SECTOR SKILLS STRATEGY
IN ADDITIVE MANUFACTURING

2.6 Kit for tracking students, future employees and job seekers in AM in M38

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1. Introduction

The current kit was produced in the framework of WP2, which aimed to develop a database for tracking students, future employees and job seekers in AM. Different tools were used for the data collection, such as follow-up questionnaires to the trainees that have completed the pilot courses.

This kit D2.6 covers the guidelines for preparing the database, meaning it facilitates the integration and the location of AM trainees within AM labour market. Table 1 shows the details of the kit.

D2.6 Kit for tracking students, future employees and job seekers in AM	
AIM	To track the integration and the allocation of AM trainees within AM labour market
TOOLS USED	Online follow-up questionnaires to trainees (via email) and available on the SAM project website http://www.skills4am.eu.
TO WHOM	AM Trainees European Commission and Skills Panorama (To report for the level of fulfilment to open labour/job positions in AM continuously)
INDICATOR/LEVEL OF IMPACT	Number of responses to the survey Number of trainees that have found a job Number of trainees that improved their knowledge and skills at their workplace
INPUT	Participants involved in training, either in Qualifications or Units of LOs/Competence Units
OUTPUT	Employability Rate in AM Sector Average time required for the integration /entrance in the labour market Feed Skills Intelligence Impact of the training in the job activities
TIMELINE	6 months after the completion of the courses

Table 1 -Summary of D2.6 features

The implementation of the current kit served as input to the methodology for revising, creating professional profiles and developing skills (WP3) and for the workshops conducted in the AM Observatory (WP4).

The current kit also includes the questionnaire template to be completed by the students, future employees and job seekers in AM (at the bottom of this document).

2. Methodology

Figure 1 below shows the methodology followed in the creation of a database in order to facilitate the integration and the location of AM trainees within the AM labour market.

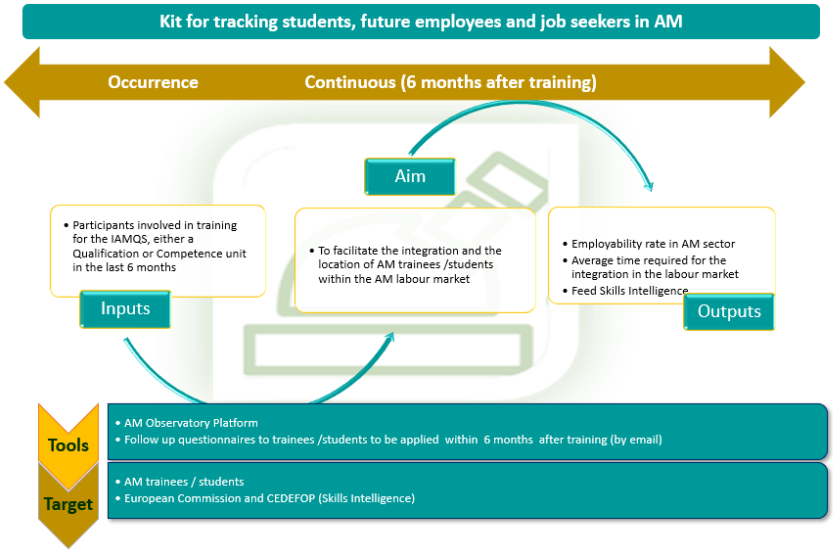

Figure 1 - Methodology applied for creation of the database

The kit can be used not only in SAM piloting activities but also in the implementation of courses by partners in their AM related teaching activities and naturally by the AM training centres of the IAMQS – International AM Qualifications System to evaluate the quality of their programs, according to the European Quality Assurance Reference Framework for VET (EQAVET).

This kit is a tool of the Quality Assurance system designed for the IAMQS, being aligned with the EQAVET, to collect data in a systematic and predictable way to provide clear outcomes for all stakeholders, and it allows gauging the adequateness of qualifications / Units of Learning Outcomes and infer about the impact of training on the employability and job activities performance.

