

# SAM

SECTOR SKILLS STRATEGY  
IN ADDITIVE MANUFACTURING

## 3<sup>rd</sup> Follow up and impact of AM Training Report

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## 1. Introduction

This report provides an overview of the results obtained with the follow-up questionnaire sent to the participants involved in the 3<sup>rd</sup> stage of the SAM piloting activities, six months after the training occurred. These activities cover the implementation of revised training guidelines for the IAMQS (International Additive Manufacturing Qualification System), including its Quality Assurance System integrated in the piloting of the methodology for creating professional profiles and skills.

The 3<sup>rd</sup> stage of the SAM piloting courses, conducted under WP5 Pilots Methodology (5.7 Piloting events of the Short-Term Scenarios), addressed the implementation of the following Competence Units (CUs)/Units of Learning Outcomes (ULOs): CU72: Metal Additive Manufacturing Binder Jetting Process and CU73: Introduction to Sustainability for Additive Manufacturing. In total, two CUs were implemented from the 24<sup>th</sup> to the 30<sup>th</sup> of March 2022. The implementation of the 3<sup>rd</sup> Stage of Scenarios Piloting counted with 31 participants.

This report compiles the information obtained through the implementation of D2.6 *Kit for tracking students, future employees and job seekers in AM* (developed in Work package 2), as well as some recommendations to improve future training sessions, collected among the participants of the 3<sup>rd</sup> of Piloting Events for Short-Term Scenarios.

## 2. Tracking and follow up survey results

Participants were invited to provide their feedback regarding the impact and usefulness of the AM Training courses received, 6 months after of the 3<sup>rd</sup> stage piloting course taking place. A total of 25 answers were collected (from a total of 31 participants), and the findings are described below.

### 2.1 Participants background

In terms of profile, the identified participants were balanced between female / males, respectively 13/18. From the participants, 19 were workers and 12 were higher education students, where 22 had Engineer or Master's degree and 6 had a doctoral degree. Most of the participants were aged between 26 and 35 years (16 of them), followed by 8 between 36 and 55 years, 5 aging between 15 and 25 and 1 between 56 and 100 years.

In terms of job position 10% of the participants were Operator/Technician (Fig.1), followed by Process Engineers (8%), Designers (5%), Managers (3%) and Supervisor (3%). -However, -most of the participants selected "Other" (71%) to describe their profile such as: PhD Student/Candidate, Project Manager, Additive Manufacturing Engineer, Researcher, Applications Engineer, Mechanical Engineer, Materials Engineer, as represented below on Fig. 2.

