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CLLAIM

Implementation and Testing at National Level

D6.1 Capacity Building for Trainers



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|-------------------------------|---|----------|
| Stephen Wisniewski (TWI) |  | 21-10-19 |
| Author Institution Sign-Off 2 | Signature | Date |
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1 Introduction

This document covers the content and evidences of the capacity building workshop for trainers of all partners involved in the CLLAIM project. The aim of this workshop was to introduce the use of the Pedagogical toolkit and good teaching practice based upon the LPBF Operator level with generic structures that span all qualification levels as per the CLLAIM project objectives.

A common capacity building workshop was held at The TWI South Yorkshire branch based at:

TWI
Advanced Manufacturing Park (AMP)
Wallis Way
Catcliffe
Rotherham
S60 5TZ,
UK

This document is accompanied by a present list and pictures

2 Scope and Targets

The capacity building training course was targeted at CLLAIM project partners (VET Providers) who will be supplying training as ATB's (Authorised Training Bodies) and/or acting as ANB's (Authorised National Bodies) in the assessment and examination of potential students. The capacity building also included an application of RPL tools and train the auditor session as part of its scope



3 Capacity Building workshop

In this section the evidence of the activities concerning the capacity building workshop is presented.

3.1 Supporting evidence:

3.1.1 Agenda and Responsible partner organisation

In September 2019 a capacity building workshop was organised at the TWI South Yorkshire Section, UK, Hosted by TWI. The first session to be held was conducted on the 9th September covering Train the Auditor. The 'Train the Auditor' session was delivered by Tobias Rosado from Idonial and the attendance sheet for this is as listed below:

Creating Knowledge and Skills in Additive Manufacturing
CLLAIM

Train the Auditor
TWI - Advanced Manufacturing Park (AMP), Wallis Way, Catcliffe, Rotherham
South Yorkshire, UK, S60 5TZ.

CLLAIM Project Attendance list 9th September 2019

| | Name | Signature: |
|----|----------------------------|--------------------------------|
| 1 | Simone Dietrich | |
| 2 | Max Horn | |
| 3 | Marco Michatz | |
| 4 | Henning Ahlers | |
| 5 | Ilka Zajons | |
| 6 | Yvonne Wessargcs | |
| 7 | Francisco Barros | <i>Francisco Barros</i> |
| 8 | Tobias Rosado | <i>Tobias Rosado</i> |
| 9 | Stephen Wisniewski | <i>SW</i> |
| 10 | Juan Carlos Rey Reinoso | <i>Juan Carlos Rey Reinoso</i> |
| 11 | Angel Garcia Beltran | |
| 12 | Pablo cabal Pérez | |
| 13 | Guillermo Sanchez Parrondo | |
| 14 | Daniel Scheller | |
| 15 | Sarunas Plenaitis | <i>Sarunas Plenaitis</i> |
| 16 | Marvin Keinert | <i>M. Keinert</i> |

Day 1 of the Train the Trainer Capacity Building Workshop began on the 10th September 2019 conducted by Stephen Wisniewski from TWI and the agenda for this session is as listed below:

Day 1 Train the Trainer – 10th September 2019

| 9:00 | Gathering - Start of the meeting | |
|-------|--|--------------------|
| 9:15 | Introduction to Train the Trainer | TWI |
| 9:45 | Using the Pedagogical Toolkit (Exercise 1) | TWI |
| 10:15 | Coffee break | |
| 10:45 | Online Study - Overview– Introduction to Additive Manufacturing (Exercise 2) | TWI/Group Activity |
| 11:45 | Review of Overview (Matching criteria) -Group Activity (Exercise 3) | Group Activity |
| 12:15 | Lunch | |
| 13:15 | Creating a lesson Plan | TWI |
| 13:45 | Testing Student learning | TWI |
| 14:15 | Coffee break | |
| 14:30 | Create a lesson Plan using the templates and toolkit provided (Exercise 4) | Group Activity |
| 15:30 | Group presentation of the lesson plan (Exercise 4) | Group Activity |
| 16:00 | Using Standards | TWI |
| 16:30 | End of Day | |

The following is the attendance list for Day 1

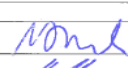



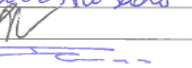

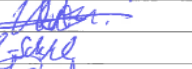


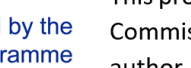
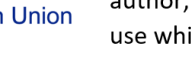



Creating KnowLedge and Skills in Additive Manufacturing
CLLAIM

Train the Trainer

TWI - Advanced Manufacturing Park (AMP), Wallis Way, Catcliffe, Rotherham
South Yorkshire, UK, S60 5TZ.

