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SCIENTIX NEWSLETTER

Building Blocks: Early Childhood Education and the Foundation of Learning

Early Childhood Education and Care (ECEC) is a crucial stage in a child's development, providing a foundation for future learning and success. This stage of education includes formal and informal settings, such as kindergartens, preschools, and family care. It covers the period from birth to 6 years old.

This edition of the Newsletter will explore the importance of STEM education in ECEC and provide resources, tips, and best practices for educators and caregivers to engage young children in STEM learning[1].

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Facts to know about ECEC

Recent studies show that ECEC can have significant positive impacts on the lives of children and their parents, as well as on society overall. The benefits for individuals include improved educational and economic outcomes, better health, and better job prospects. Societies benefit via greater socio-economic equality, lower crime-related costs, and less reliance on social welfare programs.

What's more, these benefits are often interconnected and can have a ripple effect throughout a person's life. For example, access to high-quality ECEC can promote the labour market participation of women, which, in turn, may help to reduce the gender pay gap.

Children are curious. They want to find out how they can change and affect people and things around them, even from the first months of age. By age 5, more than **85%** of the **intellect** and **personality** are **developed**, making it a critical period for learning[2].

Students who attended ECEC for less than one year were more likely to underperform on a **science proficiency test** compared to peers who were in ECEC for more than two years[3].

STEM education in ECEC has become increasingly important as we prepare our children for the **future workforce**. STEM skills are in high demand in today's job market, and introducing STEM concepts to young children can help them develop critical thinking, problem-solving, and creativity skills[3].

1. Barnett, W. S., Preschool Education and Its Lasting Effects: Research and Policy Implications. National Institute for Early Education Research, 2008
2. Edie D.,Schmid D., Brain Development and Early Learning: Research on Brain Development. Quality Matters, 2007
3. European Commission, Building a better understanding of the impact of Early Childhood Education and Care on medium- and long-term educational and labour market outcomes in Europe, 2022

Gains from participation in ECEC are more pronounced for children from **disadvantaged backgrounds** compared to those from families of higher socio-economic status.

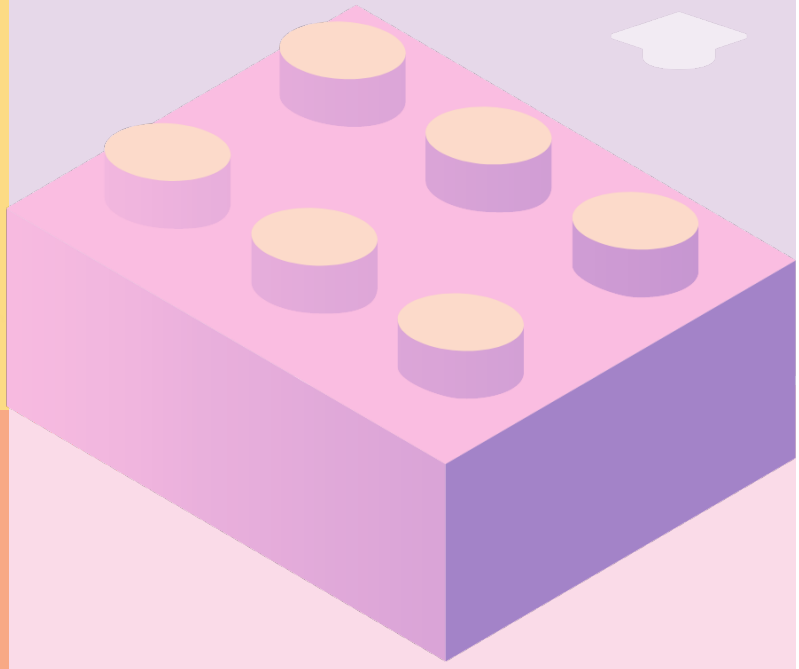
A study shows that children from families in the lowest SES group who attended ECEC did **perform better in mathematics** than those who did not attend[3].

Providing **affordable or free ECEC** is very important for **helping mothers** work outside the home. Countries with higher rates of working mothers often have more children enrolled in formal childcare programs. Denmark, Luxembourg, the Netherlands, Portugal, and Slovenia have some of the highest rates of mothers in the labour market and also have a high proportion of children enrolled in formal childcare programs. In these countries, over 70% of women aged 15-64 with at least one child under three work outside the home[2].