### Current job position

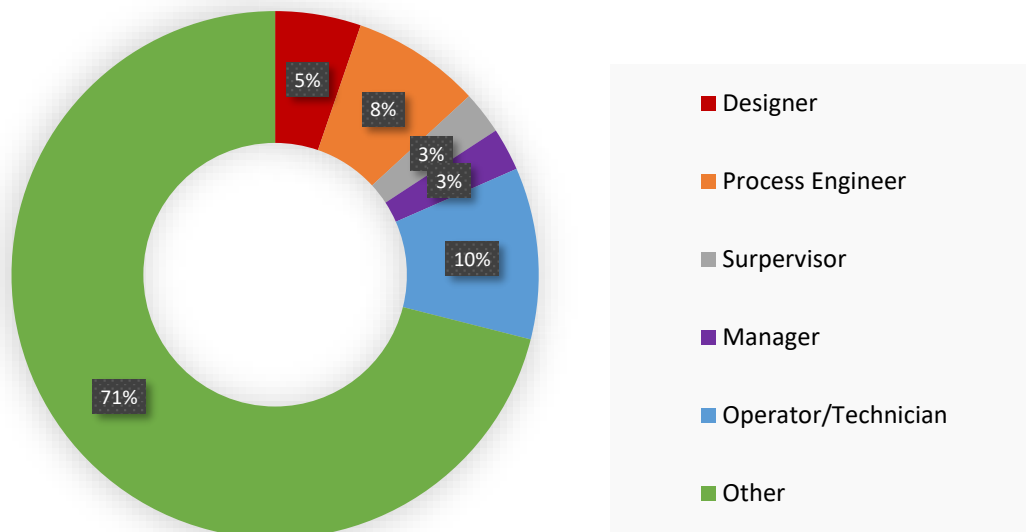


Figure 1 Current job position within your organisation

### Other

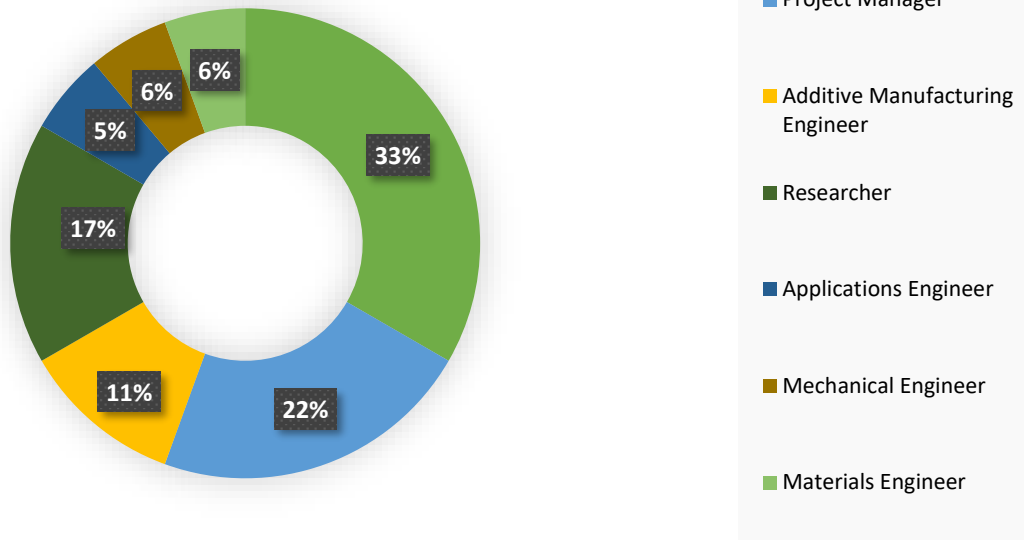


Figure 2 Current job position within your organisation/Other

In terms of employability data, almost all participants (96%) replying to the survey were employed before starting the training, compared to 4%, who were unemployed, as represented in Fig. 3. These findings are quite positive, as they show **participants' commitment to lifelong learning and re-skilling towards a specialization and/or acquisition of knowledge in the AM field**. As for the unemployed participants, their enrolment in training can be translated as an investment in learning about AM **as a mean to improve their future career/ employability and to increase their opportunities to integrate into the labour market**.

### Employability before the training

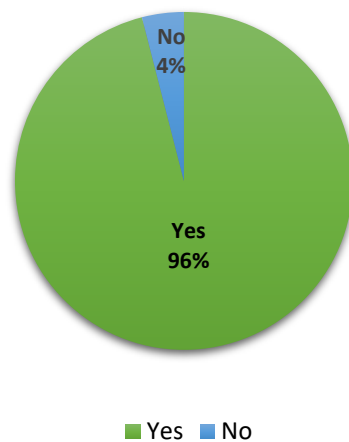


Figure 3 Employment before the training

## 2.2 Competence unit course (SAM Pilots) feedback

The follow up questionnaire was fulfilled by 25 participants after attending the training courses, distributed among two different CU/ULOs as shown in Fig. 4, by decreasing order of number of participants:

- 72% from CU72: Metal Additive Manufacturing Binder Jetting Process
- 28% from CU73: Introduction to Sustainability for Additive Manufacturing

