough education and training programs for 3D printing available in your surroundings?
    b. What kind of education and training offer concerning 3D printing do you think is missing/needs to be improved or upgrade?

a. *More than a third of German respondents (35,5%) said that they did not know when it comes to the question, if there were enough education and training programs for 3D printing available in their surroundings. Almost another third (25,8%) answered the question with no. More than another third is divided into a few who said yes (22.6%) and a few who said that there were enough training programs for 3D printing available in their area (16,1%).*



a. *When asked what kind of 3D printing education and training programme was needed or should be updated / improved, majority of German participants pointed to practical workshops (21 out of 33). A total of 13, the second largest group of survey respondents said more E-Learning content modules like online theory tutorials seminars were needed, 11 pointed to educational seminars and seven to E-Learning webinars.*

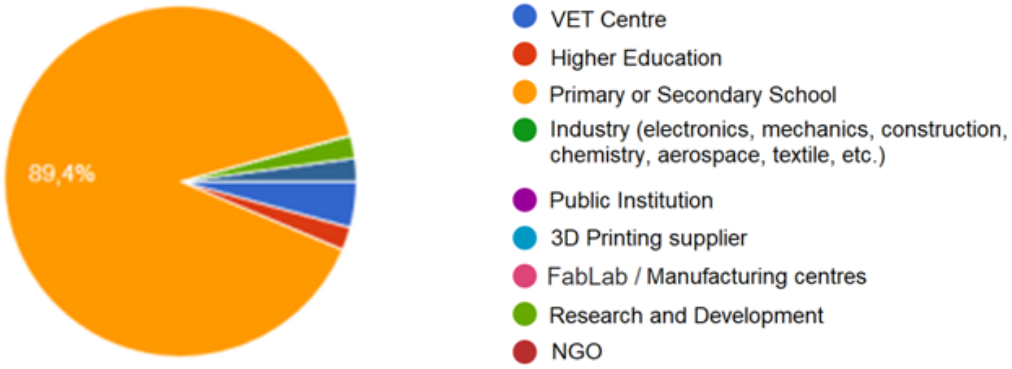


National Report, Greece
Partner contribution: European Education and Learning Institute – (EELI), Greece

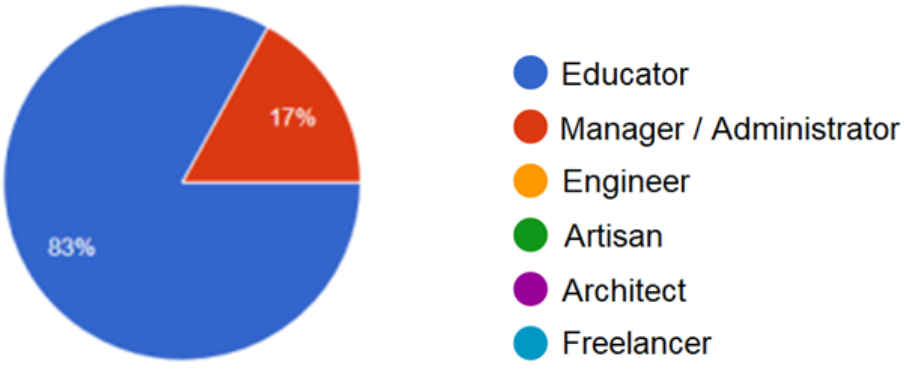
- Institution and job position (Question 2 and 3)
    a. What kind of institution do you work for?
    b. What is your job position?

In the second and third question of this survey we had 47 responses.

a. The majority of the Greek participants are working in the primary, secondary or grammar schools with an 89.4% (42 responses) and 2 participants (4.3%) are working in VET centre.

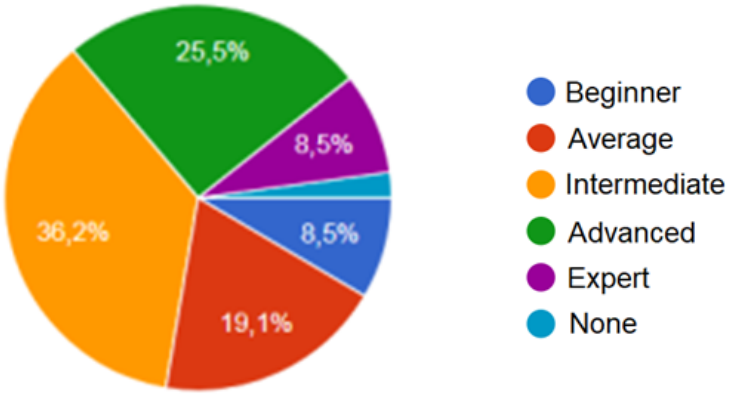


b. Concerning their profession, the vast majority of the participants with an 83% (39 responses) are Educators and the rest of them with a 17% (8 responses) are Administration staff.

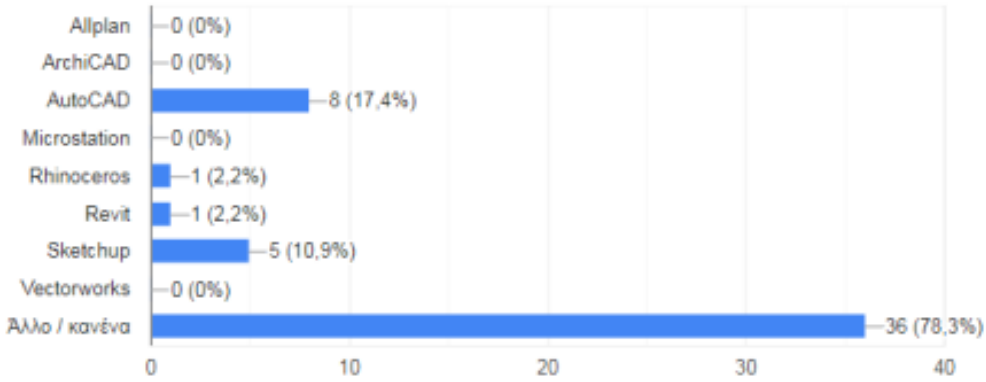


- Knowledge and experience (Questions 6 and 7)
    a. Please rate your level of knowledge in information technologies in general
    b. Do you have knowledge or experience in one or more of the modelling tools listed below?

a. The level of the majority of the Greek participants, regarding their knowledge in IT in general, is Intermediate level with a 36.2% (17 responses). The 25.5% of the responders (12 of the 47) have Advance knowledge and the 19.1% (9 of the total) have Average level. 4 participants considered themselves Experts (8.5%), 4 rated themselves as Beginners and only 1 of them, with a 2.1%, has no knowledge at all.



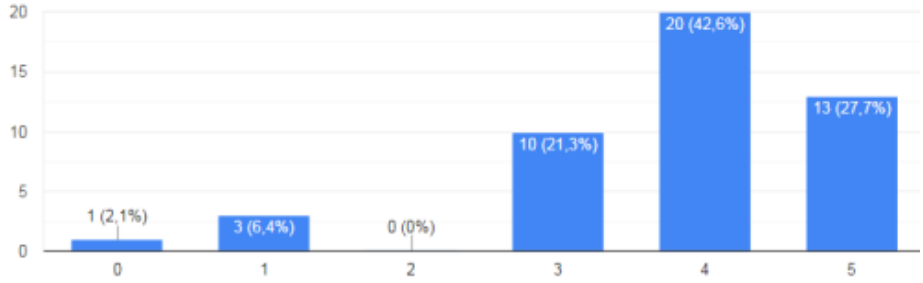
b. In question no 7 we had 46 responses. The majority of the Greek participants had no experience or knowledge of the proposed modelling tools (78.3%), while 8 of them had some experience in AutoCAD (17.4%), 5 of them in Sketchup (10.9%) and only one of them in Rhinoceros (2.2%) and another one in Revit (2.2%). None of the respondents were familiar with Allplan, ArchiCAD, Microstation or Vectorworks.



- How do you rate your creativity and willingness to experiment in general?

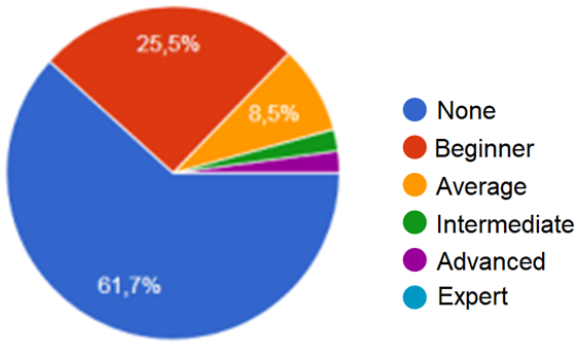
  (Question 8)

As we can see in the graph below, the majority of the Greek participants (more than the 91%) rated their creativity and willingness to experiment in general pretty high, from 3 to 5 in a scale of 1 to 5. Specifically, they gave an average rating of 3.78 overall. The majority of the participants (42.6%) rated their creativity and experimental willingness with 4, then the 27.7% with 5 and the 21.3% with 3. No one ranked their creativity with 2, only a small minority of 3 participants gave a rating of 1 and 1 participant rated his/her creativity and willingness to experiment with 0.

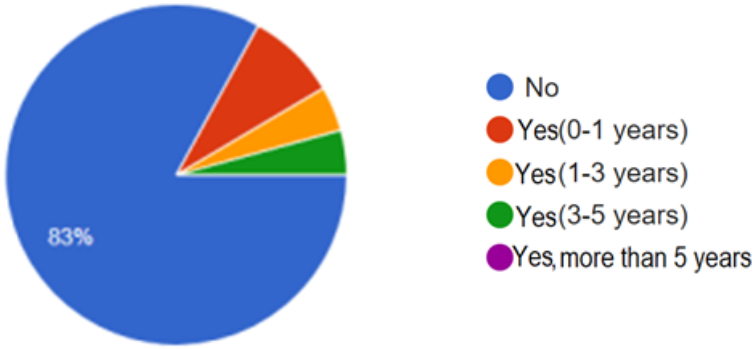


- Knowledge about and experiences in 3D Printing (Questions 9, 11 and 12a/b)
    a. Please rate your level of knowledge about 3D printing in general
    b. Have you been involved in the usage of 3D printing technologies before?
    c. Have you already attended any kind of education and training program (e.g. classroom course, seminar, workshop, e-learning, webinar, on-site education, etc.) on 3D printing?
        i. If yes: What kind of institution was the education and training program provider?
        ii. If yes, how long did it last?

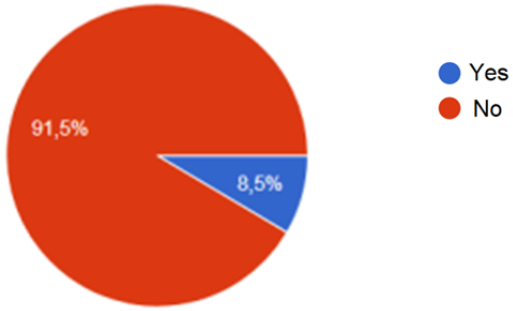
a. More than 87% of the Greek responders evaluated their knowledge of 3D Printing as very poor. The majority of the participants 61.7% (29 responders) have no knowledge of 3D printing in general and the 25.5% is at the beginner level. Only the 4.2% evaluated their knowledge as Intermediate and Advanced and the rest 8.5% (4 participants) ranked their knowledge as Average.



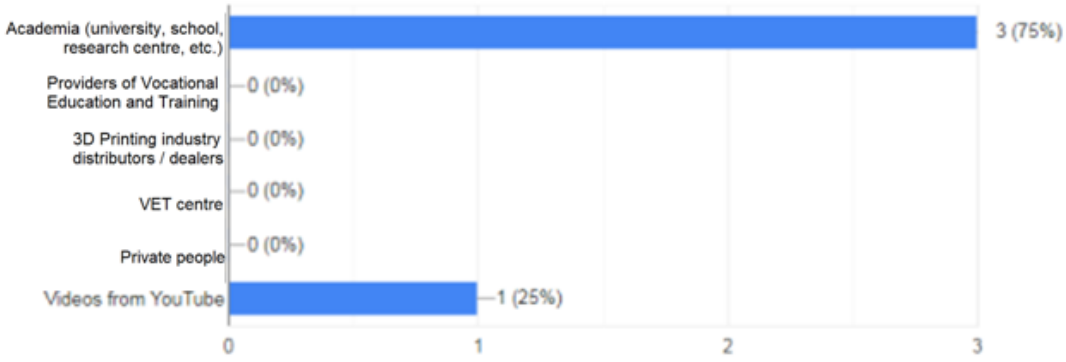
b. The vast majority, 83% of the Greek participants had never been involved in the use of 3D printing technologies before (39 out of 47). Four participants have been involved in the use of 3D printing technologies less than a year ago, while a small percentage of the rest were equally split between having 1 to 3 years' experience (2 participants) and 3 to 5 years' experience (2 participants).



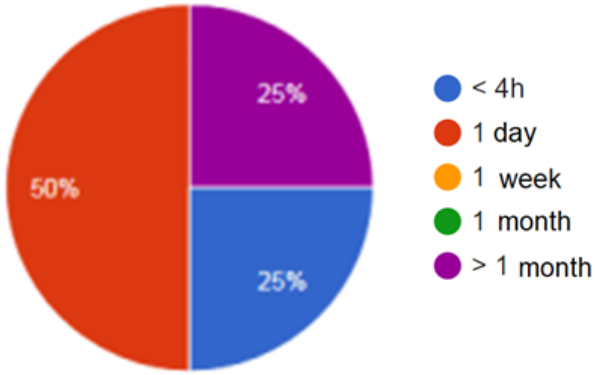
c. The Greek responders, overwhelmingly (43 out of 47 responders), have never attended any kind of education and training program on 3D printing and only 4 of the total responders participated in 3D Printing activities.



i. Of those 4 participants, 3 of them responded that the institution that provided that training was an Academic institution such as an university, school, research centre, etc. and one participant answered that watched videos on YouTube regarding 3D Printing activities.

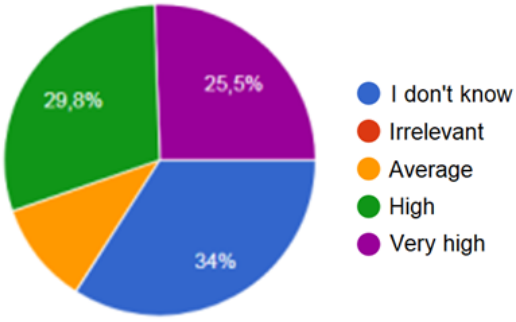


ii. Regarding the duration of this education and training program, the participants answered: 2 of them answered that the training lasted 1 day and the 2 remaining participants were split between the two extremes: less than 4 hours and more than 1 month.



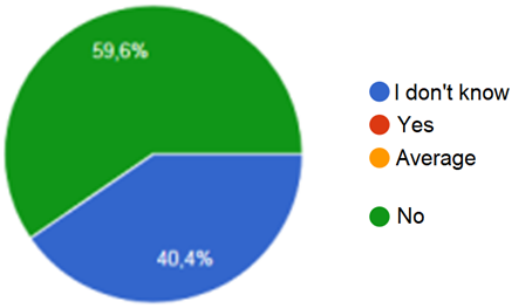
- What do you think about the importance of 3D printing technologies? (Question 10)

The majority of the Greek respondents weren't sure about the importance of 3D printing technologies but more than half of them considered it to be highly important (14 participants with 29.8%) and very highly important (12 participants with 25.5%). A minority of 5 participants (10.6%) considered 3D printing technologies' importance Average. No one considered 3D printing technologies Irrelevant.

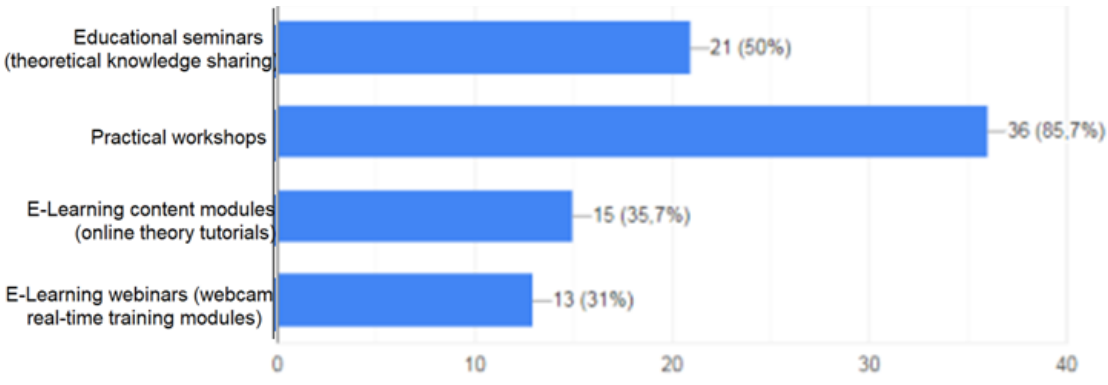


7. Necessary and meaningful courses and further education (Question 13 and 14)
    a. Do you think there are enough education and training programs for 3D printing available in your surroundings?
    b. What kind of education and training offer concerning 3D printing do you think is missing/needs to be improved or upgrade?

a. The majority of the Greek participants in the survey, 29 out of 47, almost 60%, didn't think that there are enough education and training programs for 3D printing available in their surroundings. The rest 19 participants, almost 40% responded that they didn't know.



