

Future STEAM Cities

Future STEAM Cities Investment/Continuity Plan for **the city of Oulu (en)**

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The policy context

Needs analysis in the territorial context

- The city Oulu was established in 1605 and it is the oldest city of northern Finland. The city has app. 217 000 inhabitants which makes it the 5th biggest city in Finland.
- Oulu is known for being a vibrant city of students. The city has app. 20 000 students in comprehensive schools, 4000 students in high schools, 6800 students in vocational schools, 8000 in the Universities of applied sciences and 14 000 in the University of Oulu.
- The “technology village” Technopolis Plc and its subsidiary Medipolis have provided facilities for numerous start-up companies and office spaces for researchers and students leading to Oulu developing into one of the biggest city of innovations and technology companies. Over the years Oulu has gained the title “Silicon Valley of North” due to its reputation as innovative and vital city with chances to develop ideas into businesses.
- The city of Oulu faces challenges related to demographic changes such as ageing population and difficulties in retaining working people and students who graduate from the city’s University and other schools.
- Oulu also needs to find sufficient pedagogical leadership so that all the schools in the city have the means and skills to execute STEAM pedagogy. Oulu is known for its technology and businesses that develop new technological solutions. STEAM pedagogy is an important frame for educating talented workers for the local industry. Thus securing STEAM in all the schools is critical for the city’s vitality.
- With securing the execution of STEAM in all the schools comes the question of permanent/long-term funding that allows the long-term planning and scheduling of STEAM pedagogy. Oulu needs to find ways to

involve the local decision makers and members of the council and make them understand that STEAM is one of the ways to secure the vitality of the city, to keep the local talent in the city and retain the city's competence on high level.

- To be able to compete with the other cities Oulu also needs to promote lifelong learning for all its citizens – not just for the ones in schools. This means Oulu needs to find ways to improve the digital skills of adults, seniors and other possible groups of citizens who may not have access to digital solutions or equipment on regular basis. It is important the city finds ways to bring STEAM for all.

The policy response

Oulu is committed in following Europe's Digital Decade 2030 policy and its targets. Oulu is reinforcing the good digital practises that already are functioning within the city as well as working on securing equal digital skills for all. The FSC-project and developing STEAM practises supports Oulu in digitalisation of businesses, improving digital skills and digitalisation of public services. FSC helps Oulu to gain the goals as we use STEAM to meet the targets of EDD2030.

Oulu is also following the guidelines of A new Industrial Strategy for Europe. This strategy aims to make Europe greener, more digital and globally competitive. Oulu is working on the same aims and STEAM-pedagogy is one of the keyways to reach these aims. Therefore participating in FSC- and making STEAM a cornerstone of education helps the city also to fulfill the requirements of the New Industrial Strategy.

The content of the Finnish national curriculum has basically STEAM written all over it, even though it is not (yet) mentioned there as such. STEAM provides an excellent pedagogical framework to execute basically any content mentioned in the curriculum. The term multidisciplinary learning module is, however, mentioned in the national curriculum and for many teachers in Oulu it already equals STEAM. The nature of the curriculum encourages the educators in Oulu to work within the

framework of STEAM and gives a reason to promote STEAM as a significant and natural way to plan, execute and assess the teaching. There is a strong certainty of the fact that as the present curriculum will be updated, STEAM will be added to it.

Oulu has four main priority areas in education:

- **Digitalisation**
- **Internationalisation**
- **Supporting learning process**
- **Developing participation and wellbeing**

At the moment one of the ULG members of Oulu is cross-examining a possible connection between STEAM and increased wellbeing of the students. If (and when) this connection is proved to be true there should not be any questioning about the necessity of STEAM in education. It is already a known fact in most of the schools in Oulu that STEAM provides the teachers tools to increase activity, feed imagination, help the students to take ownership of their studies and thus be more content in schools.

As the support system in education is going under changes the role of STEAM as a promoter of wellbeing cannot be overlooked. FSC project provides Oulu a change to take STEAM pedagogy further as one of our aims is to create STEAM 2.0 – new, updated ways to execute STEAM for the schools that already have a lot of experience in STEAM pedagogy. STEAM 2.0 is not a concrete tool or a model – it's more like a idea(l) of the future of STEAM in our city. In fall 2025 the original six STEAM schools gathered together with the STEAM guidance group and some of our ULG members in order to initiate brainstorming about the future of STEAM. The working title for this is STEAM 2.0 or "STEAM for all".

As the goal is to test and develop new ways to execute STEAM, the Future Steam Cities -project and the testing actions that come with it make it possible for the city to test, fail and test again to see what the best next step would be to be taken and what could be shared and spread between all the schools in the city.

STEAM in Oulu is a local network consisting of the active STEAM schools. It has an important role in sharing good practises and asking/answering questions. As Oulu is the European Capital of Culture in 2026 we have a once-in-a-lifetime chance to promote our education and STEAM practices. For example, the already traditional Amazing North and Tool camp events that are arranged for the students of our city in every May included a international STEAM summit in 2026. The call for papers attracted international presenters and speakers. Bringing STEAM in the huge public eye is also a chance to convince the local authorities and stakeholders of its necessity and important, crucial role when it comes to educating the future working citizens. STEAM needs to be made attractive enough for the politicians to grand long-term funding to it.

STEAM could easily be a factor that lures in families as it provides children with important future skills. This – if anything – should be a reason for the local authorities and stakeholders to find ways to make STEAM a permanent target for funding and development. Families with children are likely to move to the cities that are known for high quality education. Adults bring knowhow and taxes to the city, whereas at the same time the children will learn important future skills. As one of the reasons for Oulu to join FSC was to keep the talent in the city, it is obvious that the project enables the publicity and development of new practices that STEAM needs. The final meeting of FSC was held in Oulu in 2026 for reason. The status on Capital of Culture offers platforms to share information, will provide publicity also for the project and puts STEAM in spotlights. An international project should be an attraction to the stakeholders and politicians as well.