CLLAIM Project Attendance list 10th September 2019

| | Name | Signature: |
|----|----------------------------|---|
| 1 | Simone Dietrich |  |
| 2 | Max Horn |  |
| 3 | Mareo-Miehatz | |
| 4 | Henning Ahlers |  |
| 5 | Ilka Zajons |  |
| 6 | Yvonne Wessargies |  |
| 7 | Francisco Barros |  |
| 8 | Tobias Rosado |  |
| 9 | Stephen Wisniewski |  |
| 10 | Juan Carlos Rey Reinoso |  |
| 11 | Angel Garcia-Beltran | |
| 12 | Pablo Cabal Pérez |  |
| 13 | Guillermo Sanchez Parrondo |  |
| 14 | Daniel Scheller |  |
| 15 | Sarunas Plenaitis | |
| 16 | Marvin Keinert | |






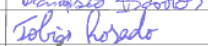








Day 2 of the Train the Trainer Capacity Building Workshop began on the 11th September 2019 and the agenda for this session is as listed below and was conducted by Stephen Wisniewski from TWI, The RPL tools were covered at the end of the day by Guillermo Sanchez Parrondo from Idonial.

Day 2 Train the Trainer – 11th September 2019

| 9:00 | Gathering - Start of the meeting | |
|-------|--|----------------|
| 9:15 | Introduction to Practical Training assessment | TWI |
| 9:45 | Practical observation worksheet marking guide creation (Exercise 5) | Group Activity |
| 10:15 | Coffee break | |
| 10:45 | Observation of an LPBF Operator carrying out an Instruction | Group Activity |
| 11:45 | Assessment of scores in accordance worksheet marking guide (Exercise 5) | Group Activity |
| 12:15 | Lunch | |
| 13:15 | Creating Test Questions and statistical assessment | TWI |
| 13:45 | Test paper (30 minutes to complete) (Exercise 6) | Group Activity |
| 14:15 | Coffee break | |
| 14:30 | Overview of test paper (Q & A) (Exercise 6) | Group Activity |
| 15:30 | Class questioning techniques | TWI |
| 16:00 | Create a series of questions using the templates provided on the LPBF topic given (Exercise 7) | Group Activity |
| 16:30 | End of Day | |

TWI - Advanced Manufacturing Park (AMP), Wallis Way, Catcliffe, Rotherham South Yorkshire, UK, S60 5TZ.

CLLAIM Project Attendance list 11th September 2019

| | Name | Signature: |
|----|----------------------------|---|
| 1 | Simone Dietrich |  |
| 2 | Max Horn |  |
| 3 | Marek Michatcz | |
| 4 | Henning Ahlers |  |
| 5 | Ilka Zajons |  |
| 6 | Yvonne Wessargues |  |
| 7 | Francisco Barros |  |
| 8 | Tobias Rosado |  |
| 9 | Stephen Wisniewski |  |
| 10 | Juan Carlos Rey Reinoso |  |
| 11 | Angel Garcia Beltran | |
| 12 | Pablo cabal Pérez |  |
| 13 | Guillermo Sanchez Parrondo |  |
| 14 | Daniel Scheller |  |
| 15 | Sarunas Plenaitis |  |
| 16 | Marvin Keinert |  |

The Train the Trainer Capacity Building Workshop began on the 12th September 2019 and the agenda for this session is as listed below and was conducted by Stephen Wisniewski from TWI, the attendance was as per the 11th September.

Train the Trainer Day 3 – 12th September 2019

| 9:00 | Gathering - Start of the meeting | |
|-------|---|----------------|
| 9:15 | Assessment of questions created (Exercise 7 review) | Group activity |
| 9:45 | Assessment of 'Preparation of CAD data' (practical demonstration) | TWI |
| 10:15 | Coffee break | |
| 10:45 | Fill in the blanks (Exercise 8) | Group Activity |
| 11:45 | Overview of Activity (Exercise 8) | Group Activity |
| 12:15 | Lunch | |
| 13:15 | LPBF Discontinuities / Defect identification | TWI |
| 13:45 | Test paper- Identify the following defects and how they may have been caused (Exercise 9) | Group Activity |
| 14:15 | Coffee break | |
| 14:30 | Overview of test paper (Q & A) | Group Activity |
| 15:00 | Control of Metal Powders | TWI |
| 15:30 | Highlight issues which may arise due to incorrect control of powders (Exercise 10) | Group Activity |
| 16:00 | Summation of the 3 day event and feedback | TWI – Q&A |
| 16:30 | End of Day | |