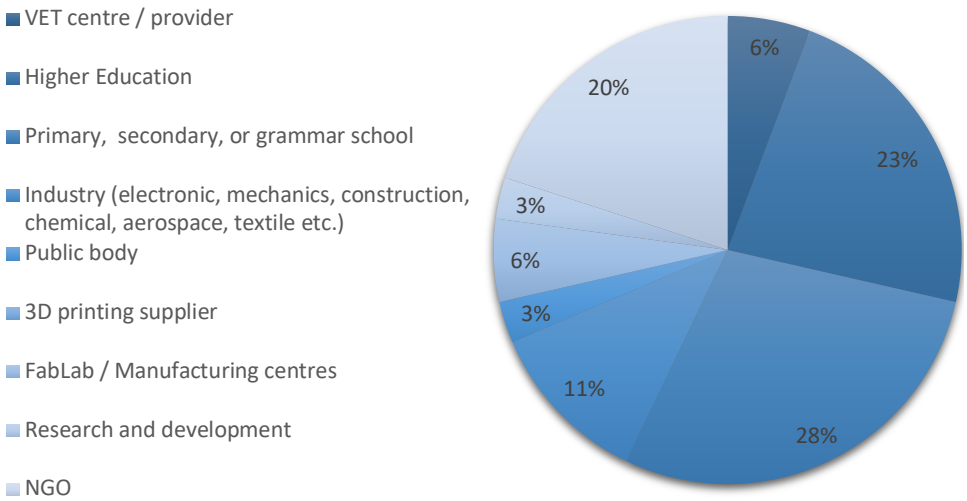
b. In the last question, the vast majority of the Greek participants (36 participants out of 42 - 85.7%) consider that practical workshops are needed and should be updated / improved. The second largest group, half of the survey respondents, answered that more educational seminars are needed, 15 participants consider that E-learning content modules must be updated / improved and 13 of them think that E-learning webinars are missing or need to be improved or upgraded.



National Report, Italy
Partner contribution: Centro Internazionale Per La Promozione Dell'educazione E Lo Sviluppo Associazione (CEIPES), Italy

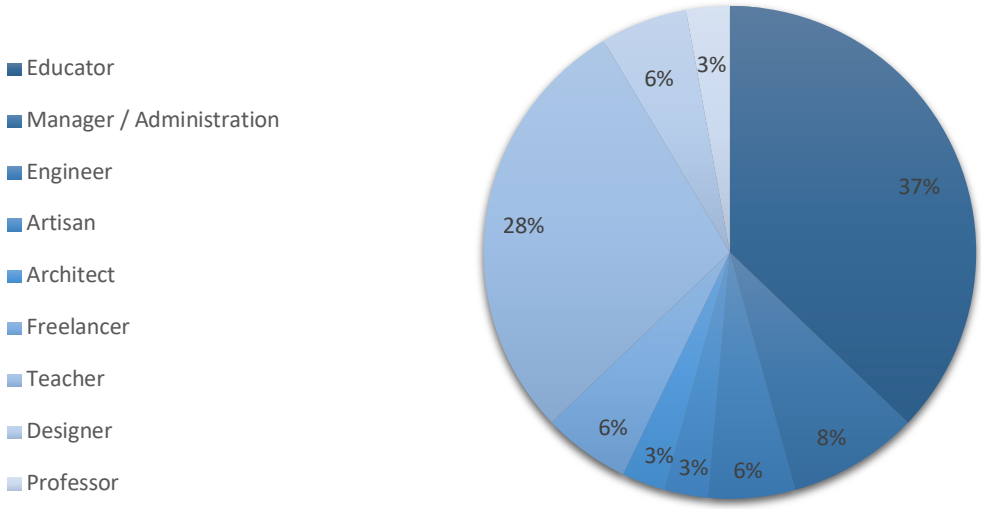
- Institution and job position (Question 2 and 3)
    a. What kind of institution do you work for?
    b. What is your job position?

Question a.



The majority of Italian participants to this survey works in the primary, secondary or grammar schools with a 29%, we then have higher education teachers with a 23% and NGOs with a 20% of participants.

Question b.

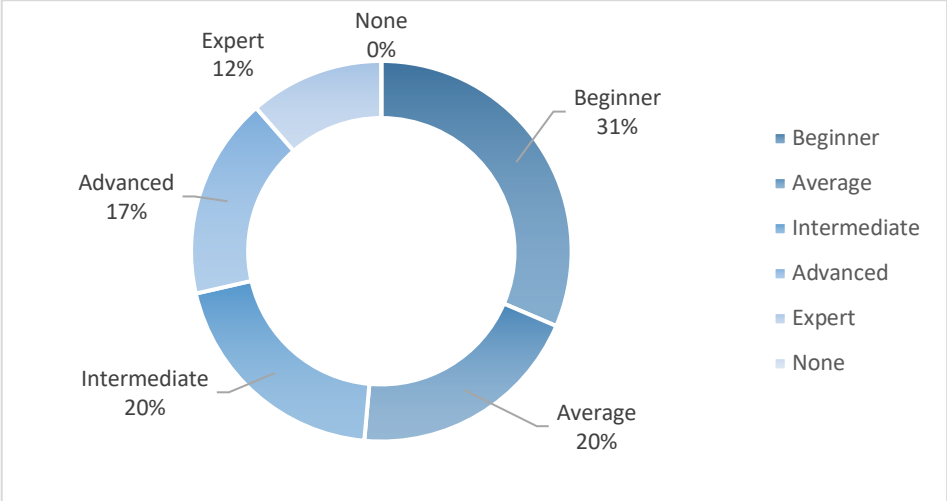


The majority of Italian participants who took part to this survey work as educators with a 37%, then there are teachers with 29% and managers/administrators with a 9%.

Knowledge and experience (Questions 6 and 7)

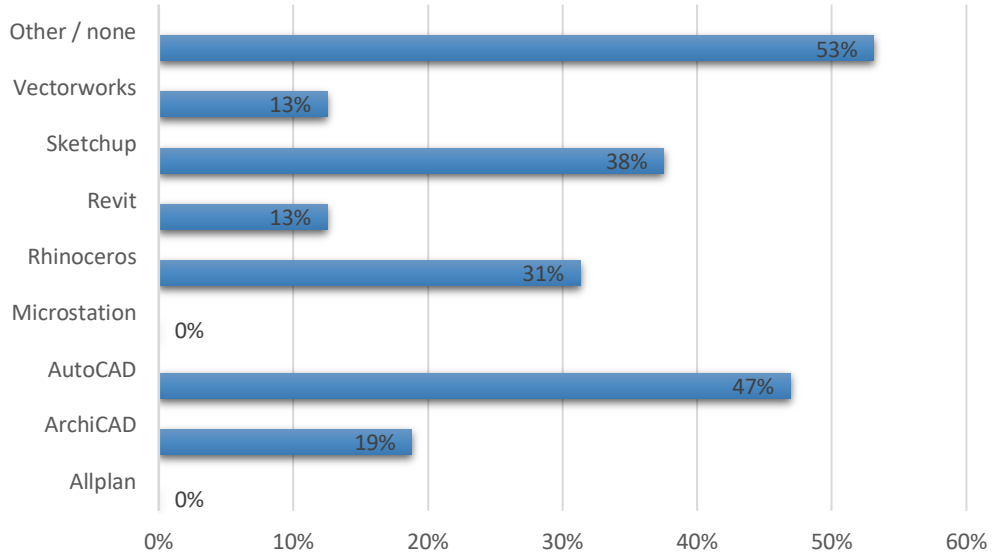
c. Please rate your level of knowledge in information technologies in general
d. Do you have knowledge or experience in one or more of the modelling tools listed below?

Question a.



The large part of Italian participants has beginner level of knowledge of information technologies in general with a 31%, after a 20% have average knowledge and 17% have advanced knowledge, only an 11% rated themselves as experts.

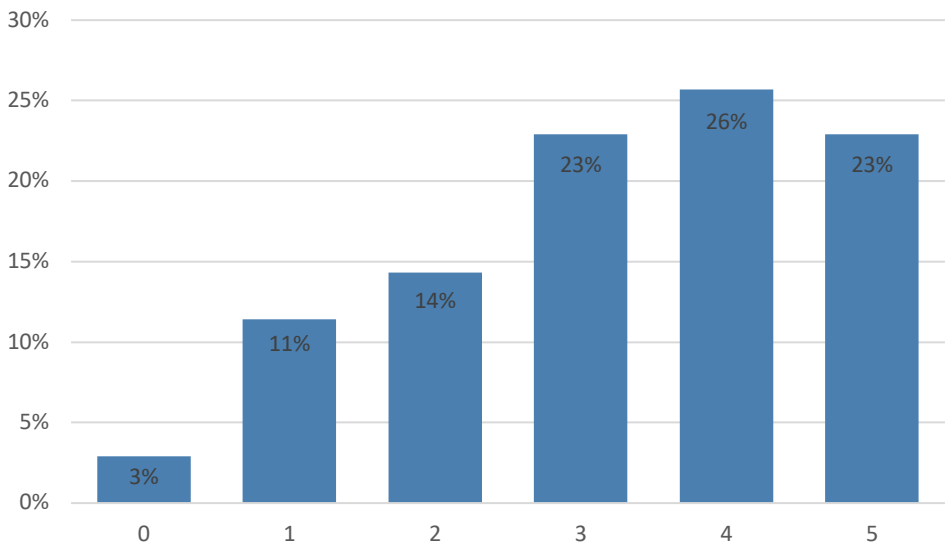
Question b.



The majority of Italian participants has no experience or knowledge of the proposed modelling tools (53.1%), while most participants only experienced AutoCAD (46.9%) and Sketchup (37.5%) and Rhinoceros (31.3%).

- How do you rate your creativity and willingness to experiment in general?

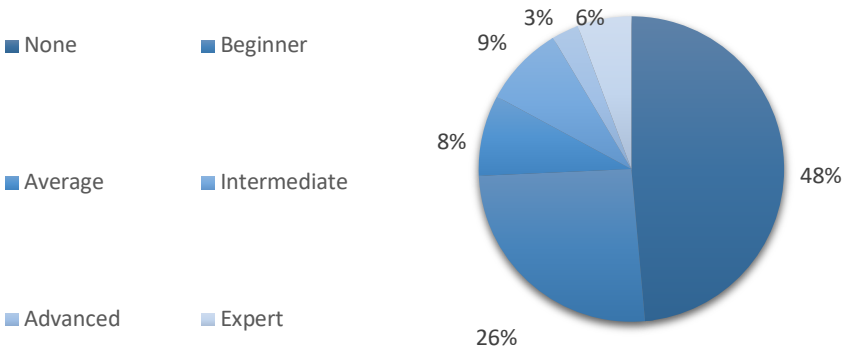
(Question 8)



Most of the Italian participant rank their creativity pretty high from to 5 in a scale of 1 to 5.

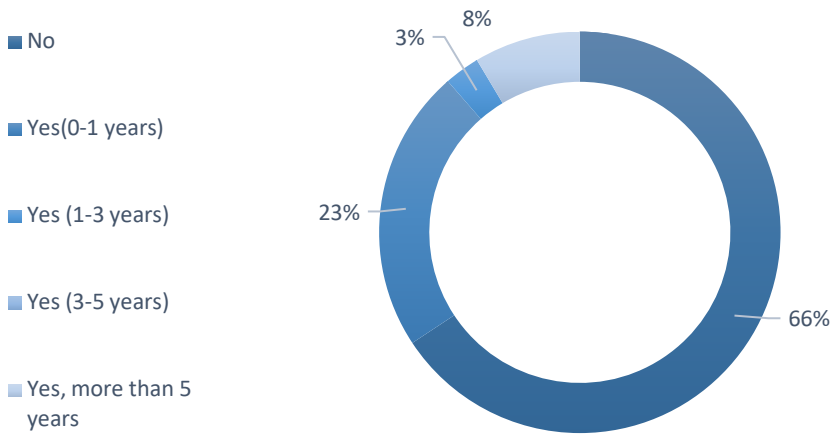
- Knowledge about and experiences in 3D Printing (Questions 9, 11 and 12a/b)
    a. Please rate your level of knowledge about 3D printing in general
    b. Have you been involved in the usage of 3D printing technologies before?
    c. Have you already attended any kind of education and training program (e.g. classroom course, seminar, workshop, e-learning, webinar, on-site education, etc.) on 3D printing?
        i. If yes: What kind of institution was the education and training program provider?
        ii. If yes, how long did it last?

Question a.



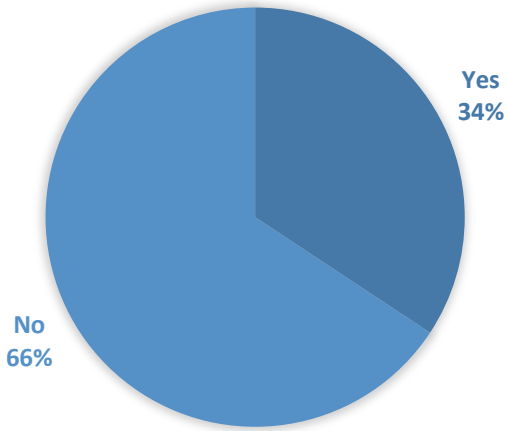
Almost half of the Italian participants have no knowledge of 3D printing in general and 26% is at the beginner level.

Question b.



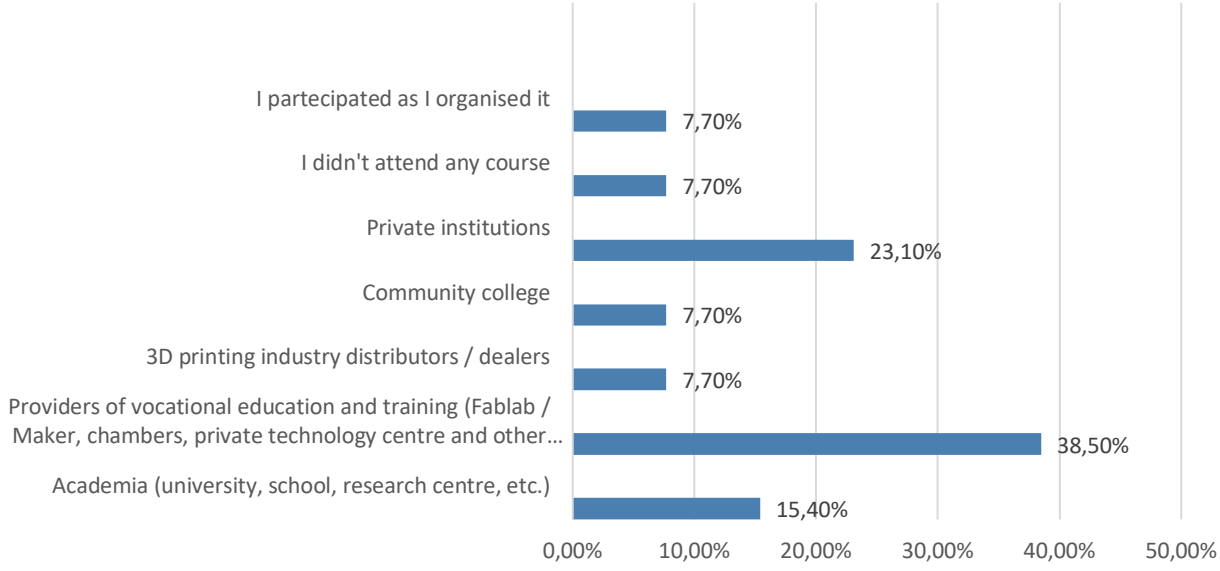
A big part of our participants has never been involved in the usage of 3D printing technologies before (66%), while 23% have only been involved for a period that extends to maximum a year.