The investment proposal

Background to the proposal

Oulu - A STEAM(y) History

Oulu has a strong history in STEAM education, with many initiatives and governance structures that help us develop and embed STEAM methodologies across the city. A common understanding has developed in Oulu about the importance of STEAM and the way it makes the city more innovative and appealing as a place to study, work and live. STEAM has already reached our kindergartens and schools. Now the goal is to involve all the other areas of the society and the people in them. Oulu – as a leading STEAM city - needs to maintain its momentum and be able to find ways to meet evolving needs.

The Future Is STEAM

Oulu's main aim in this URBACT Transfer network is to use the learning from the city of Aveiro and other project partners to develop our local STEAM practice further, into what we call "STEAM 2.0". As we have just started to collect ideas to define what STEAM 2.0. it is imperative to understand that STEAM 2.0 is not a concrete tool or a single 'model' but more an idea of the future of STEAM in our city, a combination on new methodology, pedagogical innovations and measures to spread STEAM into all areas of public services. This includes the vision of "STEAM for All" as a concept –new ways to execute not only STEAM pedagogy but also make STEAM available for all the citizens of Oulu.

An Evolving Concept

As said earlier, we know that STEAM 2.0 is still an evolving concept for Oulu. Whilst we understand some elements clearly, we will continue to explore what the future city needs will be, and test out what STEAM components could best meet those needs. In the fall of 2025 our STEAM guidance group and its representatives in our ULG sat down together with the principles from the first six schools that started developing STEAM pedagogy 7 years ago. The goal was the same: to come up with a preliminary map of ideas defining what the future of STEAM looks like within all the fields of society and public services that are represented in both our guidance group and ULG.

A STEAM Programme for All

Our current work under URBACT has led to four main workstreams, which complement each other and combine to move us towards STEAM 2.0 – these are:

- Future Classroom Prototype to provide a model for STEAM education resources
- Literacy Skills Robot to support students with learning challenges
- Hackathons for upper secondary school students, to develop innovation and creative collaboration skills and even out the skills in digital skills
- Artistic Residencies with partner cities, to foster and showcase how creativity, aesthetics and imagination can enrich cities

Urbact ITN offers a possibility to test and adapt new solutions. As the goal is to receive long-term effects on the execution of STEAM, it is highly important

to adapt the tested practices into Finnish society and education practices for them to be able to remain as permanent elements instead of living only as long as the FSC is ongoing.

Contributing To Our City Strategies

The workstreams and our wider STEAM methodologies are core to Oulu's future. We see that developing and improving our pedagogy under STEAM 2.0 as one of the key ways we will:

- Develop the city ecosystem so we continue to be seen as one of the most innovative and forward thinking digital hubs in Europe.
- Train and retain the talent of the future, with more rounded educational approaches that are better suited to the jobs of the future for Oulu.
- Promote greater wellbeing through exploration and application of the emerging connections between STEAM education, effective lifelong learning, and increased local wellbeing.
- Fulfil the strategic imperatives of the New Industrial Strategy for Europe and the Europe Digital Decade, both of which Oulu is applying at local level.

STEAM is our past, our present, and our future!

Our starting point

- As the biggest city in northern Scandinavia Oulu has participated in numerous national and international projects before. STEAM in Oulu and the national Oppiva-network (including 44 cities/municipalities) are the most important networks when it comes to developing STEAM-practices. In September 2025 Oppiva-network rewarded the city of Oulu for consistent and systematic development of STEAM pedagogy both within the city of Oulu and on national level. From FSC Oulu wishes to gain both new perspective, new and adaptable practices and possible future collaboration partners.
- The FSC lead partner, the city of Aveiro, was familiar to Oulu before FSC as there was a collaboration on another project prior to FSC. This former project was also about Artistic Residencies and confirmed the fact that Aveiro has useful solution to be shared and adapted into Finnish education system.
- Oulu also needs to find ways to make the city more luring. Whereas STEAM-pedagogy reaches all the students of the city, it is important to make the city appealing to the adults as well. Oulu is known for its innovations and high tech solutions and we want to keep that. Thus, while it is important to educate the future working people, to stay vital, the city needs the brain capacity at the moment too. Oulu aims at enhancing STEAM leadership and educational excellence, expanding STEAM access and lifelong learning, strengthening ecosystem collaboration and ensuring financial sustainability and resource development.
- Oulu has a network of educational and cultural services, the city library, the museum, university and business Oulu to strengthen the co-operation between all the fields to maintain the vitality of the city. Together the experts of these fields work to come up with ways to keep

the local talent in the city by creating new work possibilities and business ideas.

- There is a common understanding in Oulu about the importance of STEAM and the way it can help the city to be more innovative and appealing as a place to study, work and live.
- Oulu already has a strong reputation as a leading STEAM city and it is well-known for its technological innovations. However, the city needs new ways and ideas to execute STEAM, create long-term working possibilities and make people stay in Oulu instead of letting the talent slip away. Even though Oulu is not losing citizens but rather has more people moving in than out, the key is to lure in the innovative talent.
- The city of Oulu has committed in keeping STEAM as part of the city strategy which also means somewhat secured finances and resources into development work. The new city strategy was published in March 2026 and it will be operative till the year 2035. Later in the spring 2026 more accurate and detailed ways to measure the execution of STEAM will be added to the city strategy. This tells not only what is expected to be achieved but also informs the city politicians what and where the funding and resources needs to be targeted at.
- However, even though STEAM is stated in the city strategy it is imperative to take into account the challenging economic situation that Oulu – among many other cities – is facing at the moment. The economic cycle is also challenging on national level. This means that there are strong demands for cut backs and savings within the city of Oulu as well. Furthermore, the birthrates in Finland have gone down during the past years which means lower number of students in comprehensive education. This, for its part, decreases the fundings from the state that are directly connected to the number of students.
- Having stated the previous, it is clear that executing and securing the important STEAM education will need both external funding resources and re-arranging the already existing ones.