3.1.2 Target audience and other relevant stakeholders participating in the Capacity Building.

| Name of Participant | Organisation |
|----------------------------|----------------|
| Simone Dietrich | Fraunhofer |
| Max Horn | Fraunhofer |
| Daniel Scheller | EAH Jena |
| Serunas Plentaitis | SLV |
| Marvin Keinert | DVS |
| Henning Ahlers | Laser Akademie |
| Ilka Zajons | Laser Akademie |
| Yvonne Wessarges | Laser Akademie |
| Francisco Barros | EWf |
| Tobias Rosado | EWf |
| Juan Carlos Rey Reinoso | CESOL |
| Pablo Cabal Perez | Idonial |
| Guillermo Sanchez Parrondo | Idonial |
| Stephen Wisniewski | TWI |

3.2 Event

In this section evidences and information's of the activities concerning the capacity building workshop are presented.

3.2.1 Capacity Building workshop

In accordance with the lesson plans and presentations uploaded onto CLLAIM Share point a series of learning activities consolidated through practical exercises and observations was conducted. The training material was focussed on teaching in both practical and theoretical areas in line within the framework of the agreed learning outcomes. Attention was drawn to the Pedagogical kit and using modern teaching practices to facilitate student learning centred on the theme of additive manufacturing. The following topics were covered during these sessions:

- Auditing guidelines for AM auditors (Train the auditor)
- Use of the pedagogical kit
- Assessment and use of online material (examples: Overview of AM processes)
- Production of lesson plans
- Student assessment methods
- Using AM standards
- Observation of AM practical sessions
- Assessment of AM working Instructions
- Creating meaningful questions and subsequent statistical analysis
- CAD practical assessment of AM support structures
- Control of metal powders
- Identification of AM defects and their causes
- Recognition of prior learning (RPL) Toolkit assessment methods

All sections were punctuated with group activities/exercises in order to emphasise student assessment and teaching strategies centred on Blooms taxonomy.

3.2.1.1 CLLAIM Introduction

Following the Train the auditor course the train the trainer course began with an introduction followed by online learning module covering a group activity to assess an overview of AM processes given by Stephen Wisniewski from TWI.



Group activity at TWI south Yorkshire (online overview) capacity Building Workshop

3.2.1.2 Objectives

Objective: To be able to build creatively, plan and design teaching material and assessments that satisfy diverse learning styles within an additive manufacturing framework.

The objectives were centred on various teaching methodologies and the pedagogy of teaching using the following resources:

- Course material (notes/handouts)
- Video
- Case studies (could be singular or group activities)
- Additional reading material including standards
- Diagrams flowcharts
- Animations
- Images including CAD files
- Engineering drawings
- Written Instructions and procedures
- Sample questions
- Practical Exercises
- Blended online learning material which may include all of the above



Interaction of the participants during the capacity Building Workshop

3.2.1.3 RPL guidance

On the 12th of September a session was held to look at the application of the RPL toolkit. The session was delivered by Guillermo Sanchez Parrondo from Idonial.