Question c.



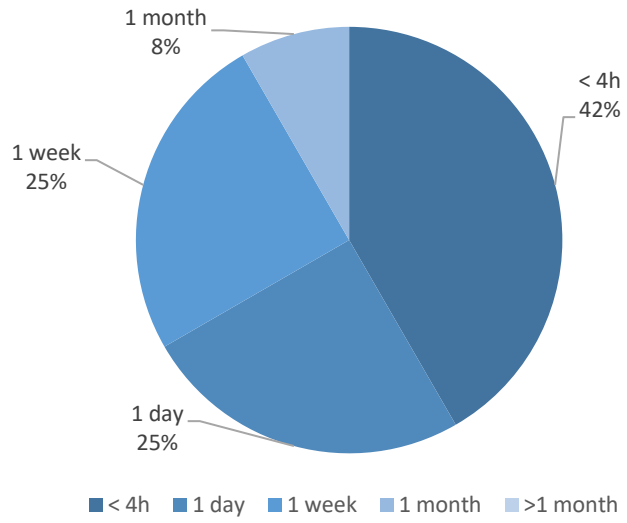
66% of the Italian participants has never been involved in any kind of education and training program.

i.)



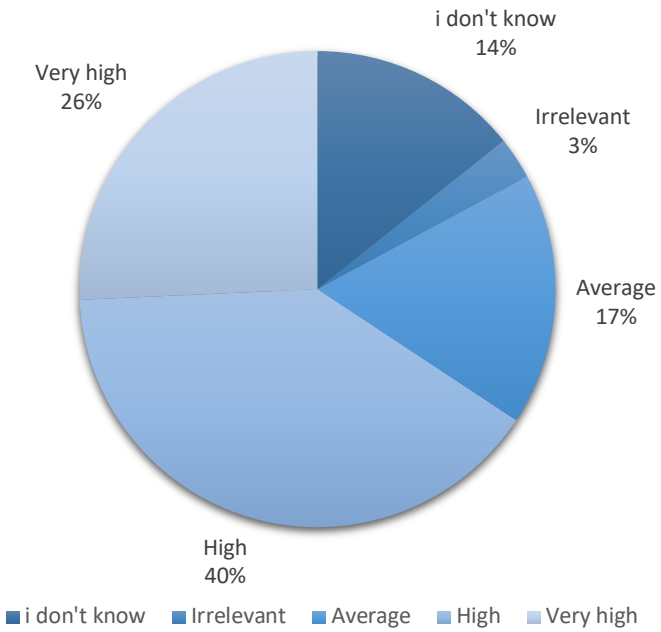
The majority of Italian participants have attended a course given by providers of vocational education and training (38.5%) while 23% of the participants from private institutions.

ii.)



None of the Italian participants have attended a >1month long course, actually the majority has attended a <4h course.

- What do you think about the importance of 3D printing technologies? (Question 10)

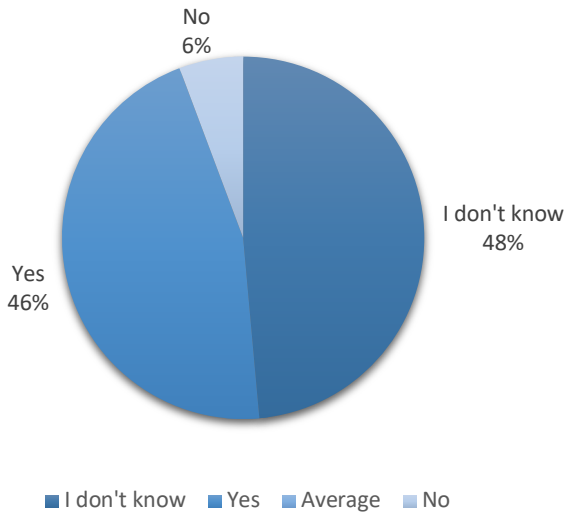


The majority of Italian participants believe that 3D printing technologies are important and 26% think that they are very important, only 1 participant thinks they are irrelevant.

Necessary and meaningful courses and further education (Question 13 and 14)

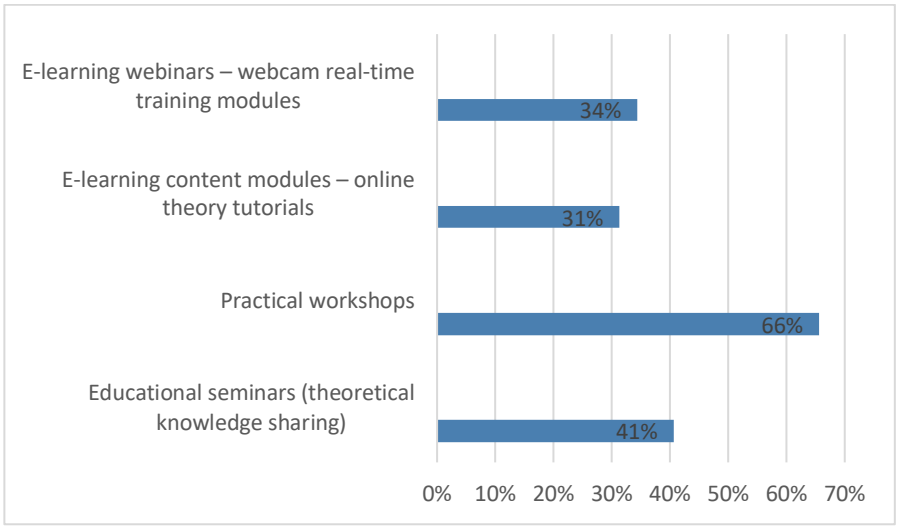
a. Do you think there are enough education and training programs for 3D printing available in your surroundings?
b. What kind of education and training offer concerning 3D printing do you think is missing/needs to be improved or upgrade?

Question a.



Almost half of the Italian participants don't know of any education and training programs for 3D printing in their surroundings, while the other 46% knows of them.

Question b.

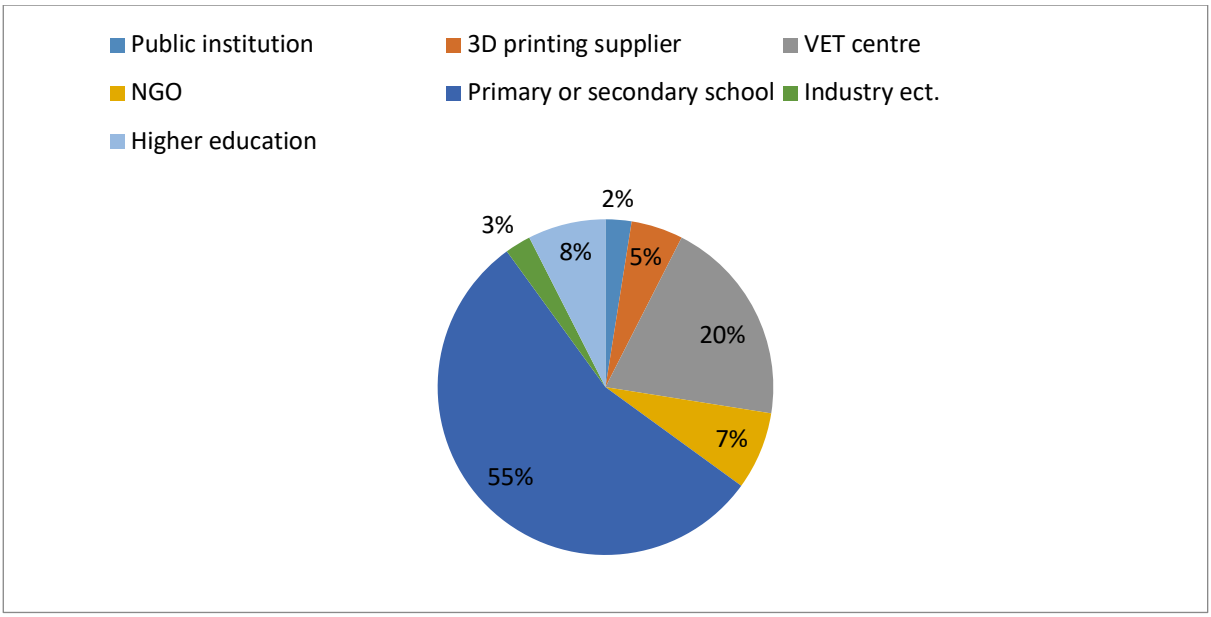


The majority of Italian participants thinks that practical workshops need improvement or are missing (65.6%), 40.6% think so for educational seminars and 31.3% feels that about e-learning webinars.

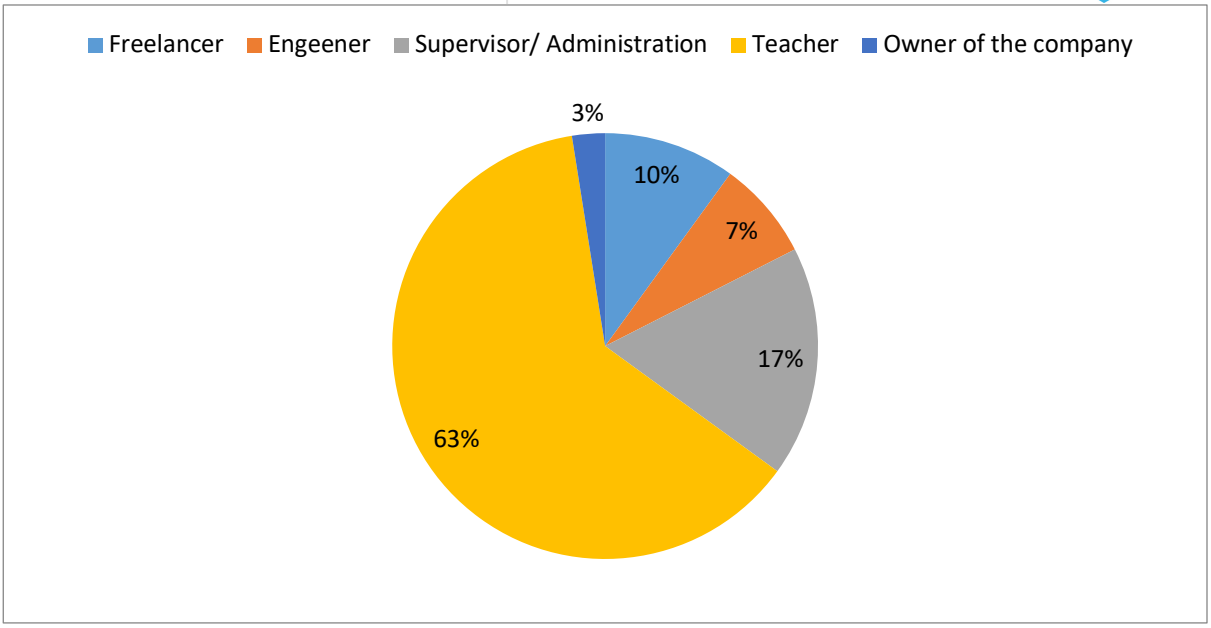
National Report, Poland
Partner contribution: University of Economics and Innovation in Lublin (WSEI), Poland

- Institution and job position (Question 2 and 3)
    a. What kind of institution do you work for?
    b. What is your job position?

a. *In Poland there were 40 responders. The majority were responders of VET schools over 50%, including secondary and high schools, the secondary group was responders from VET centres (20%). Third group was representatives of NGO's and Higher Education's. Fourth group represents 3D printing suppliers. There was for 1 responder from public institution and industry sector as well.*

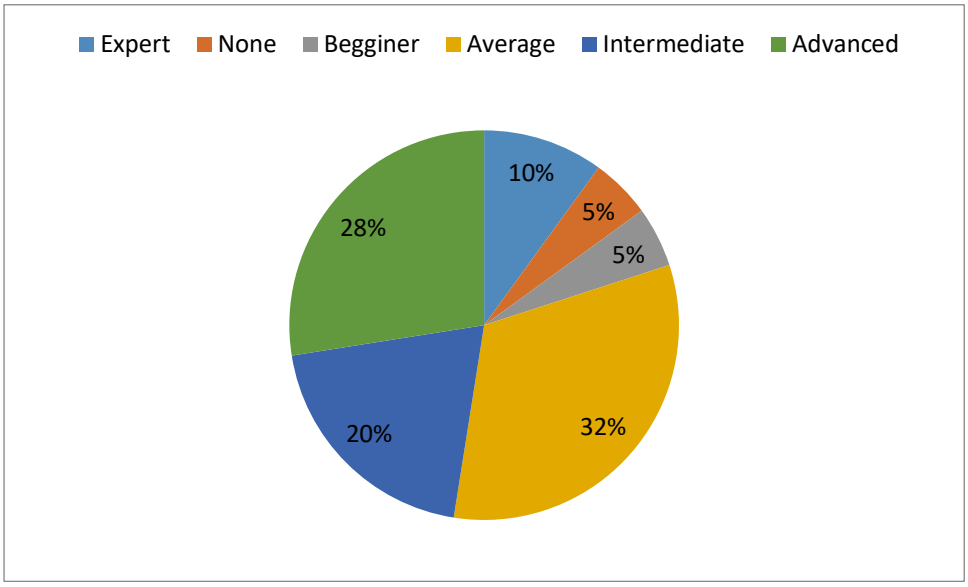


b. *Regarding professions, the majority of responders represent VET schools over 60% of them, including secondary and high school/ centres teachers, supervisors from administration sector (the second biggest participating group), the third group is freelancer – 10%. Two smaller groups of responders were engineers and 1 owner of the 3D printers company.*

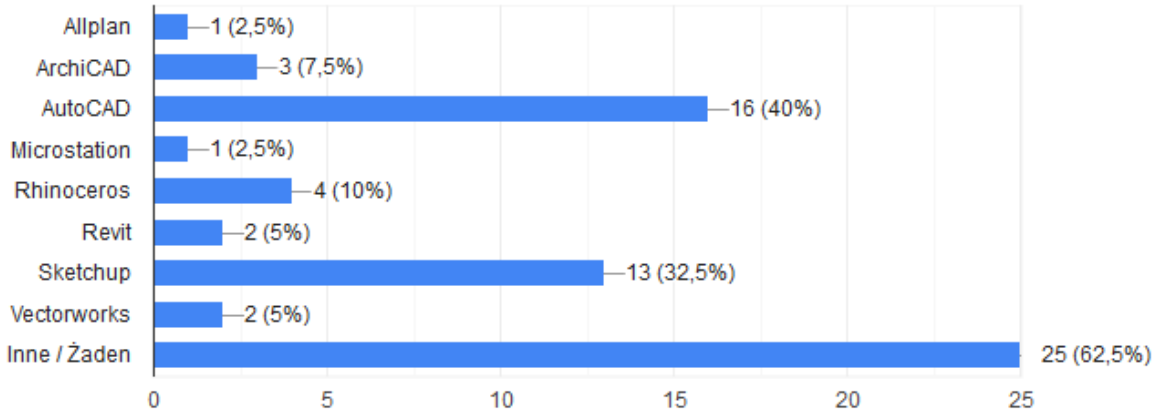


- Knowledge and experience (Questions 6 and 7)
    a. Please rate your level of knowledge in information technologies in general
    b. Do you have knowledge or experience in one or more of the modelling tools listed below?

a. *The majority of survey respondents from Poland had a very good level of IT skills, the majority of responders rated skill at average level (32%). But in total (58%) more than a half of responders declares Advanced or Intermediate level plus 10% were an Expert level. A small minority identified themselves as beginners or people with no IT knowledge (in total 4 respondents).*



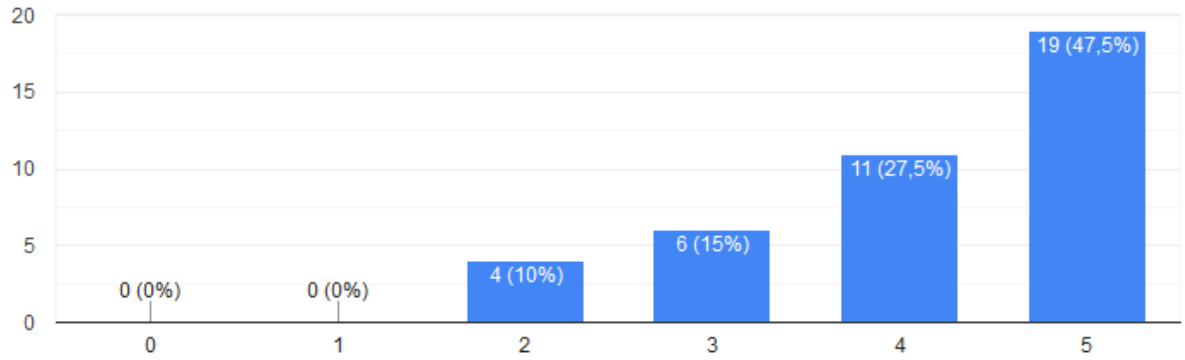
b. Regarding knowledge of experience of the modelling tools listed in the survey most of responders (25 people – 62,5%) said that they don't know anything about such tools. The most recognizable tool was AutoCAD, which is known by 16 responders (40%) and Sketchup, known by 13 responders (32,5%). Only 4 responders said that had knowledge about Rhinoceros tool (10%) and 3 responders know ArchiCAD (7,5%). The less known tools were Vectorworks and Revit only 2 responders indicated it the survey. With Allplan and Microstation were familiar only for 1 responder per each tool.