### Replies by Competence Unit

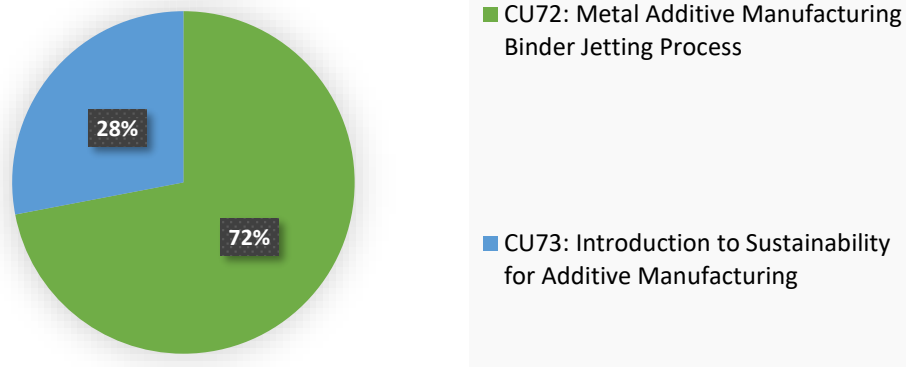


Figure 4 Replies by CU

## 2.3 Applicability and future training

In terms of **applicability of the knowledge and skills** before and after the training for the **Metal Binder Jetting (MBJ) Process**, most of the participants considered that their knowledge and skills were **Basic prior to the training**, in all covered topics, with a small percentage considering it as High and Expert. As for after the training, most participants identified, for all covered topics, their knowledge and skills mainly as **High**, followed by Average with an increasing percentage considering it also as Expert, as showed below in Fig. 5.

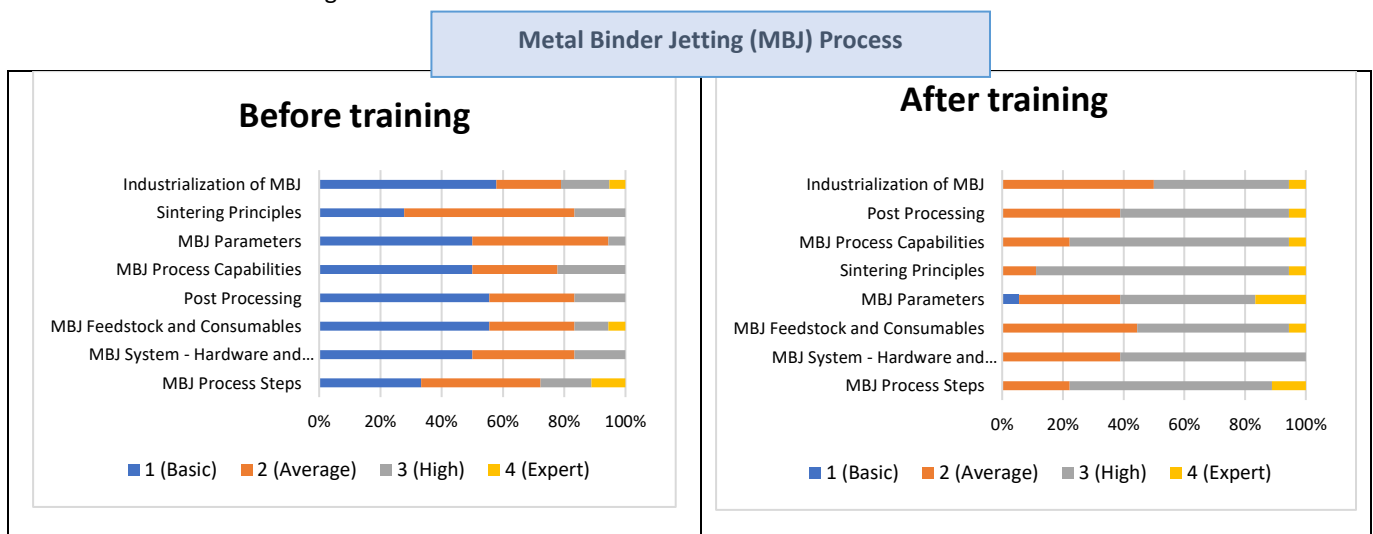


Figure 5 Applicability of the knowledge and skills on MBJ Process before and after training

In terms of **applicability of the knowledge and skills** before and after the training on **Sustainability for Additive Manufacturing (AM)**, all participants also considered a significantly increase in their knowledge and skills in all topics after the training, as shown below in Fig. 6, revealing a comprehensible progression from Basic and Average levels towards High and Expert levels in all topics.