The EQAVET Framework includes ten reference indicators as follows:

- Indicator 1. Relevance of quality assurance systems for VET providers
- Indicator 2. Investment in training of teachers and trainers
- Indicator 3. Participation rate in VET programmes
- Indicator 4. Completion rate in VET programmes
- Indicator 5. Placement rate in VET programmes
- Indicator 6. Utilisation of acquired skills at the workplace
- Indicator 7. Unemployment rate
- Indicator 8. Prevalence of vulnerable groups
- Indicator 9. Mechanisms to identify training needs in the labour market
- Indicator 10. Schemes used to promote better access to VET

By collecting feedback by surveys from trainees after six months, the kit D2.6 enables to contribute to evaluate the rate of placement in other training programmes, including VET (*indicator 5*) and the use of their acquired skills at their workplace (*indicator 6*), as well as unemployment rate (*indicator 7*) and contribute to the mechanisms to identify training needs in the labour market being part of the mechanisms used to update the VET offer according to those needs (*indicator 9*), and feeding stakeholders with the most recent information on the training needs that need to be met to provide the future needs of the labour market – which falls in the scope of the SAM forecast methodology.

3. Reference Questionnaire

The questionnaire targets students, future employees and job seekers in AM that are involved in training courses, either in Qualifications (Please refer to section 3.1 Follow up Questionnaire to the Qualification Course:) or Competence units (Please refer to section 3.2 Follow up Questionnaire to the Competence Unit Course), The questionnaire will be provided six months after the training as online via e-mail. The trainees who have attended different courses or competence units, will need to complete a separate questionnaire for each course, to feed the outputs.

The questionnaire introductory text template is provided next:

Welcome to the Follow up Questionnaire on the Additive Manufacturing (AM) Courses!

You are being asked to complete this questionnaire because you have recently been involved or completed training courses, either in Qualifications or Competence units within the IAMQS, in the last 6 months.

The questionnaire intends to gather your perception towards the efficacy of the training provided, namely if there was a direct application of knowledge and skills within your professional context and/or if the training contributed to any professional change (e.g. integration into the labour market, career progression, enrollment in further training, etc.).

It should take between 3 – 5 minutes to complete the questionnaire.

Please consider that some questions admit only one answer. In cases where multiple choices are possible, it will be indicated on the question.

This questionnaire is part of a European project entitled SAM. The SAM Consortium comprises European Partners covering different roles, including Social Actors, Industry Representatives and Education and Training Providers. The project aims to address the workforce development for AM by developing a shared skills vision and collaborative learning solutions for the sector at European level. Please find out more information at: www.skills4am.eu and join the AM LINKEDIN for students/trainees and job seekers (https://www.linkedin.com/groups/8918566/) to find job offers matching your interests.

Thank you for contributing!

This questionnaire is voluntary but necessary for the work we are developing. By replying to it, you are consenting that the European AM Observatory team process and manage the data collected. For any additional clarification, please contact ewf@ewf.be

3.1 Follow up Questionnaire to the Qualification Course:

Question 1. Your Name

Question 2. Your e-mail

Question 3. Please indicate the name of your institution (for students) / organisation (for employees) ***(If you are a student, please go to question 9 after answering this question.*** ***If you are not employed currently, please go to question 9 directly without answering this question.)***

Question 4. What is your current job role within your organisation? (Tickbox with a comment box for the last option.)
Options (*more than one can be chosen*): • Designer • Process Engineer • Inspector& Quality Assurance • Supervisor • Manager • Operator/Technician •Not employed currently • Other (Please Specify)

2.1. **Question 5. Were you employed before the training?** Yes / No question
• Yes • No

2.2. **Question 6. If your answer to question 5 is No, do you think that the training directly contributed for being employed?** Yes / No question
• Yes • No

Question 7. Which AM process(es) do you mainly use?
(Tickbox with a comment box for the last option)

Options (*more than one answer is possible*):

- Powder Bed Fusion
- Vat Photopolymerisation
- Material Jetting
- Material Extrusion
- Sheet Lamination
- Directed Energy Deposition
- Binder Jetting
- Other (please specify)

Question 8. Please rate the training with respect to each headline below
Rate from 1 to 4, being 1 (poor), 2 (fair), 3 (good), 4 (very good)

- The relevance of the course to the job that you are performing
- The usefulness of the training course to your career
- The adequacy of the training course to meet your company's real needs

Question 9. In case of rating 1 or 2 in question 8, please suggest what can be improved in the course in the future.