- How do you rate your creativity and willingness to experiment in general?

  (Question 8)

When rating their creativity and willingness to experiment in general, Polish respondents gave 5 to score their creativity and experimental willingness (19 responders which is 48%). The second biggest majority (11 responders which is 28%) gave 4 score for this question. A minority of 6 participants gave a rating of 3, and a smaller minority of 4 respondents gave a rating of 2. No one ranked their creativity in the 0 to 1 level. The average rating for this question is 4,13.



- Knowledge about and experiences in 3D Printing (Questions 9, 11 and 12a/b)

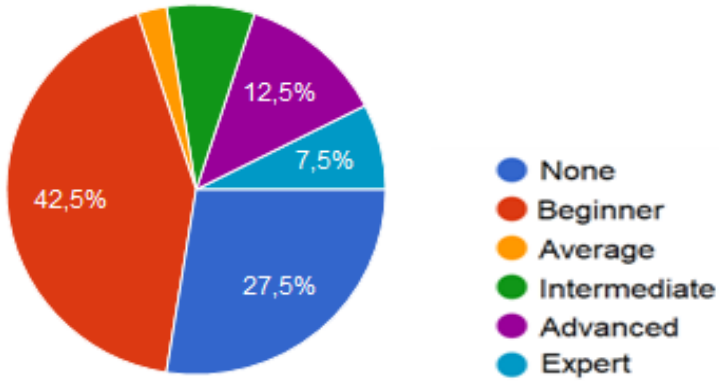
  a. Please rate your level of knowledge about 3D printing in general

  b. Have you been involved in the usage of 3D printing technologies before?

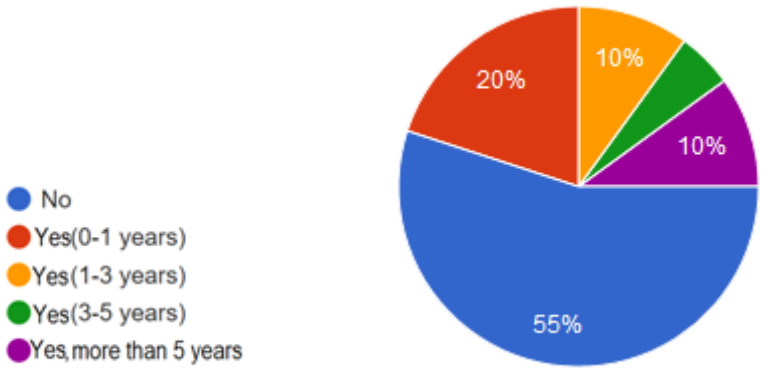
  c. Have you already attended any kind of education and training program (e.g. classroom course, seminar, workshop, e-learning, webinar, on-site education, etc.) on 3D printing?

    i. If yes: What kind of institution was the education and training program provider?
    ii. If yes, how long did it last?

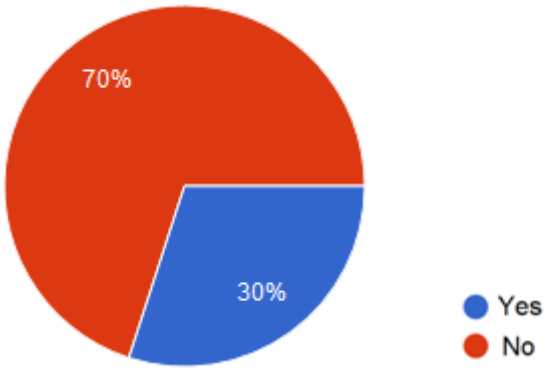
a. *Most of the Polish respondents evaluated their knowledge of 3D Printing as beginners (42,5%). One third of respondents (11 out of 40) said they didn't have any knowledge or experience with 3D Printing. Over 20% of responders (which is 8 people) rated their knowledge as an advanced level (12,5%) or as an expert in the field of 3D Printing (7,5%). Three of them ranked their knowledge of 3D Printing as Average and 1 as an Intermediate.*



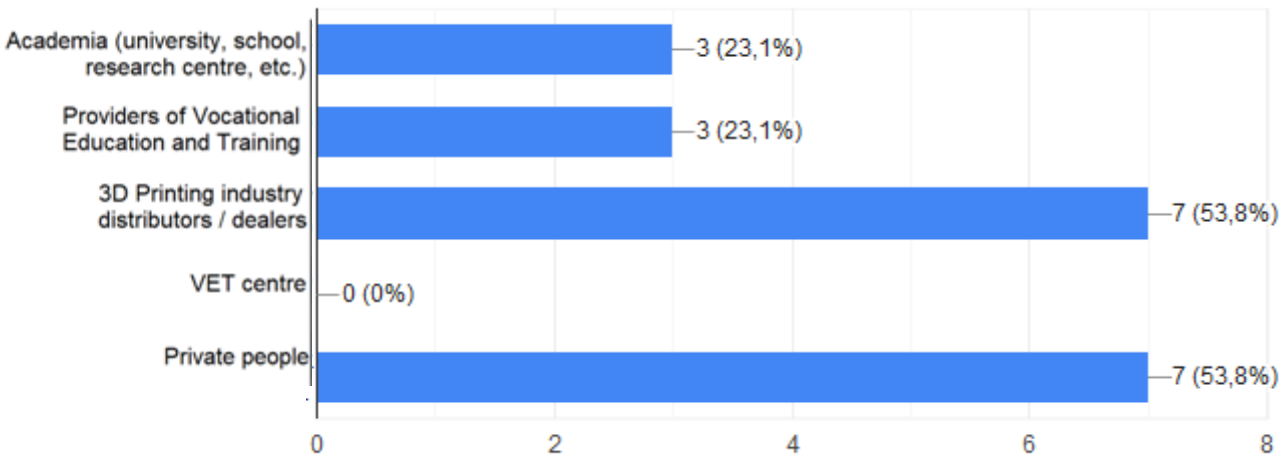
b. *The vast majority 55% of Polish survey participants said they hadn't been involved in the use of 3D printing technologies before (22 of 40). A 20% of responders had from 0 to 1 years' experience (8 respondents) and 20% percentage of participants were equally split between having 1 to 3 years' experience and more than 5 years of experience (for 4 respondents in each category). Only two participants said they had between 3 to 5 years' experience in 3D Printing.*



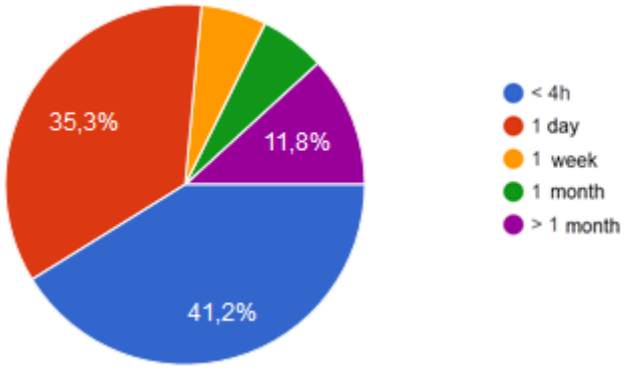
c. *Similarly, to the previous question, when asked whether they had participated in the use of 3D Printing technologies, the majority of Polish respondents said they hadn't (28 out of 40 responders), and only 12 participants declared that they participated in.*



i. *Of those respondents that said they had participated in 3D Printing activities, the majority had courses equally split between 3D printing industry distributors and dealers and private people (7 responders) and for 3 responders equally between Academic centres (including universities, schools, research centres etc.). None of them were educated by VET centre.*

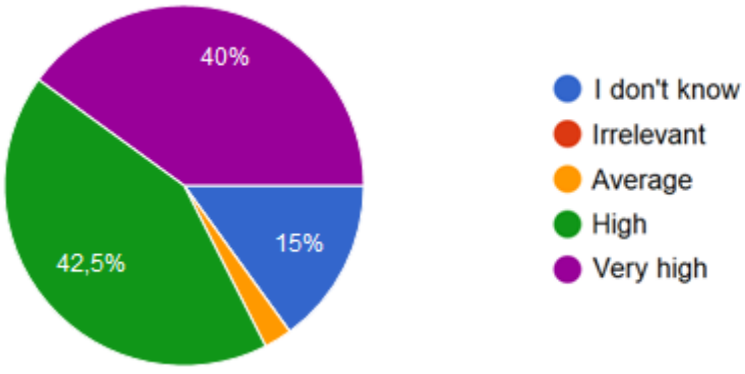


ii. When they were asked about trainings duration most of them said that it took more than 4 days (7 of 17 responders). The second group said that the training took 1 day (6 of 17 responders). Only 2 participants said that training lasted more than a month. And for 1 responder equally said the training lasted one week and one month.



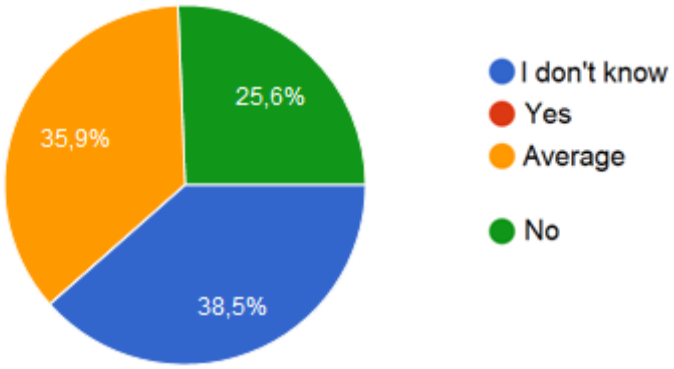
- What do you think about the importance of 3D printing technologies? (Question 10)

Regarding question about the importance of 3D printing technologies, the majority of Polish respondents were split into two main groups: very important which was rated by 16 responders and High as said 17 responders. 15 % of responders said that they don't know (6 of 40 responders) and one person said that is average importance of 3D printing technologies. No one considered 3D printing is irrelevant.

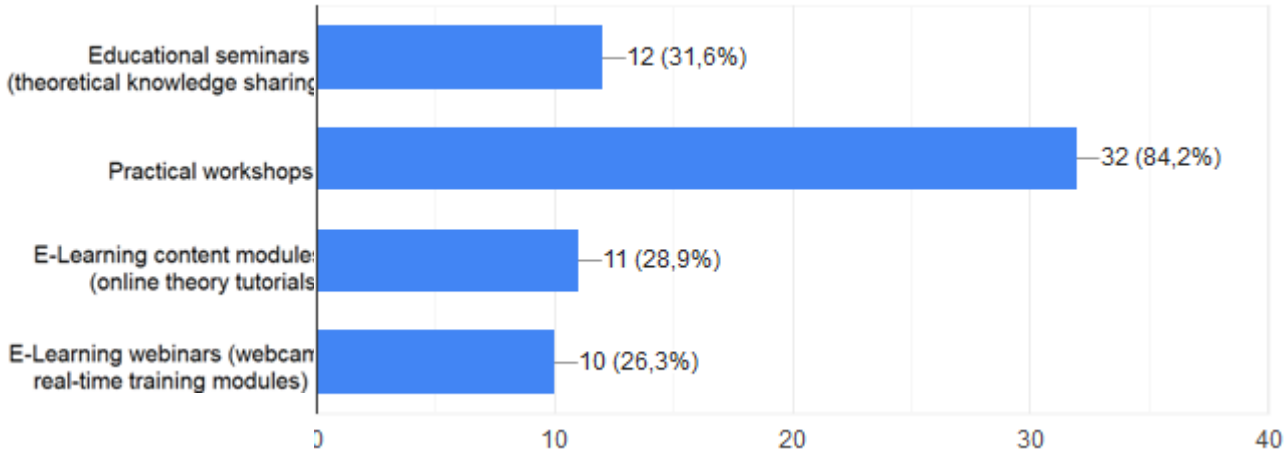


- Necessary and meaningful courses and further education (Question 13 and 14)
    a. Do you think there are enough education and training programs for 3D printing available in your surroundings?
    b. What kind of education and training offer concerning 3D printing do you think?

a. *When asked if they thought there were enough education and training programs for 3D printing available on the market, the majority of Polish respondents said they don't know (15 of 40 people) and almost equal number of responders said that the number of available programs and trainings is average (14 of 40 responders). But also 25,6% of participants 10 participants of 40, said no on this question.*



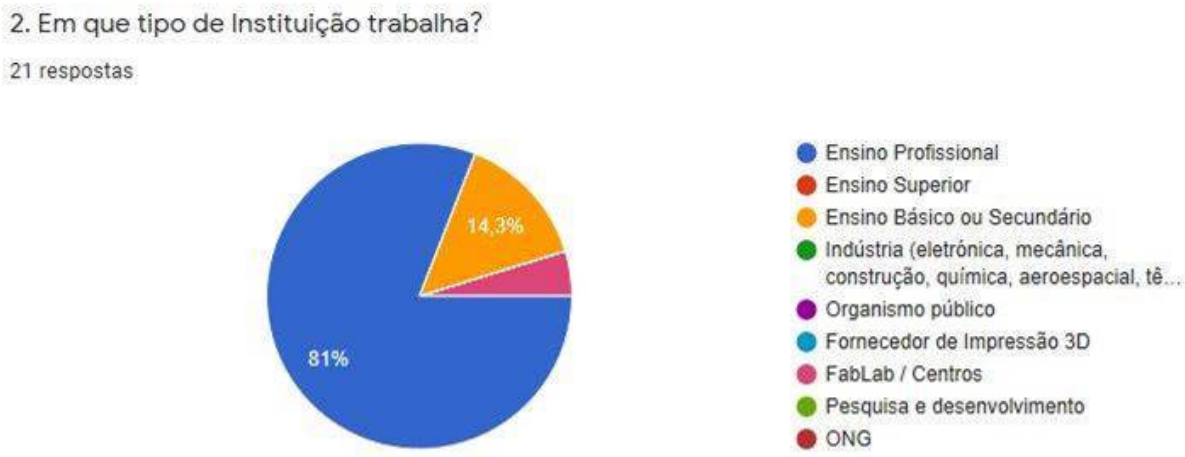
b. *When asked what kind of 3D printing education and training programme was needed or should be updated / improved, the vast majority of Polish participants said that the best option is practical workshops (32 out of 40). The next three groups had the almost the same number of responders, the second largest group of survey respondents said that they need more educational seminars (12 responders), the third group was pointed to E-learning content modules (11 responders) and 10 responders ticked on E-learning webinars.*



- Institution and job position (Question 2 and 3)
  a. What kind of institution do you work for?
  b. What is your job position?

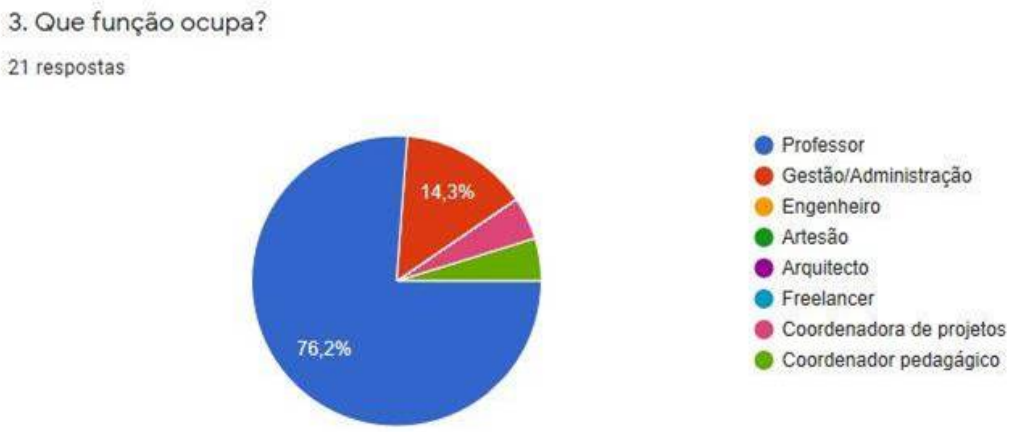
Question a.