The advantages and the threats in the beginning of the FSC-project

	Advantages What we already have?	Threats The possible threats to the already existing circumstances.
STEAM in city strategy/Support from the local politicians	The STEAM is part of the city strategy and more accurate instrument panel will be added in 2026.	The next election resulting in anti-process/anti-education city council The demand for cutbacks
STEAM in Oulu network	A full coverage of all the ca. 40 schools in Oulu as they all reportedly execute STEAM pedagogy	The boredom of the most experienced schools (STEAM 2.0) Lack of training/recourses for the most inexperienced ones
Traditions of innovation and high-tech solutions	Already existing structures for high-technology	Lack of new innovations, deployment, losing the talent to other cities
National curriculum	Pro interdisciplinary learning modules	Educators who are stuck to their old habits/unwilling or unable to learn new (digital) skills

The adapted version of the innovative practice

STEAM 2.0

Oulu needs to develop new innovative projects to maintain its position as a leading technology and STEAM city. Oulu can't afford to fall behind in the ever-changing fields of technology, education and business.

The goal is to create STEAM 2.0 or STEAM for all – a new, expanded way to execute STEAM and make it reach all the citizens. The schools are an excellent and effective surrounding to spread STEAM and teach future skills as schools and pre-schools reach all the citizens aged 6-16 years. As there are many schools in Oulu with long and strong experience with STEAM, they need to gain new information and solutions to be able to take the next STEAM step forward. The goal is to gain new perspective from the FSC partners to strengthen and complete the STEAM practices. This way the more experiences schools would have new ways to continue their STEAM education. However, Oulu aims at providing STEAM for all and this is also one of the reasons the city joined FSC project – to adapt new innovations to benefit all its citizens. The meaning and concept of STEAM 2.0 will be clarified within the following years and undoubtedly it will be an ever sifting concept.

Thus, STEAM 2.0 is a concept for the experienced STEAM schools for them to be able to move forward with their actions. This also gives the stakeholders a chance to develop STEAM practises that are naturally suitable for their field of expertise. This enables new innovations and ways to execute STEAM – with some totally new practises. This also enables the students to use their creativity with new challenges. As an result of STEAM 2.0 should be an increase of well-being and taking ownership of the studies. The risks will be minimized with good planning, co-operation and regular meetings. The planning for STEAM 2.0 has started with stakeholders in the autumn 2025 and this concept will take years to finalize due to its non-fixed nature and the flexibility of STEAM. Getting STEAM in city strategy, attending FSC and other possible projects, educating educators and exploring and testing new practices will eventually and hopefully build up to be STEAM 2.0. So far Oulu has tested and adapted the following innovative practises:

- **The literacy skills robot**

The robot is one of the ways to support students with difficulties in reading. The robot itself represents the T and E in STEAM and offers the

student not only support in learning but also a chance to work with technological units and parts.

The robot will be purchased together with one of the biggest Finnish publishing houses for school books due to its high prize. The robot will be first tested on the students with reading skill difficulties and if it proves to be efficient way to get students to read more we use this result as a justification to apply more funding for more robots.

- **Hackathon**

As the students in upper senior schools are aged 16-19 there may be substantial differences in their digital skills – especially due to the fact that their comprehensive school years may or may have not included STEAM-pedagogy. As one of the goal of the city is STEAM for all, Hackathon addressed to these students will give them an opportunity to improve their future skills and participate in STEAM projects.

The first Hackathon in Oulu was organized under the event of Tool Camp in May 2026. According to what kind of feedback it will receive from its participants, there is a chance that Hackathon – or an adapted version of it – will become a permanent element of Tool Camp.

- **Artistic residency**

There is already a prior project between Oulu and Aveiro about the A in STEAM. Oulu brought one of the artists to Aveiro in October 2024 to enrichen the scale on STEAM. Oulu acknowledges the importance of A in STEAM as that is where the aesthetics, imagination and creativity is. This also is a natural framework for the co-operation between STEAM in Oulu, the city library and the museum.

As there are still doubts about whether there is a place for A in STEAM, it is important to adapt particularly this practise in question. Art is usually one of the students' favourite school subjects and therefore gives an easy transition from arts to STEAM. Furthermore, Oulu – known for its' technological solutions – needs to pay more attention to what the creative arts provide. Especially since we have the city Museum as one of

our stakeholders. Museum is also easily accessible to the citizens so in the future integration of arts to the STEAM solutions in both effective and useful. The museum also already runs STEAM workshops for the students so – as the format is already there the museum could be an easy access way to introduce STEAM to other citizens as well.

The search for the students to work with the artists chosen for Artistic Residency -program 2026 was done in fall 2025. The project started in January and ran until May 2026.

- **Future classroom**

As the goal is to make STEAM available for all, the goal is also to build a prototype future classroom that would be ideal for STEAM based learning. The prototype enables the teachers and students to test what is working and what is not before building the solutions and sharing the ideas any further. The good practises will be duplicated around the city to ensure an equal access for all.

Also, the solutions that are found to be working with the students, might be easily duplicated to the libraries, museum, teacher education faculties for as wide accessibility as possible. So future classroom may offer solutions and practices to be shared with older citizens as well.

The first prototype of the future classroom was built in the spring 2026 in the school of Pitkäkangas that was selected amongst all the volunteering schools in the spring 2025.

The integrated approach and the participative process

- The ULG of Oulu has representatives from the university, Business Oulu, city library, science center Tietomaa and the museum (together called Tiima), educational development services and cultural services. All the

members bring valuable insights from their field of expertise and also execute STEAM in the most suitable way for their services and premises. Even though these stakeholders worked together before the project, being part of the ULG has made them to look at the same direction, through STEAM lenses. This benefits and improves the changes of STEAM cutting through the city services in the future.

- FSC has been one effective way to embed STEAM into discussion on the future of education in the city of Oulu. The adapted practices support our goal to get new solutions and ways to execute STEAM. Even though the practices are first mainly tested with students, there is a chance to take the most effective ones and share and teach them to the other age groups as well.
- As Oulu aims to be the leading STEAM city in Finland – and this is also stated in the city strategy- it is necessary to be on top of all the innovations and solutions. The more new solutions and practices we adapt and develop, the more chances we have to advocate our STEAM education as the best and the most modern one in our county. The school network that provides equal, high quality education of the future skills will be a great selling point at any occasions. High quality education lures in families -perhaps with highly educated and pro-education parents who themselves improve the age distribution and talent distribution of the working age citizens.
- As STEAM is in the city strategy and we are at the moment creating a scale of assessment on how to measure the execution of STEAM in the city, it is vital to make sure that educators, librarians, museum curators have sufficient resources to follow the city strategy. It also means that the city politicians have to address enough funding for its workers to follow the city strategy. Every project, including FSC, brings some new solutions to the city and increases the knowledge of STEAM. The goal is to gain new practises from the project that enable the city workers to follow the city strategy as far as STEAM is concerned.