Question 10. For which qualification did you attend the training?
(Tickbox with a comment box for the last option)

- AM Design Technician
- AM Operator /Technician
- AM Designer

AM Coordinator

- AM Process Engineer
- AM Inspector
- AM Supervisor
- Other (please specify)

Question 11. Grade your AM knowledge on the headlines below before and after the training?
Rate in two columns for before and after cases from 1 to 4, being 1 (basic), 2 (average), 3 (high), 4 (expert)

- AM Processes
- Numerical Modelling
- Topology Optimization
- Design
- Structural Integrity
- Metallurgical analyses and characterization
- Pre-processing & material handling
- Post-processing
- Nondestructive testing
- Certification and Validation
- Testing Quality control
- Standards
- Costs
- Marketing and sales
- Communication
- Health and Safety
- Other (please specify)

Question 12. Grade your level on technological, digital and entrepreneurship skills listed below before and after training?

Rate in two columns for before and after cases from 1 to 4, being 1 (basic), 2 (average), 3 (high), 4 (expert)

- Spotting opportunities
- Creativity
- Self-awareness and self-efficacy
- Motivation and perseverance
- Planning and management
- Learning through experience
- Numerical modelling
- Design
- Simulation
- Topology optimisation
- Structural integrity
- Ability to think in 3D
- Digital data management (big data, statistics…)
- Materials analysis and characterisation
- Pre-processing & material handling
- Post-processing
- Non-destructive testing
- Standardisation
- Resource efficiency management
- LCA & Ecodesign

Question 13. Did you encounter any barriers in applying practices presented during training in your daily professional activities? Yes / No question

- Yes
- No

Question 14. If your answer is Yes to question 13, what kind of barriers did you encounter.?

- Lack of equipment
- Lack of commitment by your superiors
- Lack of information in your team
- Cost / Financial Issues
- Other (Please Specify)

Question 15. After the attendance of this course, did you enroll in any type of the following courses or training programme (Tickbox with a comment box for the last option)?

- I did not attend any other course
- EQF Level 4: National Certificates, Professional Development Awards
- EQF Level 5: Certificate / Diploma of Higher Education
- EQF Level 6: Bachelor's Degree, Graduate Certificate / Diploma
- EQF Level 7: Master's Degree, Post Graduate Certificate / Diploma
- Other (Please Specify)

Question 16. Would you like to mention any additional comments?

Comment Box

Your Survey is completed!

Thank you for contributing to Europe's AM future workforce!

For further information visit our website www.skills4am.eu

3.2 Follow up Questionnaire to the Competence Unit Course

Question 1. Your Name

Question 2. Your e-mail

Question 3. Please indicate the name of your institution (for students) / organisation (for employees) ***(If you are a student, please go to question 9 after answering this question.*** ***If you are not employed currently, please go to question 9 directly without answering this question.)***

Question 4. What is your current job role within your organisation? (Tickbox with a comment box for the last option.)
Options (*more than one can be chosen*): • Designer • Process Engineer • Inspector& Quality Assurance • Supervisor • Manager • Operator/Technician •Not employed currently • Other (Please Specify)

Question 5. Were you employed before the training? Yes / No question
• Yes • No

Question 6. Which Competence Unit did you attend?