Most of the participants who participated in this study work in Vocational Education (81%), with a lower percentage referring to working in Basic or Secondary Education (14.3%).



Question b.

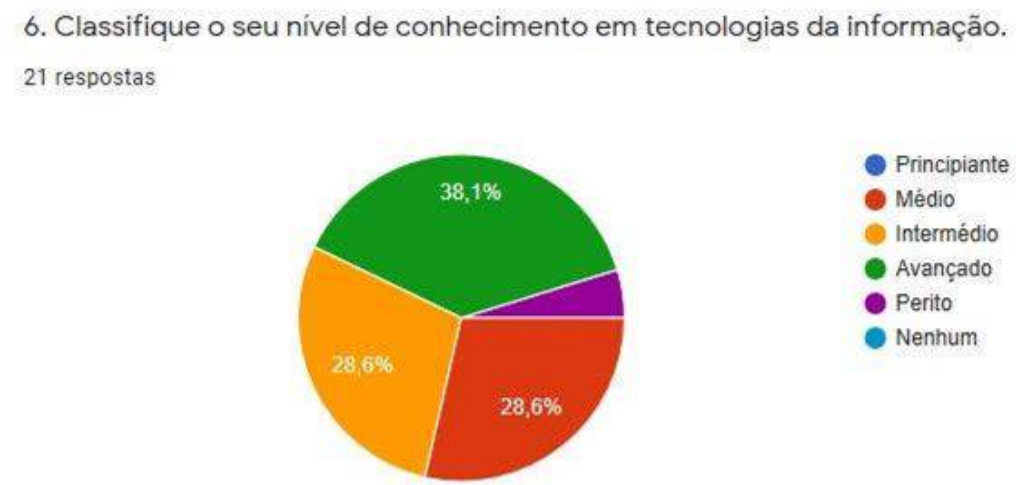
Regarding the positions held, 76.2% are Professors and 14.3% occupy positions in the Management / Administration area



- Knowledge and experience (Questions 6 and 7)
    a. Please rate your level of knowledge in information technologies in general
    b. Do you have knowledge or experience in one or more of the modelling tools listed below?

Question a.

With regards to the level of knowledge in information technology, 38.1% of the participants have an advanced level, 28.6 have a medium level and in the same percentage, 28.6% have an intermediate level.



Question b.

Most participants reported having knowledge or experience in AutoCAD (53.6%) and the same percentage (53.8%) in other types of modeling tools proposed. The remaining participants in a lower percentage report having knowledge or experience in Rhinoceros (30.8%), Sketchup (23.1%) and Revit (23.1%).

- How do you rate your creativity and willingness to experiment in general?

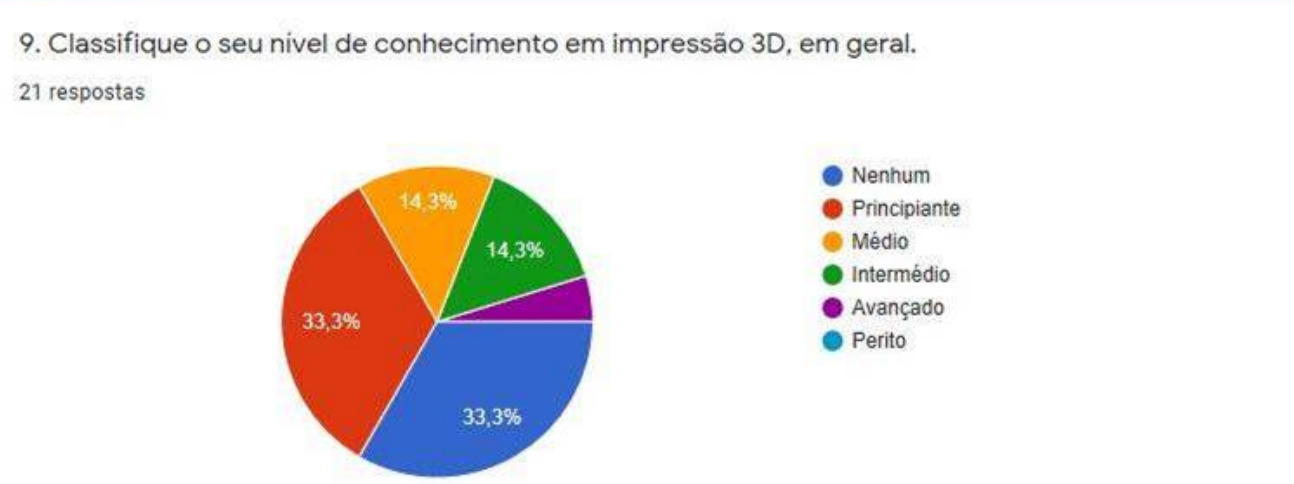
  (Question 8)

Most participants in Portugal (42.9%) rate their creativity and willingness to experiment quite high (5 on a scale of 1 to 5).

- Knowledge about and experiences in 3D Printing (Questions 9, 11 and 12a/b)
    a. Please rate your level of knowledge about 3D printing in general
    b. Have you been involved in the usage of 3D printing technologies before?
    c. Have you already attended any kind of education and training program (e.g. classroom course, seminar, workshop, e-learning, webinar, on-site education, etc.) on 3D printing?
        i. If yes: What kind of institution was the education and training program provider?
        ii. If yes, how long did it last?

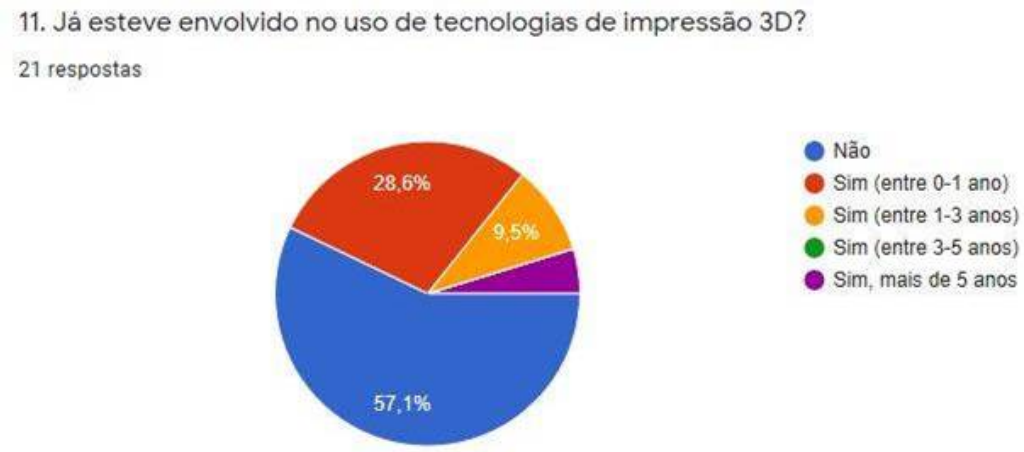
Question a.

In the present sample, 33.3% of the participants reveal that they have no knowledge of 3D printing, at the same time, the same percentage (33.3%) claims to have knowledge at the beginner level. Only 14.3% are in the middle and intermediate levels.



Question b.

More than half of our participants have never been involved in the use of 3D printing technologies before (57.1%), while 26.8% have only been involved for a maximum period of one year.

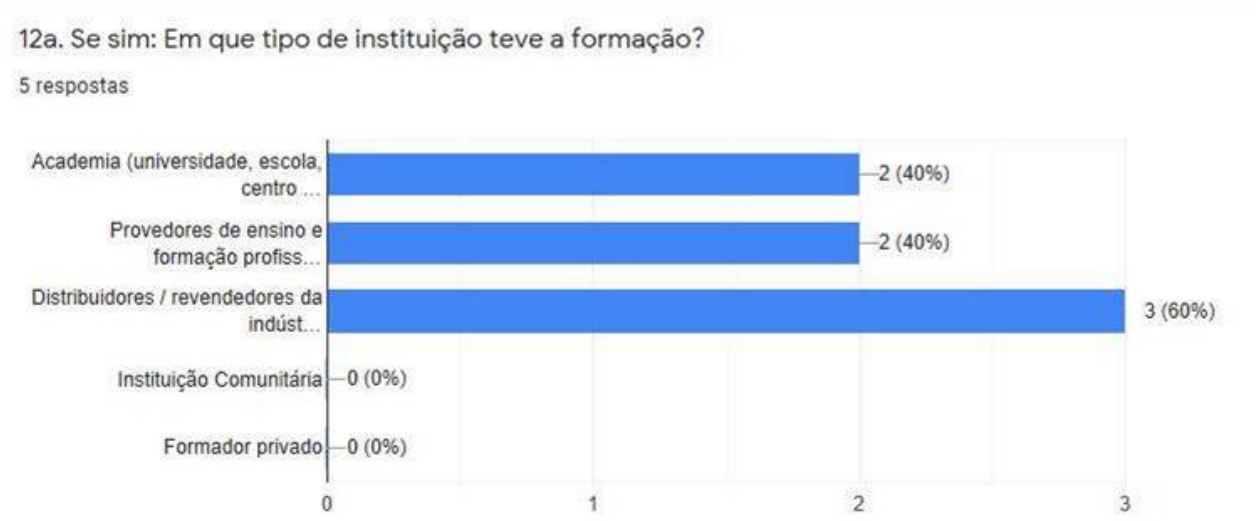


Question c.

In the present sample, 76.2% of the Portuguese participants has never been involved in any kind of education and training program.

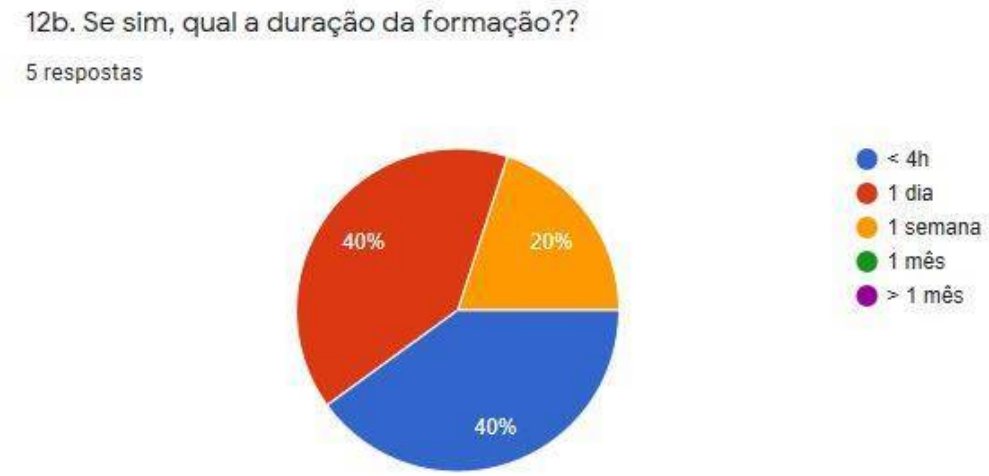
Question c: i.

According to the participants, 60% had training in industry distributors, while 40% had training in Education and Vocational Training Providers (38.5%) and another 40% of participants in Academies.



Question c: ii.

Regarding the duration, 40% of the participants were trained for 1 day, 40% for less than 4 hours and 20% for 1 week.



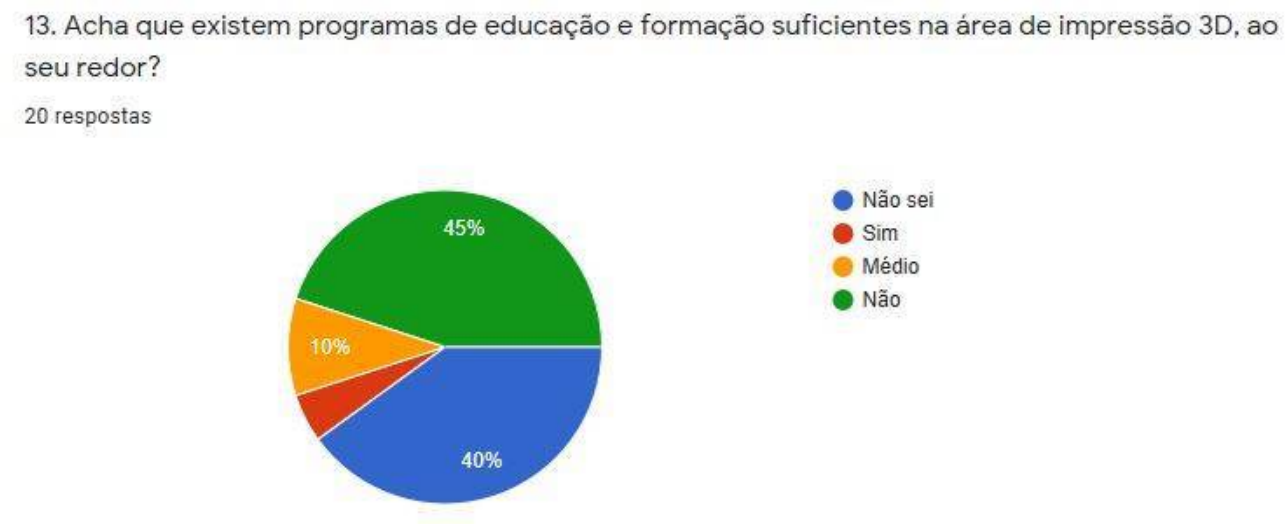
- What do you think about the importance of 3D printing technologies? (Question 10)

The majority of Portuguese participants (61.9%) attach a high importance to 3D printing technologies and 19% attach a very high importance. Only 14.3% consider it of average importance.

- Necessary and meaningful courses and further education (Question 13 and 14)
    a. Do you think there are enough education and training programs for 3D printing available in your surroundings?
    b. What kind of education and training offer concerning 3D printing do you think is missing/needs to be improved or upgrade?

Question a.

With regard to the existence of education and training programs for 3D printing in the surrounding area, 40% of the participants said they did not exist and 40% said they were not aware.

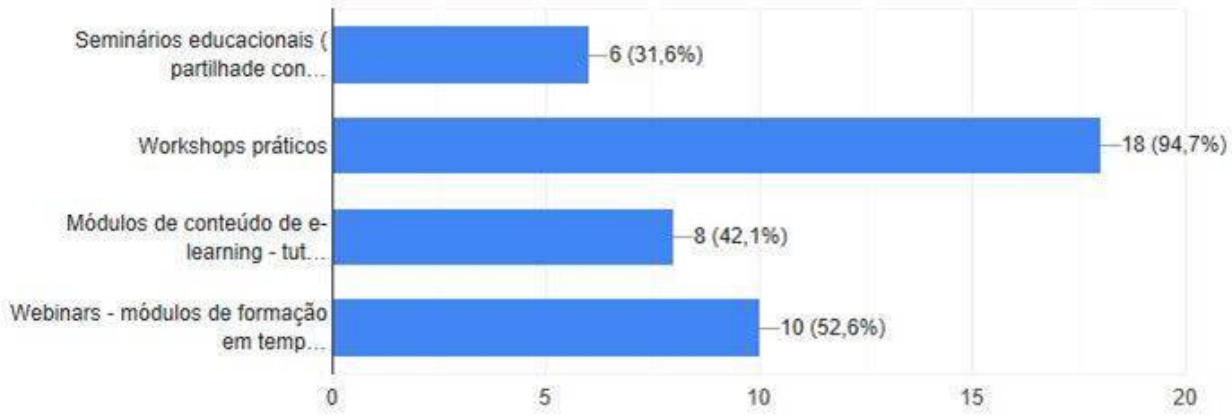


Question b.

The majority of participants (94.7%) say that Practical Workshops are non-existent or need to be improved or updated, 52.6% say they are Webinars, 42.1% refer to e-learning content modules and 31.6% educational seminars.

14. Que tipo de oferta de educação e formação em impressão 3D acha que está em falta / precisa ser melhorada ou atualizada?

