- Students progress can be monitored via individual traceability, based on accurate information for the evaluation plans.
- Exact information about machine use is available: information on machine working time, on/off and real machining time:
  o Accurate Maintenance planning;
  o Booking of machines, usage of the facilities;
  o Tool control; information available about who is using the tool, what machine, what task is carrying out, material, process; data for life analysis;
- Stock control.
- Cybersecurity managed in a local environment.
- Big data managed in a local environment.
- There is a showroom for SMEs and micro SMEs.

A key drawback implies that large investment is needed in hardware.

3.3. *SkillMan: Transnational platform of Centres of Vocational Excellence for the Advanced Manufacturing Sector*, Giovanni Crisonà, CSCS (Italy)

Mr. Giovanni Crisonà presented the objectives and key activities of the Skillman.eu initiative.

The original Skillman.eu mission implies the facilitation of the EU Skills Agenda and designing new learning pathways in the Advanced Manufacturing sector. It has been adjusted afterwards with a particular debate among the members, by adding the UNESCO 17 goals on sustainable development related, in particular, to the **ethical values** that connect the competences necessary for Advanced Manufacturing (AM) to the personal responsibility.

The AM technologies require different profiles provided with skills and ethical values that currently in both, the job market in general and in the industrial companies too, are still lacking in terms of numbers, knowledge and know-how. Different figures are required, from the design phase, up to the manufacturing technician to be committed, up to the technologically highly skilled people which have a global vision (from design, up to all the post processing), without forgetting, for example, the material experts on the different Additive Manufacturing portfolio[11].

The Skillman.eu members are convinced that the new Advanced Manufacturing technologies and the Additive Manufacturing in particular, will be more and more extended to all plants and on all manufacturing process level, since the initial prototyping phase up to the real mass production. The additive manufacturing technologies will also be adopted in the design and manufacturing of tools for the production process itself.

Thus, the current perspective and the objectives of the members of the Skillman.eu platform, regarding the new printing technologies in particular, includes two aspects that mainly fit also with supranational policies in the fields of education and training:

- the ethical issues that placed the Advanced Manufacturing sector skills to the attention of the Skillman.eu members due to the existing easy possibility to use low cost 3d printing system to make weapons, and

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[11] Regarding education, one should not underestimate the added value of re-training existing workers. A key for the deployment of additive methods in Europe is not only teaching AM skills in the educational context, but also re-focusing skills of existing workers. See, for example, AMEC 2017 - http://www.cecimo.eu/site/additive-manufacturing/cecimo-conferences/amec/amec-takeaways/

- the need to approach the Advanced Manufacturing for a mass-market production to support a 'rapid European or international scale-up of innovative solutions'[12].

3.4. *Discussion and feedback of participants*

Dr. Kristina Dervojeda invited the workshop participants to express their feedback regarding the presentations given during the morning session. The key points of the discussion included the following:

- Special attention needs to be paid to the development of soft (or non-technical) skills. These skills can be developed when students work on hands-on challenges.

- The role of schools, teachers and trainers needs to be reconsidered, with the learning ecosystem built around learners.

  - Schools still play a crucial role. There is a need for a solid initial knowledge base, before one can start applying a "nugget approach". The role of the schools is thus to teach the basics, that can be further built on.

  - Learner and teacher roles become increasingly interchangeable.

- With these new approaches, graduates enter companies with already a few years of practical work experience.

- There is a high risk of developing unrealistic expectations regarding what students should know when they finish their studies. It is not possible to address every need. First of all, there is a need to develop good engineers, with strong technical skills, and also the relevant soft skills. Finding a good balance is key.

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[12] LAB – FAB – APP — Investing in the European future we want, ISBN 978-92-79-70571-7, Luxembourg: Publications Office of the European Union, 2017