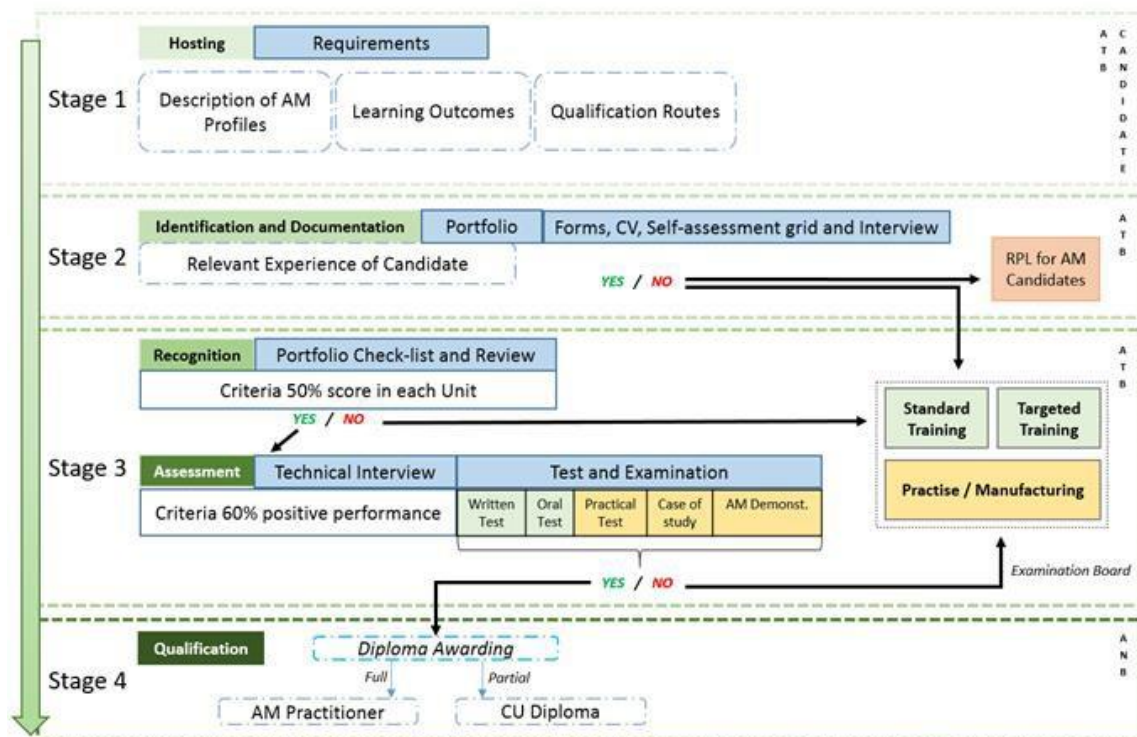


Illustration of the implementation of the RPL model and tools applied to AM Qualification.

Stages 1 through to 4 highlight the routes to be initially trialled in accordance with the relevant annexes detailed under WP3 D5.1.

3.2.1.4 Assessment of operator practical's

A proposed example was offered by EWF as a marking guide for practical assessment criteria. The assessment of practical sessions were covered in the train the trainer using the 4 key practical skills criteria as listed below:

Skill 1 - Using and Organising techniques, apparatus and materials

Skill 2 - Observing, measuring and recording

Skill 3 - Handling experimental observations and data

Skill 4 - Planning, carrying out and evaluating investigations

| CU: Hardware, software and build file set-up for LPBF | | Assessment criteria | | | | | | | Add if necessary | | |
|---|--|---------------------------|---|---|----------------------|--|---|-----------------------------|------------------|--|--|
| JOB FUNCTIONS | ACTIVITIE/TASK | Compliance with HSE rules | Compliance with the appropriate sequence of | Selection and use of spaces, equipment, tools and | Quality of the final | Ability to take decisions and solve problems | Demonstration of conceptual and technical | Time spent in the execution | | | |
| Hardware, software and build file set-up for LPBF | Interpret/fulfil technical information | | | | | | | | | | |
| | Verify compliance with manufacturer and/or internal specifications | | | | | | | | | | |
| | Prepare feedstock, build platform and the machine | | | | | | | | | | |
| | Load files | | | | | | | | | | |
| | Verify process parameters | | | | | | | | | | |
| Add if necessary | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Example only LPBF practical assessment criteria

3.2.1.5 TWI South Yorkshire Facility



CLLAIM Partners at The TWI Yorkshire site

3.2.2 Feedback of the Capacity Building workshop

In the scope of WP9, Fraunhofer circulated a questionnaire among the participants of the capacity building workshop. The feedback ratio (answers/participants) was of 6/6 for the Auditor and 14/14 for the train the trainer. In terms of grades on the feedback questionnaire most of the answers were between very satisfied and satisfied (see Annex A and B).

4 Conclusion

The capacity Building Workshop aims to prepare the teaching staff representing the ATB's and the ANB's for the creation and delivery of the competency unit pilots through guidance on the teaching, auditing and RPL assessment strategy.

This event has been a group effort with all partners contributing either individually or as groups. This Capacity Building allowed partners to be able to participate in theoretical and practical training and assessment strategies. The overall opinion of the participants in the workshop was good or very good and it was felt that this was very useful to aid in the delivery of the learning outcomes.