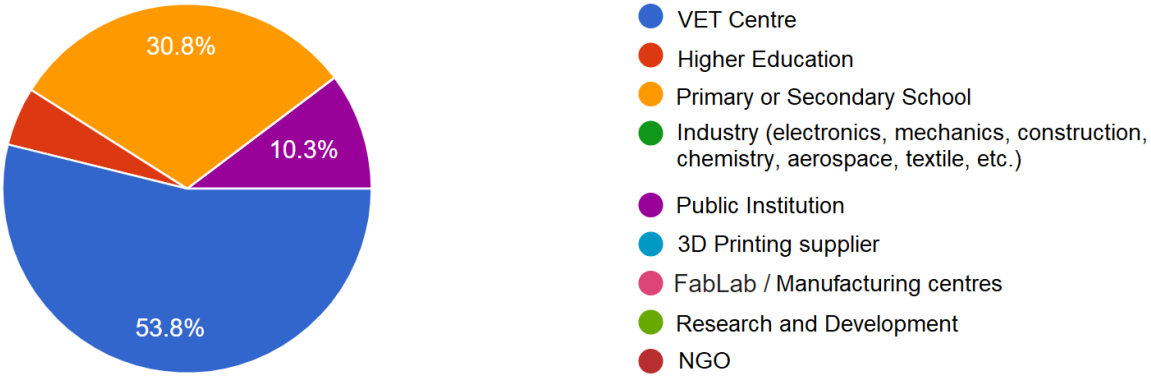
19 respostas



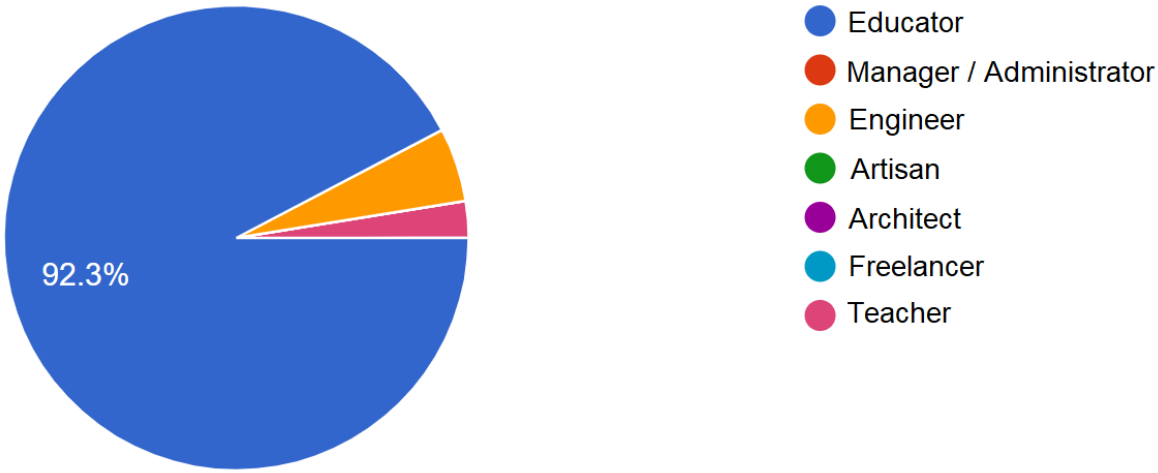
National Report, Spain
Partner contribution: Inercia Digital, Spain

- Institution and job position (Question 2 and 3)
    a. What kind of institution do you work for?
    b. What is your job position?

a. *From Spain we had a total of 39 responses from a mix of VET centres (the majority of respondents, over 50% of them), primary and secondary schools (the second biggest participating group), public institutions and a minority of higher education centres.*

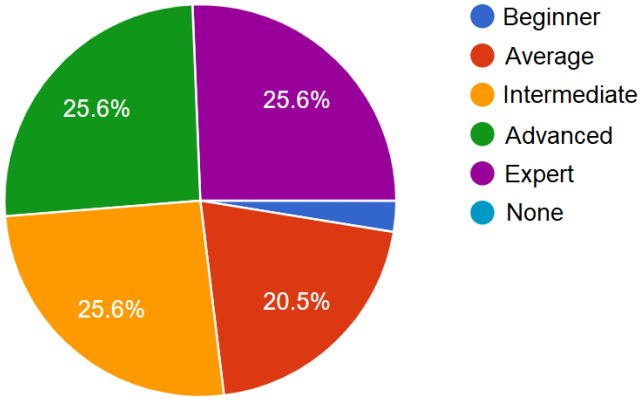


b. *In terms of professions, the vast majority of respondents described themselves as Educators (92.3%) while a small minority were Engineers (2 participants) and one self-described teacher.*

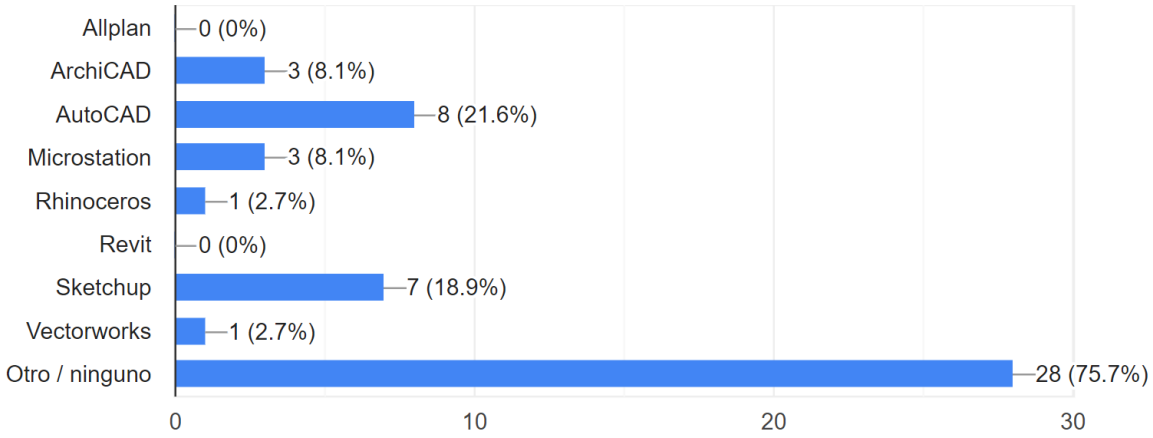


- Knowledge and experience (Questions 6 and 7)
    a. Please rate your level of knowledge in information technologies in general
    b. Do you have knowledge or experience in one or more of the modelling tools listed below?

a. *The majority of survey respondents from Spain had a very good level of IT in general, with a majority equally split between Intermediate, Advanced an Expert level (25.6% in each category, a total of 76% were in either of these three categories and over half of them considered themselves to be advanced or experts). A little less than a third of respondents described their level as Average and a small minority identified themselves as beginners (only one respondent).*



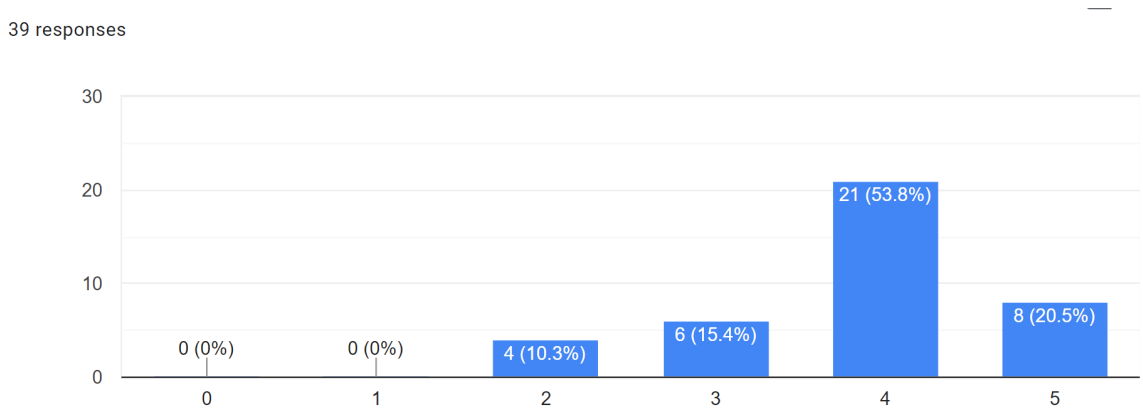
b. *Regarding their experience or knowledge of the modelling tools listed in the survey the majority said they didn´t know about any of them (28 out of 39 respondents), a significant percentage was familiar with AutoCAD (21.6%) and Sketchup (18.9%) and a small minority knew about ArchiCAD (8.1%), Microstation (8.1%), Rhinoceros (2.7%) and Vectorworks (2.7%). None of the respondents were familiar with either Allplan and Revit.*



- How do you rate your creativity and willingness to experiment in general?

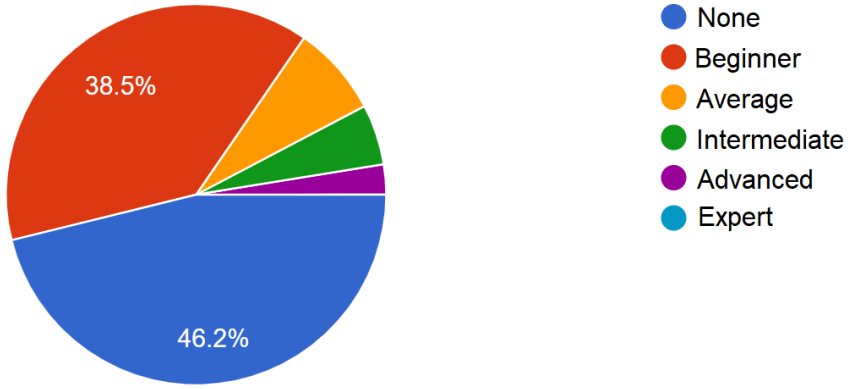
  (Question 8)

When rating their creativity and willingness to experiment in general, Spanish respondents gave an average rating of 3.8 overall and a median score of 4. The majority ticked 4 to score their creativity and experimental willingness, and the second biggest majority gave it the highest punctuation, a 5. A minority of 6 participants gave a rating of 3, and a smaller minority of 4 respondents gave a rating of 2. As can be seen in the graph below no one ranked their creativity in the 0 to 1 score category.

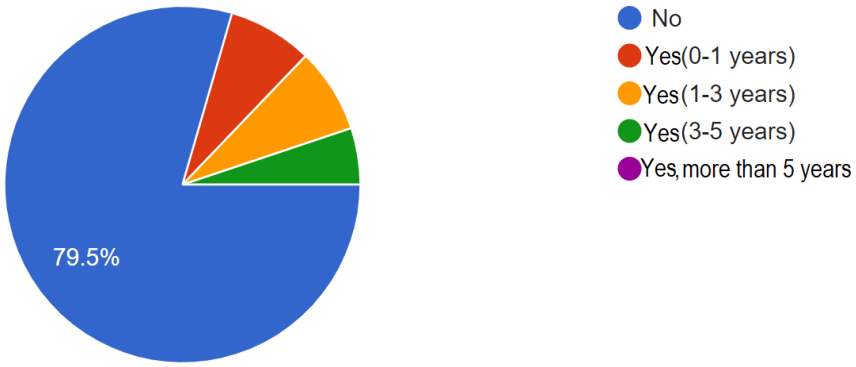


- Knowledge about and experiences in 3D Printing (Questions 9, 11 and 12a/b)
    a. Please rate your level of knowledge about 3D printing in general
    b. Have you been involved in the usage of 3D printing technologies before?
    c. Have you already attended any kind of education and training program (e.g. classroom course, seminar, workshop, e-learning, webinar, on-site education, etc.) on 3D printing?
        i. If yes: What kind of institution was the education and training program provider?
        ii. If yes, how long did it last?

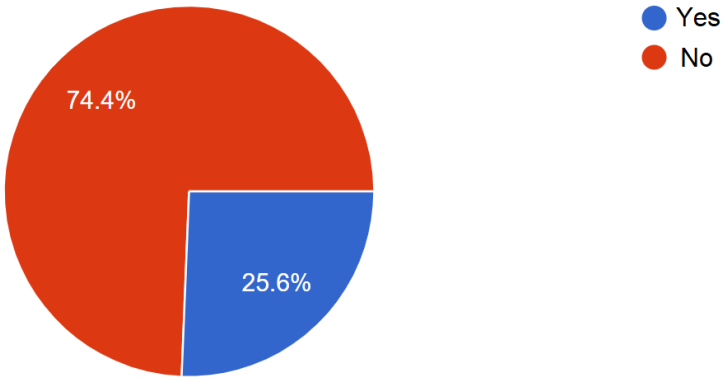
a. *Most of the Spanish respondents evaluated their knowledge of 3D Printing as very low. Close to half of the respondents (18 out of 39) said they didn't have any knowledge or experience with 3D Printing, over a third of them said they had beginner's level (15 out of 39), three of them ranked their knowledge of 3D Printing as Average, two described it as Intermediate and only one said they had Expert level.*



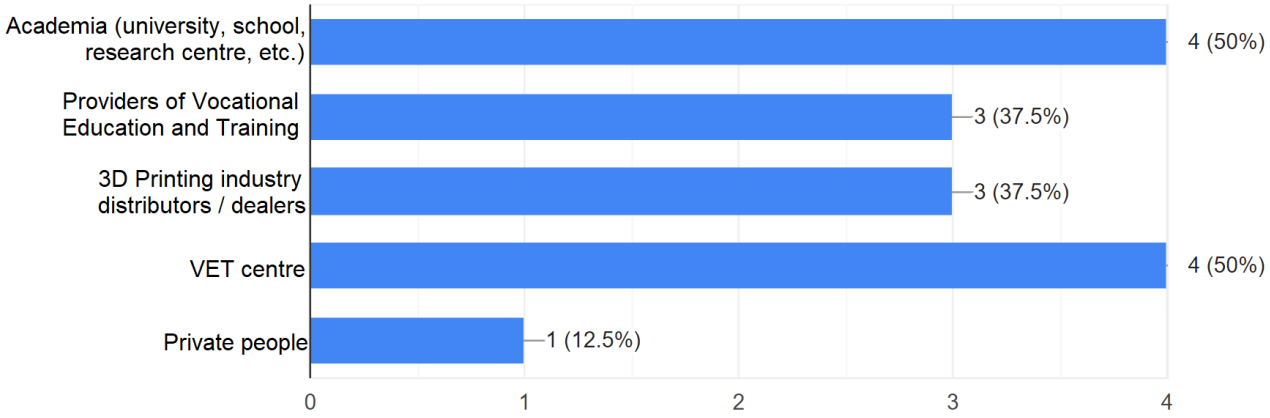
b. *The vast majority of Spanish survey participants said they hadn't been involved in the use of 3D printing technologies before (31 out of 39). A small percentage of them were equally split between having 0 to 1 years' experience (3 respondents) and 1 to 3 years' experience (3 respondents). Only two participants said they had between 3 to 5 years' experience and none had more than 5 years' experience in 3D Printing.*



c. *Similarly, to the previous question, when asked whether they had participated in the use of 3D Printing technologies, the majority of Spanish respondents said they hadn't (29 out of 39), and a third of them (10 out of 19) said they did.*

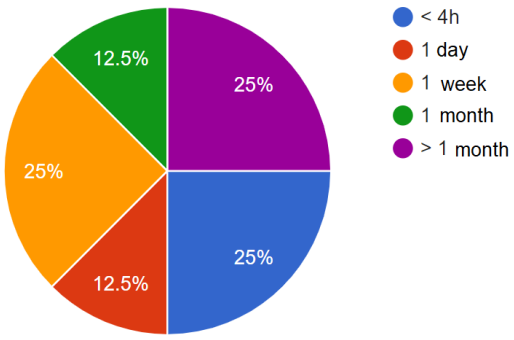


i. *Of those respondents that said they had participated in 3D Printing activities, the majority said these were offered by either a VET centre or an academic centre like a university, school or research centre.*



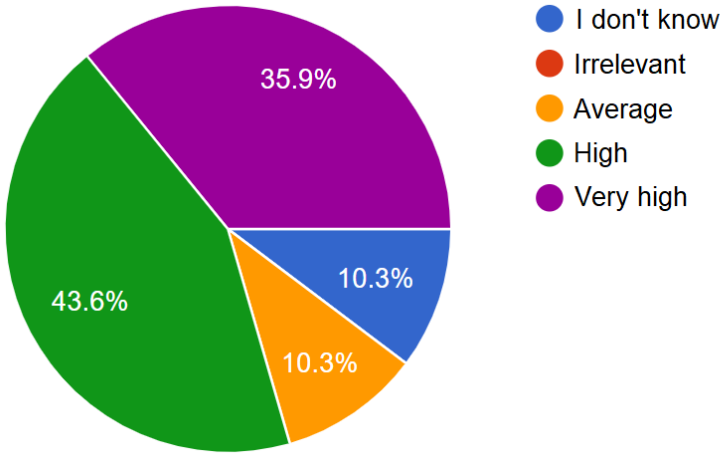
ii. If yes, how long did it last?