- At this point it is still too early to evaluate how the particular adapted practices will shape the future of STEAM in Oulu as the testing actions are still in the process. The STEAM 2.0 will take its form within the city strategy that is set until 2035.

The adapted innovation project

The Value Proposition

Oulu wants to maintain its high status as the leading STEAM city and a strong source of technological inventions and innovations. The future goal is to:

- make STEAM available for all
- increase the digital skills of all the citizens
- create new working possibilities
- keep the local and graduating talent in the city

In Oulu STEAM education is core to how we will encourage our children and young people to be creative, have the resilience to test things and 'fail forward', learning from what doesn't work as well as what does, and to have the courage to boldly try new innovations

The city will also develop new ways to teach digital skills to all the citizens to support us in the new digital world, as we work towards being greener with more digitalised economy and digital services.

All this will put/keep Oulu at the top of the field in terms of being a progressive and inclusive innovative city.

The workplan

The newly published city strategy will run until 2035. As STEAM is stated in the strategy as one of the ways to develop the digital skills of the citizens and maintain Oulu's status as a vibrant, vital and attractive city as well as being the core solution for innovative education, the results from the testing actions may contribute to developing new, improved ways to execute STEAM.

1. Future classroom

Future classroom is a prototype of a classroom that is as ideal for learning within the STEAM framework as possible. The classroom will include new technology, new intellectual equipment and it is built to support STEAM pedagogy. Testing enables finding what is worth sharing and what is not. The good practises will be made equally available for all the students in the city. Thus, the students will have a chance to work with the latest innovations. The original plan was to start the build in the autumn 2025 but due to the circumstances that are not in the hands of the city it was postponed till early 2026.

For starters it may be effective to proceed with only the one classroom established in the school of Pitkäkangas. As building the classroom is time and money consuming, it is efficient to keep the testing of the equipment in limited spaces. Testing ideas, methodologies, furniture and interior solution and new equipment is smart to be controlled. This way only the actions that are proved to be working and producing positive learning outcomes will be spread to other schools in time.

The cultural and educational services of the city are responsible for establishing the future classroom amongst any other classrooms of the city. In Pitkäkangas a company called Lekolar that provides basically everything for schools starting from pens to adjustable tables has been the main collaboration partner. To lower the costs in the future the future classroom could be a testing surrounding for other companies such as Nokia, Microsoft, Linux and Lenovo. This way the companies would provide the materials for testing giving them a chance to see what is working and what needs improvement whereas the students get to work with the newest technological solution and improve their digital skills with equipment they might not otherwise have access to.

The school of Pitkäkangas has app. 700 students. At the first phase they all get to visit the classroom with the teachers. Pitkäkangas has grades 1-9 in

it so the future classroom enables developing STEAM pedagogy for all the grades of the comprehensive schools. The future classroom also provides an opportunity for both class teachers and subject teachers to plan, test and evaluate STEAM solution suitable for their own work.

The goal is to find new ways to execute STEAM pedagogy in schools. The future classroom will provide both the students and teachers with the latest digital and pedagogical solutions – a chance to learn the future skills. The monitoring and learning results together with the first hand feedback from the teachers will be a reliable way to define what solution will be worth of duplicating in other schools as well. As the school of Pitkäkangas is a big one, the number of testing persons is also big. This enables collecting data from the students aged 7-16 and from the teachers from all the classes/subjects taught in a comprehensive school. The future classroom enables creative and innovative learning methods, provide companies a chance to test their innovations and developing them further, encourages students to think critically and even connect students and companies with future working possibilities in mind. All this supports the goal of maintaining the vitality of the city, coming up with new innovations and grounding the future work force into the city of Oulu.

The biggest risk will be a possible lack of future funding which would put the students in non-equal positions. That is why a permanent/long-term funding is necessary and it can't be relayed on the funding from the city alone. It is important to involve a homogenous group of businesses into the testing actions done in the classroom to keep the testing going. Some technological innovations will raise and die within short timelines so something that is tested and seen suitable for schools today may be old fashioned tomorrow. It is critical to involve experienced teachers with the testing actions in the future classroom as they have seen innovations and solutions come and go and have the knowledge and experience of what kind of solutions will support teaching and learning in the long run.

There have been indicators in the previous surveys that STEAM pedagogy increases school well-being. The representative of the university in our ULG

is doing cross-examination between well-being and STEAM. If these preliminary results will be proved to be accurate, duplicating the concept of the future classroom with the solutions and innovations tested to be worth keeping and sharing is highly justified. The poll about school well-being is done regularly. Thus there will be material for the future cross-examinations as well.

2. The Artistic residency

The Artistic Residency brings together local artists and students and together they create a art project focusing on sustainable development. This kind of collaboration enables a combination of the learning goals from national curriculum, collaboration with local talent and emphasizing the meaning of "A" in STEAM. Artistic residency also develops the ways to execute STEAM outside the classrooms and introduces the artists new ways to work with the citizens and to bring STEAM available to all.

The residency that started in January 2026 is called "Invisible Beauties: Art for Oulu's Endangered Species." During the project the students will research critically endangered insects in the Oulu region and collaboratively select one species to focus on. Together, they will brainstorm, sketch, and create an artwork using recycled materials. The project will integrate technology by using FabLab tools to engrave sustainability messages on materials, and digital media through QR codes linking to short videos documenting the creative process. Students will explain what they learned about their species and their experience in co-creating the artwork, allowing their voices and reflections to be part of the final piece. This approach helps students not only to engage in hands-on creation but also experience research, problem-solving, and the use of technology to communicate knowledge.

