

Contribution ID: 839

Type: Poster

Make it matter: How to foster interest in particle physics by setting it in meaningful contexts

Particle physics seems to be abstract and far away from high-school students'daily life. However, research in particle physics is not only relevant for scientists. Technologies developed at CERN have numerous applications, e.g., contributions to cancer therapy in medicine, contributions to art authentication and restoring in cultural heritage, and many others. In short, the fundamental principles of particle physics and its applications are relevant. Experiences in outreach settings show that they are also interesting for high-school students. Yet, there is no solid evidence for high-school students' interest in particle physics.

Fostering interest in physics among high-school students is crucial since it plays an important role in their course and career choices (Blankenburg, Höffler, & Parchmann, 2016). In education research, "*interest*" is defined as the "*subjective value attached to knowledge about an object*" (Krapp & Prenzel, 2011). When investigating high-school students'interest in science, previous studies focused on four aspects: interesting a) contents (e.g., optics), b) contexts (e.g., biological), c) tasks (e.g., conduct an experiment), and d) learning environments (e.g., school). Previous studies agree that when trying to foster interest, the context has a greater influence than the content, task, or learning environment (Häußler, Lehrke, & Hoffmann, 1998; Sjøberg & Schreiner, 2012).

However, since students differ in their preferences, they can be categorized into different interest types (Häußler et al., 1998). When investigating these interest types, previous studies mainly focused on gender differences (Häußler et al., 1998; OECD, 2016; Sjøberg & Schreiner, 2012). For example, girls show a lower interest in the content "*Motion and forces*" than boys (OECD, 2016). However, there are a few contents (e.g., "*The Universe and its history*" (OECD, 2016)) and contexts (e.g., "*The possibility of life outside earth*" (Sjøberg & Schreiner, 2012), or "*The human body*" (Häußler et al., 1998)) that are extremely and equally interesting for all types of students.

One limitation of previous studies is that they did not include modern physics contents such as particle physics, which might be particularly interesting for all students.

In the framework of a PhD project at CERN, a new study examines which contents and contexts arouse interest in particle physics among today's high-school students. The aim of the project is to identify different types of interest in particle physics while considering clustering variables beyond gender. Moreover, different contexts are compared in order to identify the ones that are equally interesting for all types of students.

The research is conducted in the framework of "*S* Cool LAB", CERN's Physics Education Research facility. High-school students and teachers contribute to research projects by taking part in different on-site or online learning activities. Typically, they are focused on a particular particle physics content set in different contexts. For example, the X-ray workshop is currently set in the contexts "*Medicine*" (x-ray images), "*Health*" (food irradiation for conservation), and "*Technology*" (airport security).

This contribution introduces the first findings of the interest study. Moreover, recommendations will be given to adapt or create learning activities according to the most promising contexts.

References:

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Collaboration / Activity

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Session Classification: T14: Outreach, Education and Diversity

Track Classification: Outreach, Education and Diversity