When asked about how long the training lasted half of respondents were split between the two extremes: less than 4 hours and more than 1 month. Another third said the training lasted one week. One person pointed to 1 day and another to 1-month training sessions.



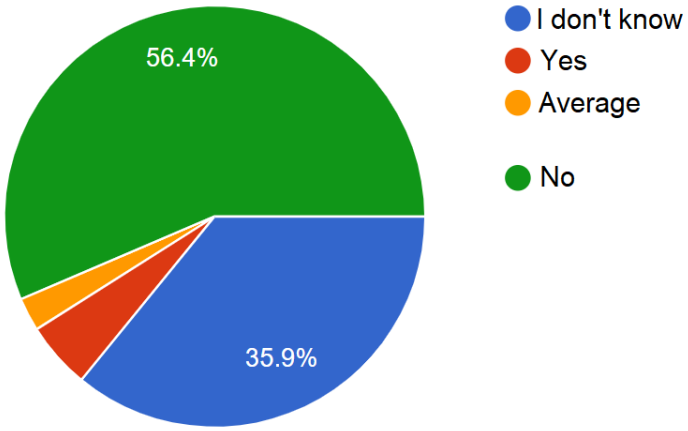
- What do you think about the importance of 3D printing technologies? (Question 10)

When asked about what they thought on the importance of 3D printing technologies, the vast majority of Spanish respondents said they considered it to be highly important and very highly important (a combined 79.5% of votes and a total of 31 out of 39 participants). A minority of 4 participants said they weren't sure about its importance and another 4 said its importance was average. No one considered 3D printing irrelevant.

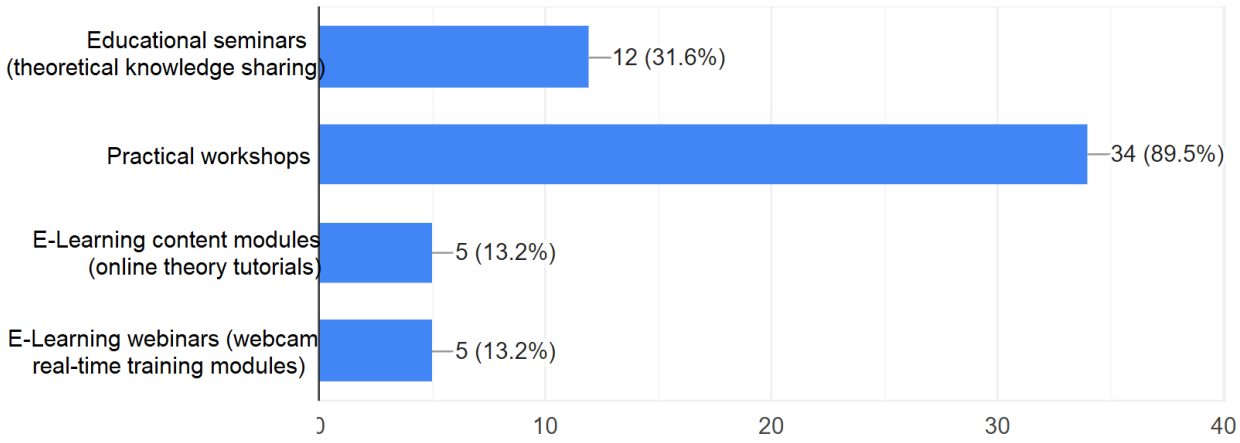


- Necessary and meaningful courses and further education (Question 13 and 14)
    a. Do you think there are enough education and training programs for 3D printing available in your surroundings?
    b. What kind of education and training offer concerning 3D printing do you think?

a. *When asked if they thought there were enough education and training programs for 3D printing available in their surroundings, the majority of Spanish questionnaire respondents said they didn't think there weren't, while the second biggest group of respondents said they didn't know. Only two respondents said there were enough training programmes on 3D printing and only one ticked the "Average" box.*

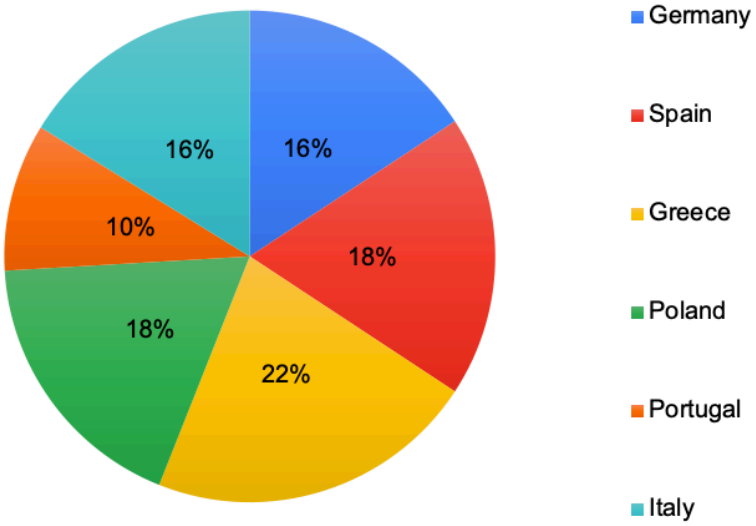


b. *When asked what kind of 3D printing education and training programme was needed or should be updated / improved, the vast majority of Spanish participants pointed to practical workshops (34 out of 39). A total of 12, the second largest group of survey respondents said more educational seminars were needed, five pointed to E-learning content modules and 5 to E-learning webinars.*



Transnational Report

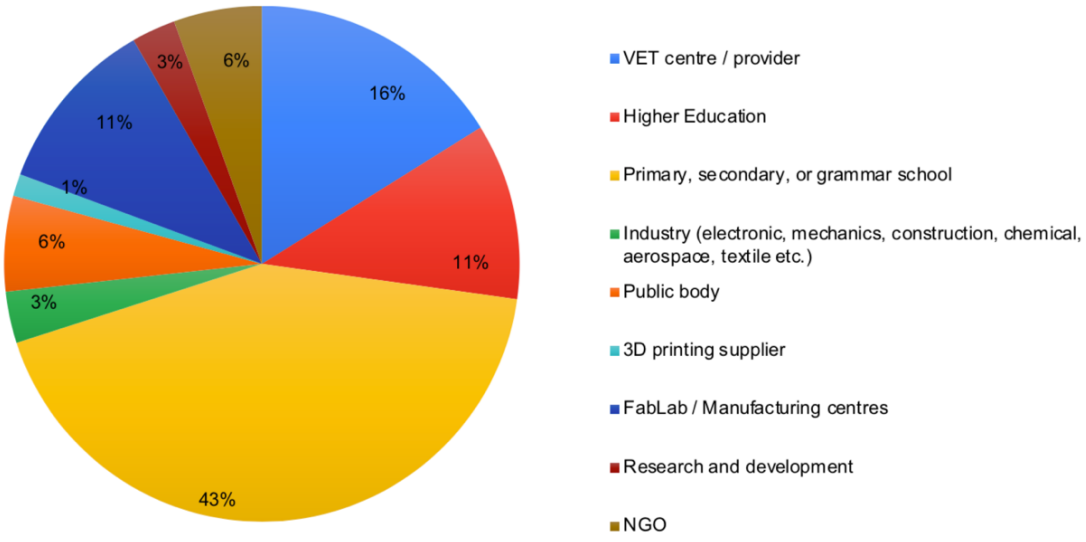
Question 1: Where are you from?



General Comment:

From the total of 216 people answering the questionnaire 16% are from Germany, 18% are from Spain, 22% are from Greece, 18% are from Poland, 10% are from Portugal and 16% are from Italy.

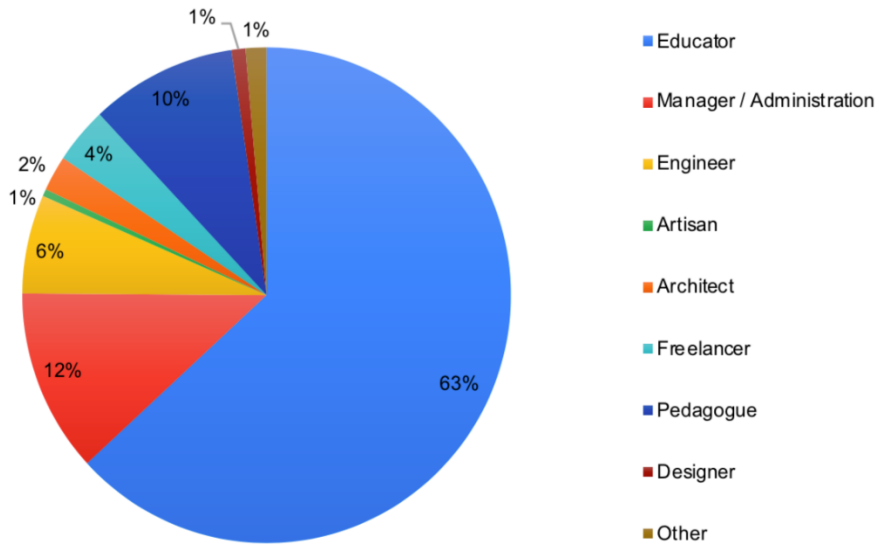
Question 2: What kind of institution do you work for?



General Comment:

The majority of participants work for the primary, secondary or grammar schools with 43%, second up are the VET centre / providers with 16%, thirdly higher education teachers with 11%.

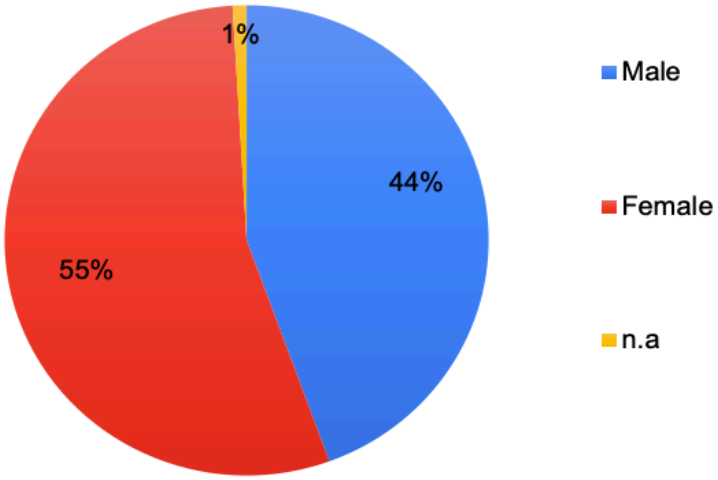
Question 3: What is your job position?



General Comment:

The vast majority of participants work as educators, taking up more than half of all participants 63%, then Managers / Administrators with 12%, and Pedagogues with 10%.

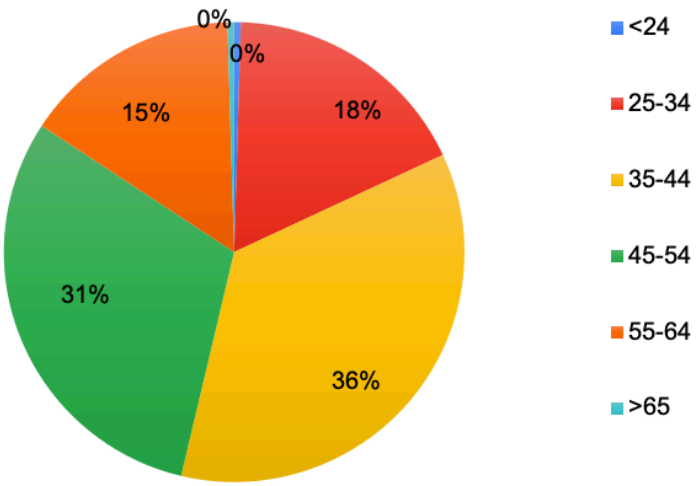
Question 4: What is your gender?



General Comment:

In terms of gender, this questionnaire is answered by, 55% female and 44% male participants. 1% chose not to give an answer.

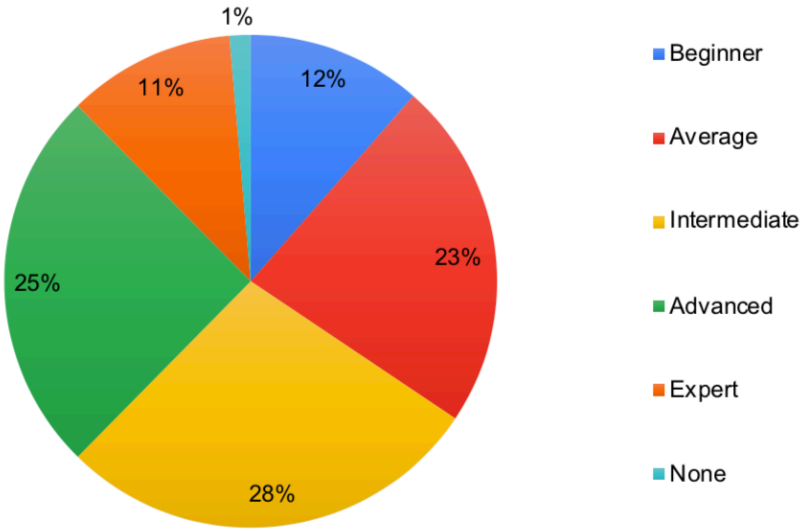
Question 5: What is your age?



General Comment:

Regarding the age of our participants, 18% are between 25-34 years old, 36% between 35-44 years old, 31% between 45-54 years old and 15% between 55-64 years old.

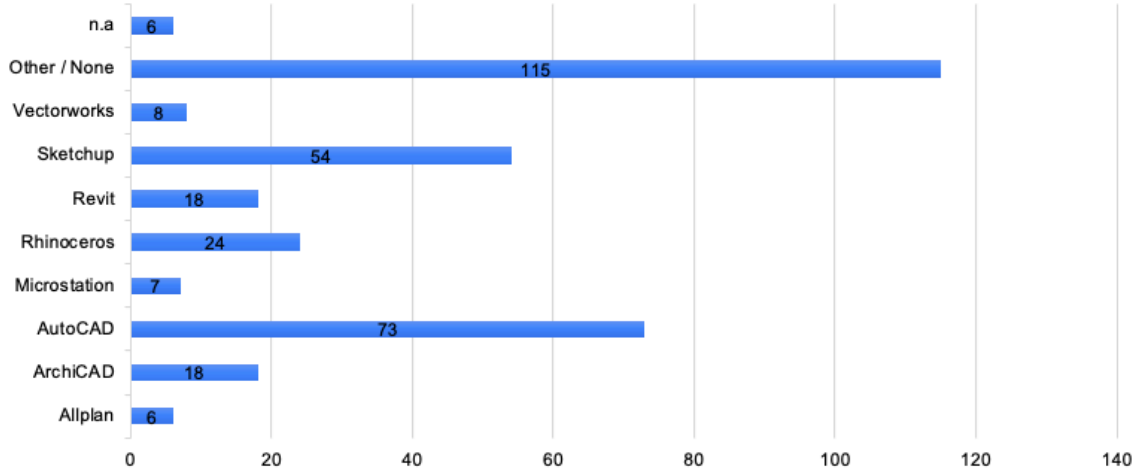
Question 6: Please rate you level of knowledge in information technologies in general.



General Comment:

28% of the participants consider themselves having an intermediate level of knowledge about information technologies, 25% an advanced level, and 23% average level.