This project fully integrates the STEAM methodology:

- Science: researching local endangered species
- Technology: FabLab tools, digital media, and QR codes
- Engineering: designing and constructing the artwork

- Art: visual design, sketching, and creative expression
- Mathematics: measuring, scaling, and planning for collaborative construction

While this project currently focuses on endangered species, it can be adapted to explore other local environmental or social themes depending on the students' interests and available resources. Alternative approaches, such as accessible digital tools or materials, help students to participate and contribute creatively. Through this kind of project, students will develop scientific understanding, artistic skills, technical literacy, teamwork, and environmental awareness. Collaborating with an Oulu-based teacher, the artist will guide students throughout the creative process. Sharing outcomes with the Aveiro team will provide an international perspective, enabling cross-cultural dialogue and collaborative learning.

This residency represents an opportunity to combine youth engagement, social activism, and environmental awareness with innovative STEAM education.

There are undoubtedly many positive and effective qualities in the Artistic Residency project. However, in the current format it takes almost 30% of the budget meat for STEAM innovations. Therefore there is a high uncertainty in how it can and will be executed in the future. Artistic Residency and art workshops have great potential of being the low access way to introduce STEAM to citizens from all age groups. Like with the future classroom, securing the finances for residencies is crucial.

However, as there is already a culture path in Oulu's curriculum for the classes 1-9, the model of artistic residency could be run with already existing facilities and the demand for funding would be smaller. The goal of the path is to provide cultural experiences to all the students in the 40 comprehensive schools of the city. As a part of this path eg. the 4th grades visit the the ruins of the Oulu forth and an optional cultural sight that often is the art museum. The 6th graders visit certainly the city art museum and the science center Tietomaa. Once the new additional building will be

finished in 2026 the city museum and Tietomaa will join forces and become art and science center Tiima.

The city museum is already arranging STEAM workshops for the visiting student groups and once Tiima opens there will be even more possibilities to arrange workshops that combine arts and science. As these workshops will reach all the 4th graders and 6th graders of the city, there would be around 4000 students participating in them each year. Seeing how great learning results have been gained through artistic residency testing actions, developing workshops that enables the collaboration with artists and students is an excellent way to execute STEAM outside the schools.

As the new kinds of workshops take their form it would be possible to expand them to be arranged to other citizens as well. The museum already has open days and the traditional [Oulu days](#) that are organized every year would provide an excellent format for introducing STEAM for all! art workshops. The newly renovated city library also has facilities to host and organize workshops – if the staff would be interested in arranging them. The art workshops would also be a suitable heritage that is left to the city after being the Cultural Capital of Europe. In the long run, the timeline for developing the workshops could fall in together with the timeline of the new city strategy and be developed, tested and established by the year 2035.

As for now, the educational and cultural services of the city are responsible for the cultural path for the students and the content of. The same services would also be responsible for the future, expanded workshops. If the workshops would be incorporated as part of the museum and library services – as they already to some extent are – the costs would be lower than the ones of the Artistic Residency and the number of participants would be significantly higher. If only two additional workshops would be organized weekly, they would reach app. 50 citizen/week, app. 200/month and around 2400 on yearly basis. Together with the visiting students the number would be app. 6000 citizens/year. During open days and any other special events the number would be higher. If the facilities allowing, for

example senior citizens could join the students for some inter-generations learning experiences.

As arts are an easy access to STEAM and there are no wrong ways to create art, the workshops would be highly suitable format to develop and increase the digital skills of the citizens of all ages. As one of the city's goals is to provide STEAM for all and develop the digital skills of all the citizens, the art workshops would serve this purpose perfectly.

3. Hackathon

Hackathon is a coding event organized for the students in upper secondary school as part of the Tool Camp event. Tool Camp is an annual event for which the students work on finding solutions to different kinds of challenges by using STEAM methodology. Hackathon will provide chances for the older students to improve their future skills. As there are big differences between the older students when it comes to how much STEAM education they have received during their earlier school years Hackathon is one way to narrow this gap.

As the educational and cultural services of the city of Oulu are responsible for organizing Tool Camp, they are responsible for the Hackathon as well. The evaluated cost for one Hackathon event is app. 5000€. Due to the nature of Hackathon, it is an excellent way for variety of businesses to join in for collaborations and thus gain positive publicity for their services. The Hackathon needs equipment, instructors/teachers/coders/judges, catering and internet services. Providing these is one way for the businesses to pitch in and – not only to get their name/logo on display – but also find possible future workers for them.

The first Hackathon took place in May 2026. Due to the changes in the STEAM in Oulu -personnel the first one was organized with a really tight schedule. It would have been important to plan the first Hackathon properly for it to be credible and worthy of joining and being invested in. The risk of presenting something that is not properly planned is not worth of taking. So

the more thorough plan is needed for the next Hackathon organized in May 2027.

There are 13 highschoools in Oulu and 6 vocational schools with several campus areas around the city. The first Hackathon reached 14 participants. That can be considered to be a sufficient starting point. Well-targeted advertisement and information is crucial when searching for the competitors for the event in 2027. 1-2 students/school would be a great achievement in the future.

As for the risks of arranging Hackathons the lack of human and material resources is a substantive one. The better the Hackathon is planned and executed the better changes it has to become a permanent part of the Tool Camp. As the cultural and educational services are arranging the Tool Camp, the event as such is secured. However, due to the – what almost feels – constant demands for savings and cut backs could set a threat to individual parts of Tool Camp. Thus getting external investors and resources is critical. The biggest risk in Hackathon is not to have one. As the goal is to make STEAM available for all and develop the digital skills of all the citizens, Hackathon is a great learning venue for the students aged 16-19. These students may have substantial differences in digital skills based on what comprehensive school of the city they attended to earlier. A successful, permanent concept of Hackathon might also inspire the upper secondary schools to organize mini-Hackathons within their units, either just to choose contestants to the main event or – in the best case of scenario – as a permanent part of their schedule.

4. The literacy skills robot

As the reading skills of the students have been weakened during the past few years – especially with boys – new ways to engage students into reading are needed. The literacy skills robot is a robot that is tested as a reading companion to see whether it encourages even the students with learning challenges to overcome the intimidation of reading, especially aloud.