- CU 00: Additive manufacturing Process Overview
- CU 01: DED-Arc Process
- CU 08: DED-LB Process
- CU 15: PBF-LB Process
- CU 25: Post Processing
- CU 26: Introduction to materials
- CU 27: AM with steels feedstock (excluding Stainless Steel)
- CU 30: AM with Nickel feedstock
- CU 31: AM with Titanium feedstock
- CU 34: Process selection
- CU 35: Metal AM integration
- CU 36: Coordination activities
- CU 43: Production of PBF-LB parts
- CU 44: Conformity of PBF-LB parts
- CU 45: Conformity of facilities featuring PBF-LB
- CU 61: Simulation Analysis
- CU62: Simulation Execution
- CU63: Certification, Qualification and Standardisation (CQS) in AM
- CU64: Business for Additive Manufacturing
- CU65: Overview on polymer materials and properties
- CU66: Designing Polymers AM Parts
- CU67: Post Processing for Polymers
- CU68: Design for Material Extrusion (MEX)
- CU69: Design for Powder Bed Fusion (PBF) Polymer
- CU70: Design for VAT Photopolymerization
- CU 71: Design for Material Jetting
- CU 72: Metal AM Binder Jetting Process
- CU73: Sustainability for Additive Manufacturing

Question 7. Grade your AM knowledge on CQS before and after training?

Rate in two columns for before and after cases from 1 to 4, being 1 (basic), 2 (average), 3 (high), 4 (expert)

- Certification and Qualification in AM
- Standardisation in AM
- Applicability of Certification, Qualification and Standardisation (CQS) to the AM enabled process chain

Question 7. Grade your AM knowledge on Business for AM before and after training?

Rate in two columns for before and after cases from 1 to 4, being 1 (basic), 2 (average), 3 (high), 4 (expert)
• Business strategies and models • Quality Management • AM workflow management • Health Safety, Environment and Sustainability • Policy and governance • Budgeting and Costs

Question 7. Grade your knowledge on Polymers Materials and Properties before and after training? Rate in two columns for before and after cases from 1 to 4, being 1 (basic), 2 (average), 3 (high), 4 (expert)
• Type of Polymer materials • Polymer Materials properties • Materials applications

Question 7. Grade your knowledge on Designing Polymers Parts before and after training? Rate in two columns for before and after cases from 1 to 4, being 1 (basic), 2 (average), 3 (high), 4 (expert)

• Additive Thinking
  • Design principles for AM
  • CAD files in AM
  • Simulation tools

Question 7. Grade your knowledge on Post Processing for Polymers before and after training? Rate in two columns for before and after cases from 1 to 4, being 1 (basic), 2 (average), 3 (high), 4 (expert)
• General considerations • Depowdering, cleaning and support removal methods • Surface smoothing methods • Practical application

Question 7. Grade your knowledge on Design for specific AM Processes (PBF/MEX/VAT) before and after training?

Rate in two columns for before and after cases from 1 to 4, being 1 (basic), 2 (average), 3 (high), 4 (expert)
• Overview of Machines, Process Capabilities and Limitations • Process related Materials • Specific Design Considerations

Question 7. Grade your knowledge on Metal AM Binder Jetting (MBJ) Process before and after training? Rate in two columns for before and after cases from 1 to 4, being 1 (basic), 2 (average), 3 (high), 4 (expert)
• MBJ Process Steps
• MBJ System – Hardware and Software
• MBJ Feedstock and Consumables
• MBJ Parameters
• Sintering Principles
• MBJ Process Capabilities
• Post Processing
• Industrialization of MBJ

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Question 7. Grade your knowledge on Sustainability for AM before and after training? Rate in two columns for before and after cases from 1 to 4, being 1 (basic), 2 (average), 3 (high), 4 (expert)
• Economic and social context for Sustainability Policies
• Product Life Cycle
• Additive manufacturing within a sustainable production scheme

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Question 8. Grade your level on technological, digital and entrepreneurship skills listed below before and after training?

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Question 11. Did you encounter any barriers in applying practices presented during training in your daily professional activities?

- Yes
- No
- Other

Question 12. If your answer was "yes" in the previous question, what kind of barriers did you encounter?
• Lack of equipment • Lack of commitment by your superiors • Lack of information in your team • Cost/Financial Issues • Other

Question 13. After the attendance of this course, did you enroll in any type of the following courses or training programme (Tickbox with a comment box for the last option)? (Tickbox with a comment box for the last option)?
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Question 14. Would you like to mention any additional comments?
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