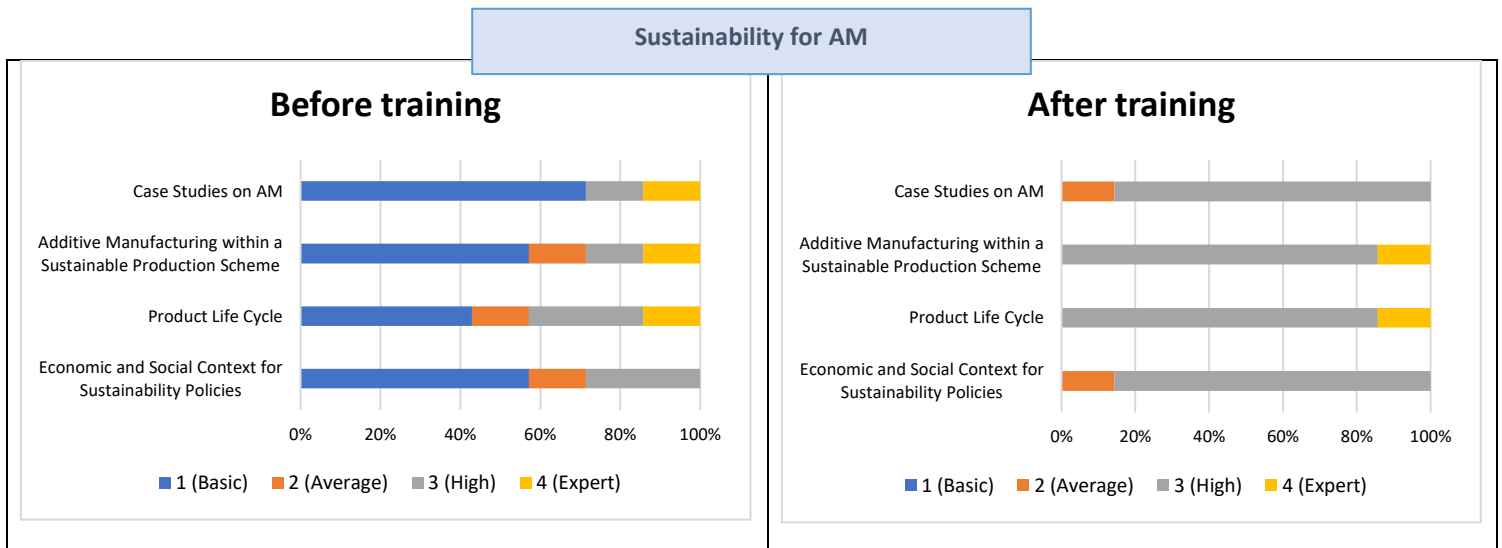


Figure 6 Applicability of the knowledge and skills on Sustainability for AM before and after training

Regarding the transferability of training for professional activities, more than 90% of the participants rated it positively, as seen in Fig. 7, where most of the participants considered it as Good when applied to their working reality, either to their company’s real needs; to their career; and to their job and a smaller percentage considering it as Fair and Poor. Regarding, these last two ratings, participants were asked to suggest what can be improved in the course in the future, and the following recommendation emerged: “Add empirical experiences”. Also, participants who choose these low ratings justified it with the following: “At the moment MBJ is difficult to apply in my field. I am looking for some opportunities also in other fields.”; “Other objectives of company, but really nice to have overview on metal binder jetting now!”; “The low rating about the usefulness in my career is not related to the course, but to the topic of my research.”

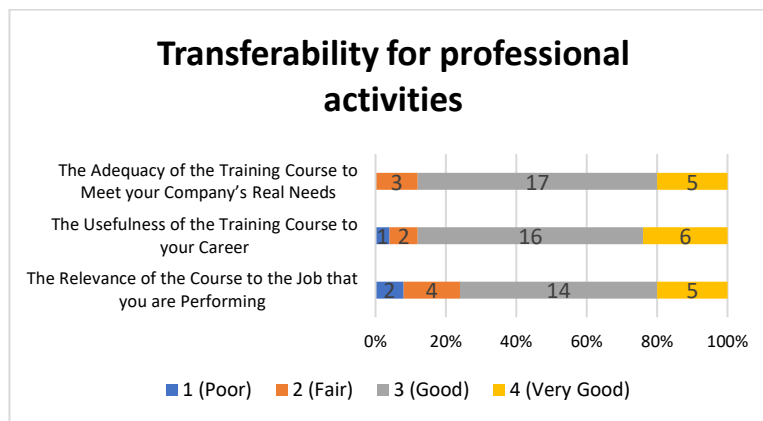


Figure 7 Adequacy, Usefulness and Relevance of the course

Regarding if the participants **encounter any barriers in applying the practices presented** in the training in **their daily professional activities**, the majority, as seen on Fig. 8, replied “No” (88%) and a small percentage answered with Yes (8%), identifying the following barriers: “Lack of equipment” and “No use Cases”; and Other (4%), corresponding to “I am not using this technology at the moment”.