As the robot is all about the T and the E in STEAM combined with literacy it brings the A along as well. If the robot is proven an efficient way to teach reading skills, there will be a need for more of them.

The educational and cultural services are responsible for the purchasing the first robot. Due to some unexpected delays, the purchase for the first robot will be done late spring 2026 and the testing will get in full action from the start of the school year 2026-2027. The purchase is possible with the project funding from Urbact. The first placement for the robot could be the Future Classroom that itself is a testing environment. Thus the robot would reach app. 700 students during the first year of its availability. After being tested, the robot could either stay in Pitkäkangas or could get send to all the schools within the city. During one year, staying one week in each unit, the robot would reach all the app. 20 000 students in the comprehensive schools of Oulu. After the purchase there will be no additional expenses to the city as the futher development and collaboration around it (the content of the classes, the materials used with the robot) will be done with variety of companies such as Sanoma publications.

Due to the its high price, if tested to be efficient learning assistant, the future purchases for more robots will be depending on external funding. If the funding fails but the value of a technical reading assistant is seen high, important and necessary, the city may have to look for some more affordable options. One, low budget option might even be to make creation of a assistant robot as one of the challenges for Tool Camp. If it is found out that it is not the more advanced qualities of the robot that support the literacy skills but merely just having "someone" next to you "listening" , then a more simple model – even one made by students – could to the work of an assistant as well. The possible future need and use will be defined as the testing action has been finished.

What the robot will provide us is the information whether technical equipment will increase the literacy skills of the students. As stated earlier, it is also a way to combine the T and E with the A of STEAM. The robot – being used and seen in action – might also get girls more interested in

coding, robotics and electronics, in technology all in all. As stated earlier, art is an easy access to STEAM. So is a robot – especially combined with literacy. There could also be a need for the robots in Tiima and in the city libraries so proven efficient and functioning ambassador of STEAM the robots would be placed around the city. This would give hundreds and - within the next years - thousands visitors of Tiima and the libraries an easy access to practice not only reading but coding and electronics as well. The robots will bring the city closer to the goal of providing multiple ways to execute STEAM for the citizens of all age groups.

Governance and delivery model

innovation	objectives	actions	timeline	result indicators
Future classroom	To create an ideal learning enviroment for STEAM education	Provide first one chose n classroom and equip it with the latest technology and solutions.	The first classroom will be ready for testing in March 2026	Number of students who get to test innovations and equipment.
			The following ones will be build and equipped according to the testing results indicating what is working and what is not.	Number of companies reached for collaboration.
			The current city strategy runs till 2035 and has STEAM in it as one of the development targets. This is the timeline for building future classrooms as well.	The continuance of the testing and re-building the testing facilities.
				The number of schools with improved STEAM equipment.
				The improved skills in STEAM related subjects and fields.

Artistic residency	Collaboration between local artist and chosen students to emphasise the A in STEAM	Arranging the call for both the students and artists to collaborate within the project	The sixth project started in January 2026	The number of executed projects in the future.
				Possible new ways to arrange collaboration on a more low-maintenance level to include more artists and students into this kind of collaboration.
				Art workshops for other groups of citizens as well – not only for students.
				The number of citizens participating in art workshosp by the year 2025.
Hackathon	To increase the number and quality of the future skills for the older, upper secondary level students.	Arranging a coding event for the upper secondary level students as part of the Tool Camp event.	The first Hackthon Oulu was organized in May 2026.	1. Will the Hackathon be a permanent part of the Tool Camp.
				2. Is there a possibility to arrange hackathon-like event on a smaller scale, within school units to promote STEAM skills?
				3. The number of students participating in Hackathons by the year 2035.
				4. Improvement of the digital skills of the students in upper secondary schools.

Literacy skills robot	To increase the literacy skills of the children/the young	Acquisition of the prototype robot in collaboration with a Finnish publishing house.	The purchase will be done in the spring 2026.	1. Will the presence of an robot promote reading?
				2. Are the results sufficient/reliable enough to justify the purchase of more robots.
				3. Could the robot be self-made eg. as part of the Tool Camp challenges.
				4. The number of citizen using the robot as a learning assistant.
				5. The improved digital skills of the users.

- The projects and actions will be monitored by the STEAM development team, including members from the university, Business Oulu, city library, science and art center Tiima, educational development services and cultural services
- The STEAM development team meets on regular basis and has monitored the execution of STEAM in Oulu for years. Thus, it is an experienced and trustworthy team to moderate the actions of the FSC project as well.
- There is already a regular survey for all the schools asking about the ways and quantities of executing STEAM. Support (human and financial resources) is available for those units that need it the most. The actions

described in this IP would fill in the void for many schools. The schools themselves also monitor their STEAM-pedagogy by making sure all the students have access to STEAM despite eg. the level of the digital skills of their classteacher.

- As the actions take place around the city in several locations it is imperative to measure the learning results on the spot. The learning results of the students will come out to the teachers immediately and will in due time be seen in the overall assessment of the students as well. However, with other citizens the follow-up monitoring is more difficult and that's why a more structured way to collecting data of the learning process is needed. A questionnaire to be filled after using the robot or attending the art workshop or even the Hackathon is a fast, real-time way to self-assessment of the learning results and it can be done on the spot.

