
Evaluation Summary

STEAM Imaging:

Art Meets Medical Research

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A Workshop by Fraunhofer MEVIS

For Pupils in Bremen, Germany, and Linz, Austria
at the Fraunhofer Institute for Medical Image Computing
and the Ars Electronica Center

In Cooperation with the International Fraunhofer Talent School Bremen

Workshop in Bremen at Fraunhofer MEVIS: 28-29 March 2017

Workshop in Linz at Ars Electronica Center: 8-9 June 2017

Workshop Leaders: Sabrina Haase and Yen Tzu Chang (Artist)

Project Lead & Management: Bianka Hofmann

A brief Dialogue

Our science communication projects such as this workshop are expressions of responsible research and innovation in medicine. We want to stimulate engagement with, critical dialogue about, and implementation of new technology in society. The developments in medical technology are changing our everyday lives in increasingly shorter innovation cycles. We need adaptive, cross-disciplinary, intergenerational platforms to deal with the implications of these technologies at an early stage. Team STEAM Imaging

It is important to already start this conversation with school kids. Such workshops and especially the ethical discussion between pupils, artist, and scientists that took place in the course of the workshop was an important aspect to trigger this. Inviting an artist to engage with the technology developed by Fraunhofer MEVIS added a dimension and opens the conversation with a wider audience and supports the communication by adding new sensory experiences.

Evaluator Claudia Schnugg

We wanted to assist an artist to complete her work with new technology, a software platform for medical imaging. Through the school workshop, we brought the artist into contact with new professional outlets. Team STEAM Imaging

The artist aimed at engaging in a positive communication about recent technological developments. She wanted to reduce the fear of robotic developments in health care and life sciences perceived in public. The contextualization within Fraunhofer MEVIS technology supported her goal and enriched her media artworks with new tools.

Evaluator Claudia Schnugg

One aim of the STEAM workshop was to bring STEM topics to pupils interested in art and raise their awareness of the role of math, physics, and computer science in health care and life sciences and to show the value of current science and technology for art. Team STEAM Imaging

The workshop raised the awareness of the role of math, physics, and computer science in health care and life sciences. Pupils also displayed a growing interest in medicine after the workshop and stated the knowledge they gained about medical technologies as one of the main benefits.

The pupils also learned about the value of current science and technology for art and were interested in the possibility to combine art and science. However, raised interest in STEM topics by pupils interested in art is not supported by the data.

Evaluator Claudia Schnugg

The pupils used medical image processing technology in an artistic way, and learned about media art. Team STEAM Imaging

The workshop provided knowledge about medical image processing technology and gave the opportunity to create an audiovisual media art piece. Pupils learned much about media art and sound art and how sound can support visual information. In a next step, such a workshop could provide more time for artistic exploration and interplay of artistic and scientific aspects. An explorative approach in the artistic creation process also triggered a learning process in programming skills.

Evaluator Claudia Schnugg

Both artist and scientists had the chance to engage and work with the next generation.

Team STEAM Imaging

Such a workshop format certainly fosters an exchange between generations, especially between professionals and youth who otherwise would not get in direct contact. The ethical discussion in these two workshops helped to create a more intense dialogue.

Evaluator Claudia Schnugg

Evaluation Summary

Fraunhofer MEVIS collaborated with sound artist Yen Tzu Chang to create a pioneering STEAM workshop format that complements the successful STEM workshops at International Fraunhofer Talent School Bremen. The workshop combined medical imaging and visualization methods with sound art. Two “STEAM Imaging” workshops took place, one in Bremen, 28-29 March 2017, and one in Linz, 8-9 June 2017. Thus, experiences and feedback from Bremen could be considered to improve the workshop format in Linz. Due to lack of space in Bremen, the pupils had to be divided into two groups: one led by the artist, one by the scientist. Only during the plenary talks at the beginning and end of the workshop and for lunch the groups spend time together. The pupils did only partly experience this as STEAM. The workshop design in Linz thus did not divide the group and all pupils were exposed to both workshop leaders continuously. This changed their experience essentially. The evaluation is based on a pupil questionnaire combined with qualitative interviews with key persons and observation of the workshop in Linz.

STEAM Imaging introduced pupils to a problem-centric approach in learning that combined art and diverse STEM subjects. Pupils claimed that in the workshop they were confronted with the possibility that mathematics, physics, and informatics can be used to gain knowledge about the body and health for the first time. The majority also claimed this was their first contact with media art. Prior to the workshop; they were not aware that mathematics, physics, and informatics could be used as tools or as fundament for artistic ideas. Interestingly, even pupils who knew that media art existed, did previously not consciously think about the cross-fertilization between art and STEM. This suggests that such a workshop format is a relevant tool to make them aware of creating an experience.

It was fun for the pupils to work on topics allowing them to integrate their artistic and STEM knowledge, in Linz they were so excited they even skipped the breaks except for lunch. Pupils still were hesitant, however, regarding their willingness to do this at home or whether or not they wanted to repeat such projects. Although the pupils absorbed the knowledge presented, the same is true for their rating whether artistic activities help them to better understand STEM subjects, medical questions, and for their perceived confidence in their artistic skills or STEM knowledge. The pupils in Linz were more positive about these questions as compared to the ones in Bremen. Intriguingly, in the qualitative part of the analysis, many pupils of both workshops claimed they learned much about medicine, health, medical imaging techniques, sound art, and that sound could support visual information.

The mix of methods of theoretical contributions and application-oriented and open/explorative teaching activities is an important asset to create a holistic experience. It introduced pupils to the fact that problems are explored and understood by combining knowledge from different subjects. Diverging answers from Bremen and Linz show that it is important to create a well-balanced agenda of theoretical contributions and practical tasks in such ambitious workshops. The intense and comprehensive schedule was doable with the group in Linz, where all pupils were at the same age and had the same educational background, although some pupils would have required more time to digest all the information. The group in Bremen with pupils from different schools and different school grades experienced more difficulties.

Finally, the presentation at the end was meaningful in Bremen and Linz to create a goal to work towards throughout the workshop which concluded by staging the pupils’ achievements. The pupils were interested in presenting their work to others and to get feedback. The official character of the final event and the representation in the media also created an important reference point for them.