## Barriers in applying practices in professional activities

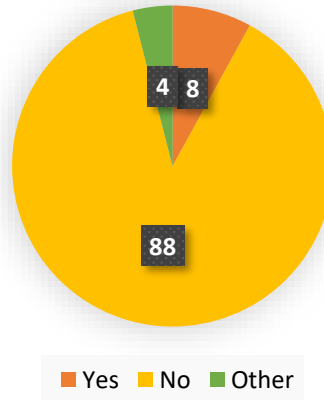


Figure 8 Did you encounter any barriers in applying practices presented during training in your daily professional activities?

Considering the **enrolment of the participants in other courses/training** after their attendance in these courses, the **majority replied with “I did not attend any other course”** (92%), as seen on Fig. 9, followed by “Other” (8%) corresponding to “Internal company training: Autodesk technical product support accreditation” and “Autodesk Technical Product Support Accreditation”.

## Enrolment in following courses/training

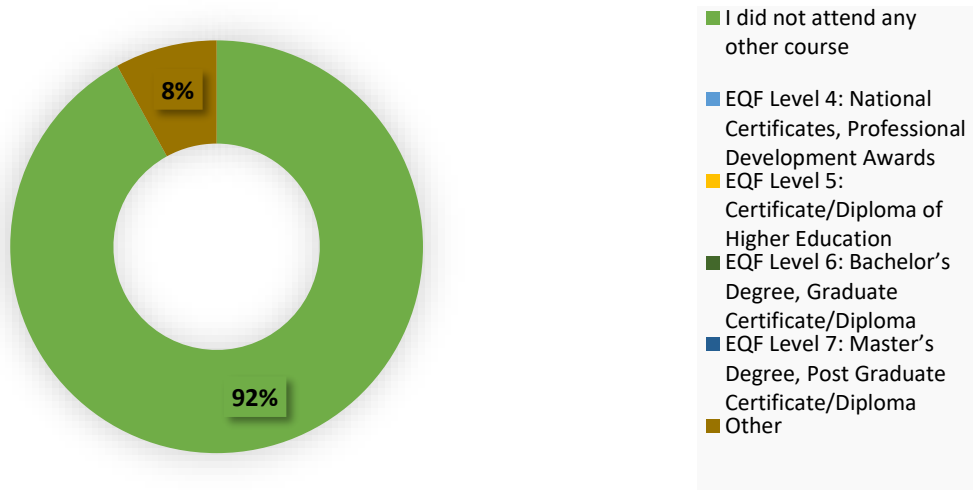


Figure 9 Participants enrollment in other courses/training

## 2.4 Qualitative Feedback

Based on the comments left by the participants of the pilot courses, presented on Table 1, it was possible to also gather some qualitative feedback-, as seen below.

Table 1 Additional comments

<b>Would you like to add any additional comments?</b>
"Thanks for the interesting course."
"I am always interested in new trainings, especially if they are related with AM and if they are as interesting as Sustainability for AM was."
"I found it to be a very interesting and very practical course. I am always willing to learn new things especially if they are related to welding and additive manufacturing."
"Thanks for the wonderful course!"

## 3. Conclusions

The report compiles the information obtained through the implementation of D2.6 *Kit for tracking students, future employees and job seekers in AM* (developed in Work package 2) among all participants of the 3<sup>rd</sup> Stage of Piloting Events for Short-Term Scenarios. Considering the number of responses collected during the implementation of the impact and follow-up survey - 25 answers were collected with the follow-up questionnaire out of 31 participants in the pilot courses - it was possible to conclude the following:

- **AM course contents were attractive for both workers** (96% of the participants were employed before starting the training) **and unemployed people** (4% of the participants had no current working position).
- Diversity of profiles attending the course and replying to the survey, where most of the respondents are PhD Students, Project Managers, Engineers and Researchers.
- In both assessed CUs, participants considered having significantly **increasing of their knowledge and skills** about the topics.
- The training provided had a **positive impact concerning the applicability and transfer of knowledge and skills into the professional activity** (rated in its majority as Good, followed by Very Good).
- The training provided had a lower impact as a trigger for enrolling in future training (only 8% mentioned having started another course).
- Overall, comparing the before and after training applicability of the knowledge and skills, there was a sustained impact in demonstrated by the increased results , where 88% of the participants found **no barriers in transferring the acquired knowledge and skills to their working practices** and more than 80% considered "Good" and "Very good" the impact of the training for their company's real needs, their professional career and for their current job.