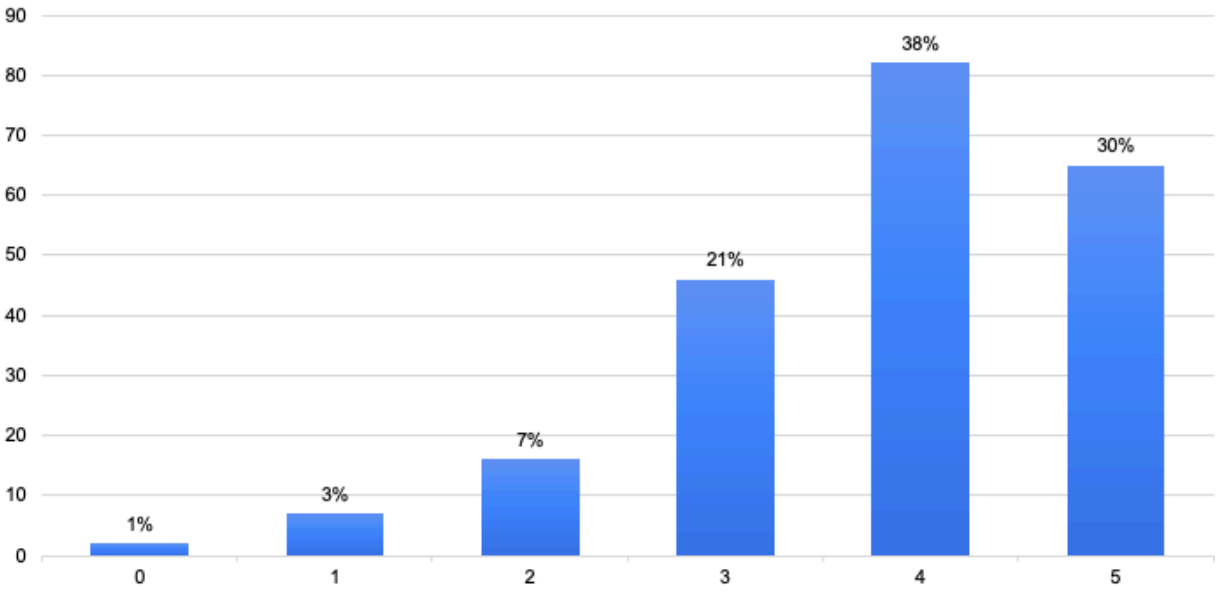
Question 7: Do you have knowledge or experience in one or more of the modelling tools listed below?



General Comment:

The study shows which modelling tools are most used among the participants. For this question it was possible to give more than one answer. 115 participants stated that they have no prior knowledge on modelling tools. The most popular modelling tool is Autocad in every country, voted by 73 people.

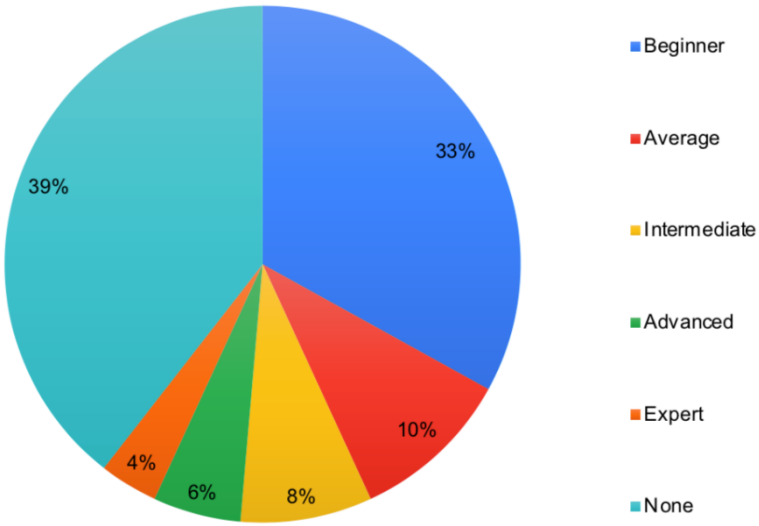
Question 8: How do you rate your creativity and willingness to experiment in general?



General Comment:

The participants are asked to rate their creativity and willingness to experiment on a scale from 1 to 5, 30% percent of participants give the rating 5, 38% give the rating 4 and 21% give the rating 3.

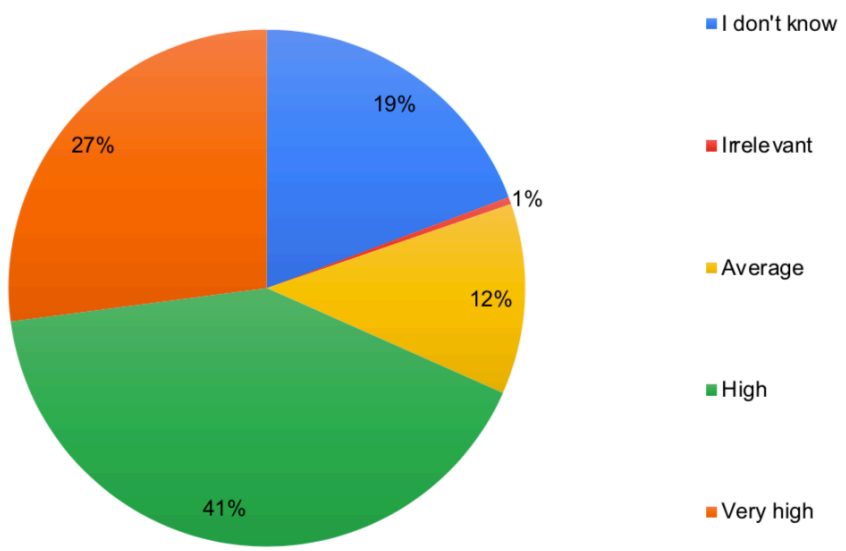
Question 9: Please rate your level of knowledge about 3D printing in general



General Comment:

In the present sample, 39% of the participants state that they have no prior knowledge on 3D printing, 33% percentage claim to have just the beginner level knowledge, and 10% have average knowledge on the subject.

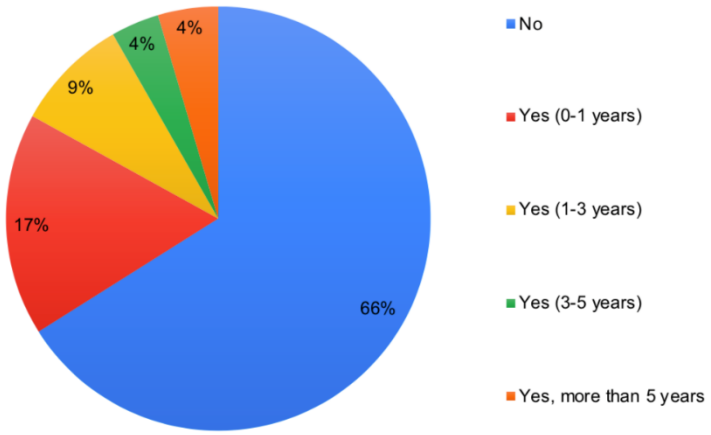
Question 10: What do you think about the importance of 3D printing technologies?



General Comment:

The sample shows that 41% of the participants think that 3D printing technologies have a high importance, 27% rate the importance very high, and 19% state that they don't know.

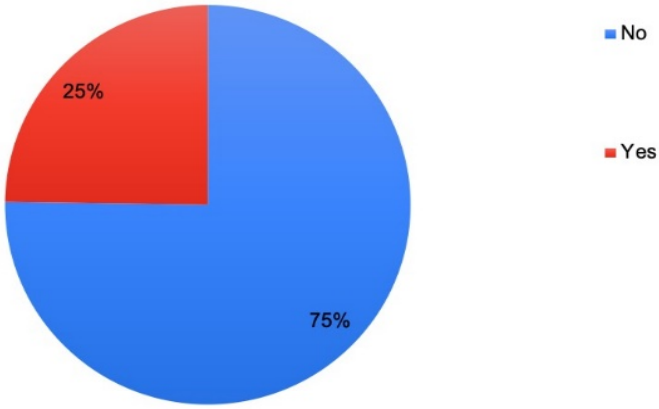
Question 11: Have you been involved in the usage of 3D printing technologies before?



General Comment:

From every 3 persons participating in the questionnaire, 2 state that they haven't been involved in the usage of 3D printing technologies, consisting 66% of the total votes, while 17% have had maximum period of one-year experience in the 3D printing field.

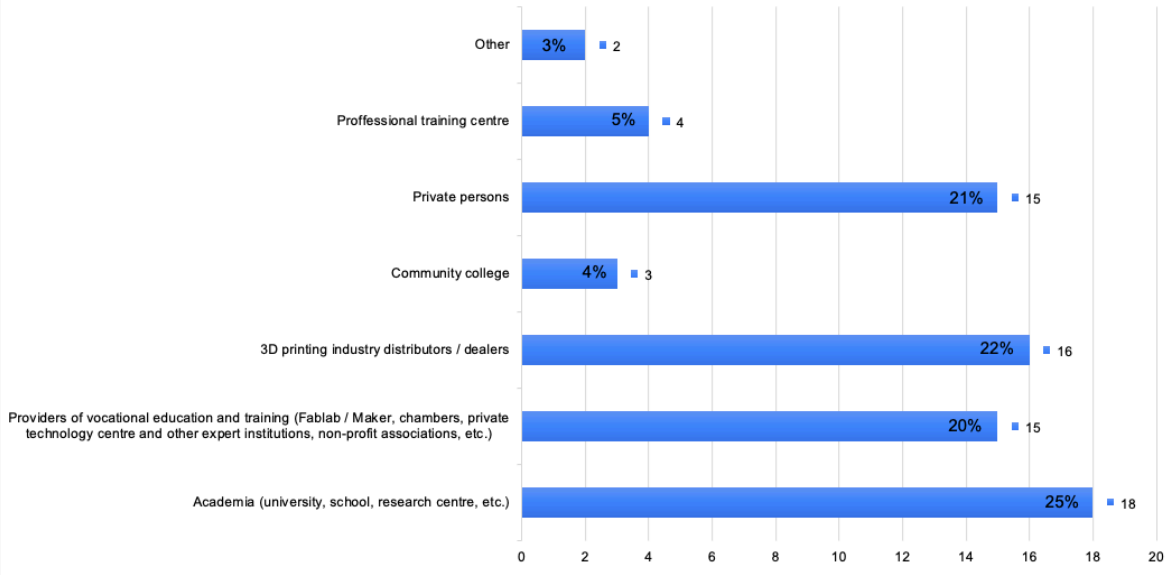
Question 12: Have you already attended any kind of education and training program (e.g. classroom course, seminar, workshop, e-learning, webinar, on-site education, etc.) on 3D printing?



General Comment:

The study shows that only the 25% of the participants have had some kind of education on 3D printing, while the vast majority consisting of 75% has never had any kind of education on 3D printing.

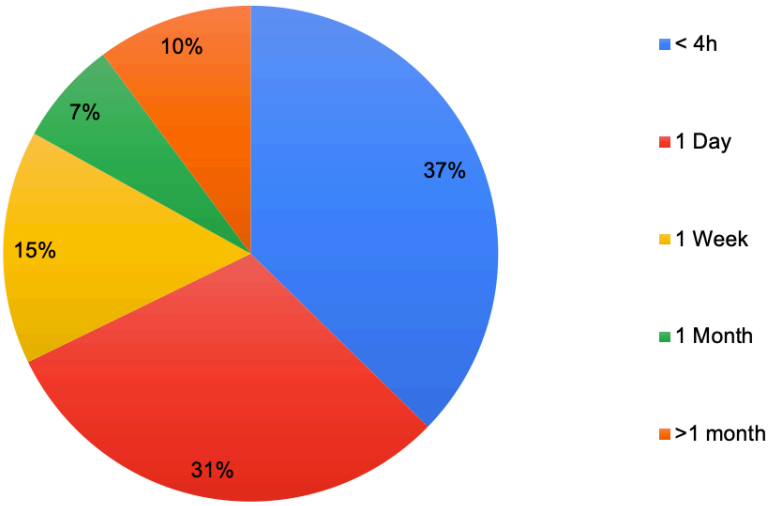
Question 12a: If yes: What kind of institution was the education and training program provider?



General Comment:

From the 25% percent of all the participants that had an education about 3D printing, 25% were trained by Academics, 22% by 3D printing industry distributors / dealers, and 21% by private persons.

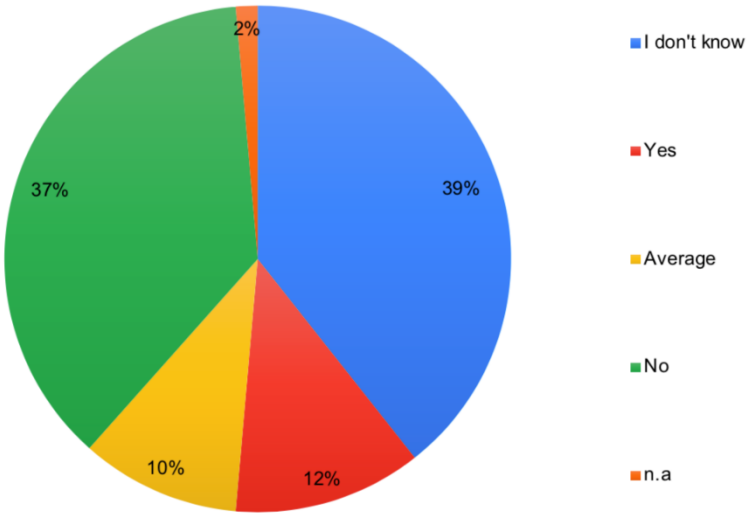
Question 12b: If yes, how long did it last?



General Comment:

From the participants that took part in an education about 3D printing (25% of all participants) 37% were trained for less than 4 hours, and about 31% were trained for 1 day.

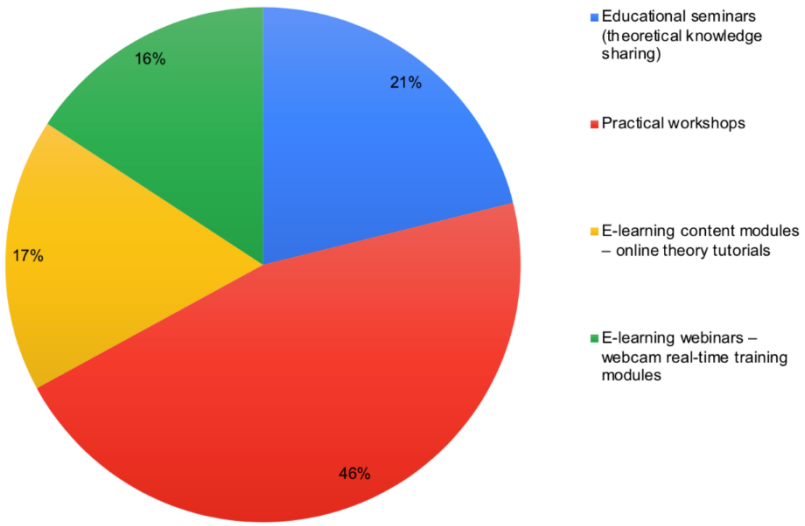
Question 13: **Do you think there are enough education and training programs for 3D printing available in your surroundings?**



General Comment:

About the amount of education and training programs that are available in the surrounding area, 39% of participants stated that they don't have an idea about the subject, while a close number of people with 37% think that the availability is not enough.

Question 14: What kind of education and training offer concerning 3D printing do you think is missing/needs to be improved or upgraded?



General Comment:

Almost the half of the participants (46%) think that the practical workshops are needed to be improved or updated, 21% state that they prefer educational seminars, 17% refer to E-learning content modules, and 16% prefers E-learning webinars.

Conclusion

The analysis report for the 3D Printing Skills and Competencies of Educators is presented. The collected and analysed results from the questionnaire in IO2/Task 3 showed that although more than half of the subjects has at least beginner level of knowledge about 3D Printing (61%), only 1 out of 4 participants took part in some kind of education or training program. The knowledge of modelling tools is crucial for 3D Printing practices. Most of the participants state that they have no prior knowledge about any modelling tools. The survey shows the most popular modelling tool in every country is AutoCAD. Other common used tools are SketchUp, Revit and Rhinoceros. The vast majority, almost 90% of the participants, rated their creativity and willingness to experiment in general pretty high, from 3 to 5 in a scale of 1 to 5.

Looking at the study, we see that there is definitely a deficiency of educations and training programs for 3D printing available. The study revealed the need for further learning and training programs. The most desired kind of training offer by the subjects is practical workshops.

Annex: Questionnaire

This questionnaire is part of the European project “3D Printing in VET”

Questions:

Q1. Where are you from?

Q2. What kind of institution do you work for?

Q3. What is your job position?

Q4. Gender

Q5. Age

Q6. Please rate your level of knowledge in information technologies in general

Q7. Do you have knowledge or experience in one or more of the modelling tools listed below?

Q8. How do you rate your creativity and willingness to experiment in general?

Q9. Please rate your level of knowledge about 3D printing in general

Q10. What do you think about the importance of 3D printing technologies?

Q11. Have you been involved in the usage of 3D printing technologies before?

Q12. Have you already attended any kind of education and training program (e.g. classroom course, seminar, workshop, e-learning, webinar, on-site education, etc.) on 3D printing?

Q12a. If yes: What kind of institution was the education and training program provider?

Q12b. If yes, how long did it last?

Q13. Do you think there are enough education and training programs for 3D printing available in your surroundings?

Q14. What kind of education and training offer concerning 3D printing do you think is missing/needs to be improved or upgraded?