As important it is to evaluate the results of the actions it is as imperative to estimate the possible risks that may effect on the implementation of the actions to get the best results as possible. Risk analysis is done at least by the STEAM quidance group for all four actions but also by the personnel of educational and cultural services when allocating the annual budget. For each action the quidance group needs to regognize the possible risks, estimate the degree of the likelihood for the risk and also to come up with the ways to migitate the risks. Currently the following risk assesment can be stated for each action as following

action	risk	likelihood	migitation
Future classroom	Lack of sufficient financial resources	high	Establishing a widespread network of companies to join the development and testing
Artistic Residency	Lack of financial resources	medium	Keeping the Artistic Recidency as part of the Educational and cultural services => secured finances Applying for external fundings Strategic planning for more affordable way to implement residencies

	Incapability to modify the current model into common, easy access workshop	high	Involve the city Museum into the planning process more tightly than before Adding the workshops into the students' cultural routes
Hackathon	Not being able to launch the event as appealing and attracting	low	More public advertising for the event. Making small-scale hackathon as part of the schools' yearly schedules (to qualify the contestants to the main event).
Literacy skills Robot	high cost	high	Attracting commercial collaborators as is done with the first one. Developing more affordable solutions using the innovations already accessible within the city (FabLab)

Overall project schedule

- the first STEAM + ICT pilot classroom from March 2026 onwards
- the current Arts Integration Pilots from Nov 2025 on May 2026 (including the call for artists and the students)
- the first Hackathon January 2026 (planning) to June 2026 (assessment of the first one)
- Literacy skills Robot May 2026 onwards

Budget

Project costs

The development of STEAM 2.0. including Artistic Residency and Future Classroom will be mainly funded by the City but we have plans to apply for additional funding through the EU funding routes (not decided yet). At this point it's really difficult to estimate the division of the funding between the city and other possible funding resources.

innovation	total cost/unit	% funded by the city in the future	% funded by external source in the future	possible external funders
Future classroom	100 000€	80 000€	20 000€	Lekolar? Microsoft?
Artistic Residency	12 000€	6000€	6000€	Lekolar? Erasmus+ for the travelling expenses Local foundations for the materials.
The literacy skills robot	8500€	1000€	7500€	Publishing house Sanoma Pro Microsoft?
Hackathon	5000€	2000€	3000€	The already existing collaboration with the businesses attending Tool Camp.

Investment sources

- City of Oulu

The educational and cultural services of the city are responsible of arranging all the actions described in this IP. STEAM is part of the city strategy set for until 2035. Therefore funding at least to some extent has to be addressed to STEAM on yearly basis for the next 10 years. However, due to financial cut backs and the constant demand for them, it is imperative for the city to also look for some external funders whenever it is possible. Oulu is an experienced project partner with several projects running constantly all the time.

- So far Oulu has received funding for the previous projects from the following funders:

Asylum, Migration and Intergration Fund (AMIF) Creative Europe, European Regional Development Fund (ERDF), Erasmus+ -program, Horizon Europe, Interreg Aurora, The Interreg Northern Periphery and Arctic, Leader, Urbact and European Social Fund Plus (ESF+)

- Oulu has also received funding from Ministeries and other national fundings, Foundations and Nordic fundings.
- All these funders mentioned above are potential funders for the actions described in this IP as well.

Other potential collaborations for the actions are:

- Nokia or other IT companies and Microbit for Hackathon, reading skills robot and future classrooms
- Private sponsors/foundations especially for the Artistic Residency as there are foundations in Oulu supporting education of arts and culture

- Lekolar for Future classroom
- Other fundings that can be applied for

To develop all the testing actions into permanent parts of the workplan and yearly schedule is not only important for the future STEAM education but it also provides a possibility for a long-term planning of teaching methodology. This will evidently require resources from outside of the city too.

Monitoring and Evaluation

The Monitoring and evaluation approach

- The monitoring and evaluation will be cumulative at least for the time being as our goals and actions will last at least for the next ten years, for the lifeline of the newly published city strategy. As always, the new actions will be planned, executed, evaluated and – if needed – re-adjusted.
- For the analysis of the connection between well-being and STEAM the evaluation is qualitative. This is done by the University of Oulu, by its representative in the ULG to be more precise. The stronger the connection is between school well-being and STEAM, to more imperative it is to make pro-STEAM decisions on every level of the decision making.
- The evaluation of the increased digital skills is qualitative and will be done with surveys both on city level and within school units as well as in connection with singular events such as Hackathon and Art workshops. The data collected during the first year will be measured and compared up against the data collected the next year and so on to gain up-to-date information about whether the actions are effective and whether they need some development and re-adjusting.
- All the STEAM projects and actions in the city are monitored by the STEAM development team, including members from the university, Business Oulu, city library, science and art centre Tiima, educational development services and cultural services. Therefore these stakeholders will also monitor and evaluate the usefulness, functionality and productivity of the actions led to the city services from the innovative actions of the FSC-project.
- The STEAM development team meets on regular basis and has monitored the execution of STEAM in Oulu for years. Thus, it is an experienced and trustworthy team to moderate the actions gained from the FSC project as

well. The progress of the actions will be monitored and evaluated regularly in the meetings of the STEAM development team. Each member is also responsible for monitoring and reporting what is happening with the actions and securing the continuance of the process within the units they represent. The STEAM development team will both keep on evaluating the success of the actions and develop new innovations and practices in the name of STEAM 2.0

- The schools are the headquarters of assessment. There the assessment is quantitative in terms of the number of the students testing the future classroom and the robots and attending the art workshops and Hackathon. Qualitative assessment is used when measuring and testing the development of the digital skills. Basically all the subjects taught in comprehensive fall in some of the elements of STEAM. Therefore STEAM skills are also evaluated as part of the summative assessment that is done only at the end of each school year.
- The city of Oulu has a digital path for all the classes 1-9. Each year the the students are guaranteed to be taught certain digital skills according to this path. Many of the school have also connected STEAM path to the digital path expanding the path from mere digital skills to learning entities including all the aspects of STEAM. The actions gained from the project can be included in the path as such. The path itself provides a tool for quantitative assessment of the number of participants. Learning results of the students can be evaluated with qualitative methods.

As all the actions are planned, implemented and evaluated by the cultural and educational services as part of the public services their quality is also evaluated as any other field of public services provided by the city of Oulu. Therefore there will be no need for external evaluator.

5.2 The monitoring and evaluation framework

Oulu has already a working, strong STEAM network and development team that has a lot of experience in planning, executing and assessing new STEAM practices. As there are representatives from all main fields of public services in the developmental team, the monitoring and evaluation is both guaranteed and in the control of the city officials.

A logical time frame for the evaluation is the one of the new city strategy that is set for the next ten years. The fact that STEAM is part of the current strategy tells not only about the current pro-education decision makers but also obliges the possible future anti-development decision makers until year 2035.

