



The Future Maker's Journey: Will Tomorrow's Skills Come from School, Hobby, or YouTube?

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Study requested by: Estonian Business and Innovation Agency, Startup Estonia programme

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We conduct qualitative research that enables to find solutions to problems that occur either in the society or within companies and organisations. We prioritise the knowledgeable action of companies and the application of research findings to the development of the organisation and the subject field.

We apply qualitative methods such as in-depth interviews and participant observation characteristic of the humanities and social sciences. We combine state-of-the-art technology and visual methods in our research process in order to give a well-rounded overview of the answers to the one who posed the questions. We approach each company individually, following from their particular problems and needs.

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We are grateful to all the research participants.

EXECUTIVE SUMMARY

From October 2022 until January 2023, Center for Applied Anthropology of Estonia and Estonian Research Center conducted a study with the aim to understand **what influences young people to develop a deeper interest in STEAM fields and to participate in activities that develop enterprisingness**, and which role formal and hobby education, as well as self-learning play in the development of the interest.

Research was conducted in two stages. In the first, **qualitative stage**, we made 17 individual interviews with pupils aged 13–19, and group interviews with teachers in formal and hobby education, as well as parents. We also used the method of participant observation at four youth events related to STEAM fields and entrepreneurship. In the second, **quantitative stage**, we conducted an online survey with pupils aged 13–19 from various school in Estonia. 600 pupils answered the survey.

Key findings

STEAM fields

- More than half of the young people thinks that STEAM fields are very or rather interesting.
- On average, boys find science, technology and engineering more interesting than girls.
- Interest in STEAM fields is represented in both formal and hobby education, as well as independent activities.
- Pupils like STEAM subjects when the classes are interesting, related to real life and developing, and when they understand the subject. At the moment, young people feel the lack of practicality and flexibility in school education. Thereby, the teacher has an essential role in how the subject is perceived.
- Both youth and parents have a relatively narrow view of science and technology as something with strict borders that is not suitable for everyone. Stereotypes have an impact on young people's self image and through that on their interests.
- Many young people feel a societal pressure to start a career in IT. This does not always correspond to their interests and wishes though, for example it is common to think that creativity does not have an output in IT.

Enterprisingness and entrepreneurship

- Enterprisingness is often associated with entrepreneurship but for some also with being active in the society.
- Enterprisingness is associated with characteristics such as the ability to come up with good ideas, leadership skills, communication skills, analytical skills, readiness and will to act, courage, and solution-oriented attitude.
- On average, interests related to enterprisingness start later than interests in STEAM fields. Often, the starting point is an entrepreneurship course at school or being active in a student company, especially if the interest is not sparked at home.
- Activities that develop enterprisingness are usually carried out within formal education and independent activities, rather than hobby education.
- Contacts with entrepreneurs, either through visits to companies, job shadowing or internships, are an important factor that can influence developing interests related to enterprisingness. These companies are responsible for the impression that a young person gets from the field.

Starting points of interests

- In earlier age, parents are usually the ones that direct young people towards hobby activities. Whether an interest is sparked, is also influenced by other surrounding people, such as siblings, relatives, friends, teachers and influencers.
- Self image also influences the activities which young people are drawn to and which they find suitable for themselves.
- Often, a new interest is discovered through experimenting and getting acquainted with a new field in a one-time activity.
- Games and playing is frequently a gateway to an interest in technology – for example through legos, computer or video games.

Factors that influence the development of interests

- In formal education, teachers have the greatest impact on the development of interests, as some increase an interest in a subject, even if the subject itself does not seem fascinating, while others may decrease an interest in the subject. Learning methods are also important – young people would like to solve more practical tasks, and have more discussions in classes.
- In formal education, pupils struggle with a variety of issues, such as a big focus on exams and tests, a large amount of homework, faster learning pupils also with the lack of achievable extra tasks. Russian speaking pupils have difficulties in understanding subjects in Estonian, which results in no time or energy for hobbies.
- In hobby education, young people value a more relaxed environment than in school, more practical way of learning and versatile learning methods.

- From the teachers' perspective, there are several problems in hobby education in STEAM fields, for example lack of system, lack of feeling appreciated and belonging to a community, lack of knowledge, small pay, lack of specialists, and inadequate funding for competitions.
- Hobby education in STEAM fields is not accessible in many places. This creates challenges in logistics for parents.
- Young people increasingly engage in independent hobby activities. Self-learning offers freedom and independence, but is sometimes also a result of not finding a suitable organised activity. Also, some young people do not have the necessary skills or resources for self-learning.
- Experiences of success are necessary for the development of interests, such as in competitions. However, competing is not suitable for everyone, and success can also be experienced in other ways.
- Even though young people find that both, boys and girls, can be equally good in various fields, they concede that girls tend to have less interest in technology and that there are too few positive examples of female entrepreneurs.

Why interests do not start, or fade away

- Lack of time is the primary reason for not being engaged in STEAM fields. Other more popular reasons are the feeling that independent activity in the field is boring or complicated, and not seeing oneself capable enough.
- Young people tend to quit hobby activities around the 6th–7th class. One reason is the increased study load at school, which means that the person has to narrow down their other activities. Another factor is friends quitting mutual activities.
- Important factors are also the loss of playfulness in education, too little flexibility in hobby education, lack of challenges or too difficult challenges.

Views on future and career choices

- While some young people already consider certain narrower career choices, there are many of those who do not have so specific ideas yet.
- The technology sector is considered as a secure choice with high salaries. For some young people, IT is a comfortable back up option. For others, however, it creates pressure because they are either not interested in the field or do not see themselves as capable enough.
- Several young people view entrepreneurship as a possible future prospect. At the same time, it is also acknowledged as a tough choice that involves a great risk and extreme amounts of work.
- There are young people who consider a vocational school as the best choice for them, since the teaching is practical and they can concentrate on learning a specific trade.

Based on the results of the study, we conducted a **co-creation workshop** with experts in the field with various backgrounds. In the workshop, main challenges, revealed by the study, were discussed, and solutions and policy recommendations were developed and formed to encourage more young people to be engaged in STEAM fields and in activities that develop enterprisingness. The solutions, presented in the report, concentrate on following topics:

- Bringing STEAM fields and enterprisingness closer to young people in formal education
- Making hobby education in the STEAM fields more systematic and accessible
- Integrating formal and informal education
- Including young people as teachers and mentors
- Communication activities