- As the goal is to strengthen the already existing STEAM network and develop ways to bring STEAM available for all – with the help from the the actions – the following monitoring procedures will be needed:

Collecting data

- the yearly number of local participants in Tool Camp and whether it has gone up from the previous year. If the number has gone down, an analysis for the reasons is needed.
- the yearly number of international participants in Tool Camp and whether it has gone up from the previous year. If the number has gone down, an analysis for the reasons is needed.
- the number of participants in the first and future Hackathons. Will it prove to be successful or does it need to be adapted more? As the Hackathon is a new action in the city the lifeline of the new city strategy is suitable time frame for developing and evaluation of its success.
- the number of students and teachers using the first future classroom. As this action is new we can only make the first comparison between the number of users from school year 2026-2027 to the one of 2027-2028.

- the number of innovations that pass the test of supporting STEAM education and the number of innovation duplicated outside the testing classroom.
- how many future classrooms is the city able to duplicate in the future?
- possibly change in the gradings and school well-being amongst the students using the future classroom. This is done every second year and provides five rounds of results within the timeframe of the pro-STEAM city strategy.
- number of teaching staff working in a future classroom.
- number of students working in a future classroom.
- number of other citizens using the future classrooms if the school can open the classroom for other citizens as well.
- number of students and artists participating in the Artistic Residency -projects.
- the number of executed residencies.
- the number of teaching staff working with the artists.
- the number of other citizens the residencies reach.
- feedback from the participants for the possible development needs.
- number of students using the reading robot during the first month/year
- feedback from the students using the robot
- possibly change in reading skills of the students using the robot Will the reading robot increase the reading skills of the students? There are already formative and summative ways to measure that – the chances between starting point and the level of skills after using the robot.
- possibly change in the gradings and school well-being amongst the students in the most advanced schools. This is done every second year and provides five rounds of results within the time frame of the pro-STEAM city strategy.
- lowering number in cases of illicit absence from school in STEAM schools based from information from administrative databases. This data can be analysed every year or together with the school well-being analysis.

In the long run, after executing the actions for years, the city should have answers to the following questions:

- How will the acquirement of future skills develop in the future for all the citizens? Were we able to expand the STEAM actions around the city. A survey will be needed by the end of 2035.

Will the schools have individual, unique approaches to STEAM 2.0? This also can be measured with a survey executed by the STEAM in Oulu network.

What is STEAM in libraries, museums, youth centres, pre-school education, retirement homes? Exploring this would make an excellent topic eg. for a thesis done in our University.

Monitoring framework table for the city of Oulu to be altered as the actions live and get modified and adjusted to meet the needs of the city could be something like the following

action	baseline	target	objective	result indicator	evaluation measures
Future classroom	0	700 students by the end of year 2026	To find out the best possible pedagogical solutions and equipment to support STEAM education. To provide companies a possibility to test their innovations in an actual school surroundings .	The recognition of the best solutions supporting STEAM education through testing. The possible improvement in STEAM related subjects seen in the assesment of the students. A long-term testing programme of innovations and ability to duplicate the best ones outside the testing classroom. A long-term testing collaboration and practise with (local) companies and their innovations.	First evaluation of the learning results in December 2026 (mid-report for the students), the second one in May 2027. Forms-survey made by the teachers for the students who have used the classroom collecting data on what is working and what's not and why? The evaluation of the results of the testing and decisions for duplicating the solutions made by the city STEAM quidance group. Questionnaire for the collaborating companies to survey their experiences from what has been accomplished and for their future needs by

				The continuance of the testing and the capability to re-build the testing facilities in several classroom spread evenly around the city.	the city STEAM guidance group
Artistic residency	5	A class from the grades 1-9 chosen on basis of open call for applications. In the upcoming years the goal is to arrange artistic residencies for all the citizens.	To create an artistic collaboration using STEAM pedagogy and methodology . To further develop more easy access art workshops following the form of artistic residency in collaboration with the city museum.	A new kind of possibility for the students to demonstrate their STEAM skills through art The improvement in the grades for the STEAM related school subjects. Getting Artistic Residencies a permanent part of the students cultural route. Ability to facilitate multiple residencies around the city with artist from all the areas of cultural field. Possible new ways to arrange collaboration on a more low-maintenance level to include more artists and students into this kind of collaboration. The expansion of the residencies and securing their availability to other citizens as well. A permanent Artistic Residency program in the city of Oulu.	The improvement of the study skills are assessed every six months as part of the assesment done in schools. The cultural and educational services plan, implement and evaluate the artistic residencies as they are at the moment and the future ones in the city museums. These are evaluated as part of the regular evaluation work of the STEAM guidance group and the field of services that have representatives in the group. The evaluation covers eg. the number of participants and the quality of the workshops (surveyed both by the participants, the artists and the funders).
The literacy skills robot	0	Students struggling with literacy skills. The first test	To find out whether a robot will help the students with	Improved literacy skills amongst the test group. Better ability to concentrate and focus	The assesment of study skills is done in schools every six months. A survey for the students about the usefulness of the

		group consists of the students in the school of Pitkäkangas.	challenges to meet their goals and improve their literacy skills.	on literacy assignments. Improvement in self-esteem as the skills develop. Increasing number of other citizens (in addition to the students) using the robot as a learning assistant – or rather as eg. reading companion - and thus gaining new digital skills.	robot. A survey for the teachers on their experiences while working with the robot. There will be two surveys for the students and teachers: the one made by the city of Oulu and one made by Sanoma Pro – a publishing house partnering with the city in launching the robot.
Hackathon	1 - the 1st Hackathon from May 2026	Students in high schools and other upper secondary schools	To provide older students with STEAM education and digital skills that they might have missed during their years in elementary education.	Up-to-date digital skills amongst the students aged 16=> Establishment of Hackathon as permanent part of Amazing North. Increasing number of participants in Hackathon as the concept gets established. Parallel, small-scaled hackathons in the high schools and upper secondary schools.	Improvement in digital and STEAM related skills assessed every six months as part of the annual assessments by the teachers. The first ever Hackathon was held in May 2026. The success of it will be evaluated by the city of Oulu, particularly by the STEAM guidance group in spring 2026. The survey to map all the areas needing improvement will be arranged for the participants of the first Hackathon.