Most families have to pay **fees** for ECEC for children under age 3, with the highest average monthly fees found in Ireland, the Netherlands, the United Kingdom, and Switzerland. **Accessibility** and **affordability** are considerably better for older children[4].

High-quality Early Childhood **Education** can have a significant impact on a child's academic and social success, and it **is essential** for building a foundation for lifelong learning.

In the European Union, 31 million children under the age of 6 could benefit from early childhood education and care (ECEC) services, but universal access and high-quality services have not yet been achieved in many countries[4].



Having minimum **education requirements for teachers** working with children is only the starting point of creating a highly qualified workforce. However, the education requirements are usually lower for those who work with younger children.

In Europe only five education systems have made continuing **professional development mandatory for all ECEC staff**[4].

4. European Commission, Eurydice, Key Data on Early Childhood Education and Care in Europe, 2019

Unfolding Early STEM with Miriam Molina Ascanio: Teacher Training Needs to Explore STEM in ECEC

Scientix spoke with **Miriam Molina Ascanio**, Project and Pedagogical Coordinator at European Schoolnet.

Molina is the main author of the paper Early STEM: Teacher Training Needs to Explore STEM in ECEC.

- **Why do teachers and parents lack confidence to engage children with STEM education?**

I would say the lack of confidence comes from a **lack of background information**. There is a lot of pressure on how to teach according to pedagogy, didactics, or in learning a language, basic counting and social skills, which are indeed very important. But there is a gap in early science education, since just exploring and observing the world around you, which is the way little kids learn, is not made a priority in the curriculum.

There is also a lack of preparation from teachers on how to to facilitate **age-appropriate learning** experiences that encourage this exploration and observation. This happens because there are a lot of resources for science in primary and in secondary school, but little children learn differently: they are not sitting and writing things, they are moving, they're exploring, they're asking questions.

Another challenge is how to explain complicated terms, which can be too abstract to understand even for adults. This means that teachers need to find a different approach to convey the meaning such as attaching a story to the word or showing it through body movements or experiments. But this is not something that is taught to teachers and parents when it comes to teaching to little children.

- **Are there fewer resources for ECEC than for primary education?**

Yes, but this might be changing. On the one hand, more and more ministries of education are investing in early childhood education since they recognize the importance of having a good foundation from the early days of education and the need to help children from **disadvantaged families**.
On the other hand, less resources are invested in early childhood because it's not always compulsory. However, I can say that the industry is trying to create more age-appropriate materials and resources together with teachers. This is key to move forward and to give the right importance to Early Childhood Education, which has been lacking in the past.

- **What about industry, science centres or universities? Can they help?**

It can be difficult to build a partnership between the school and an external stakeholder. For instance, in the case of primary and secondary students, it's easier also for the teachers to bring the kids to the library or to a science centre, spend the day there, collaborate, and receive this kind of synergy feedback. While in the case of the little ones, it takes more time, resources and adults to accompany them.

Nowadays, there are **more online opportunities**, but it is still necessary, also from the management of the school, to create opportunities of collaboration between early childhood education and other stakeholders. A very simple and effective example would be to bring your students to a nearby library or to have a staff member visiting your students to read them stories. Another collaboration could be with a science centre or even with one of the parents that might have a STEM career and let them visit the school and perform experiments with the students.

The same goes for industry and universities. It is important to **create lessons together**, learning scenarios and resources. In any case, the teachers need the support and investment of stakeholders in Early Childhood Education centres and schools to build partnerships together.

- **Anything else you'd like to add?**

There are many different terms used to define education from an early age. **Early Childhood Education and Care** refers to any regulated arrangement that provides education and care for children from birth to compulsory primary school age, which may vary across the EU. But we also have "kindergarten" coming from Germany. There's another term that I really don't like which is "**pre-primary"**, it comes from the United States. It suggests that teachers are always preparing the children for the next step, and they have to be able to sit down, read and follow certain norms that adults expect from them. **We shouldn't look at Early Childhood Education as the preparation for primary school**. We should give the right importance to this stage. It's not just a preparation for something later.

What have we learned?

Children are born with an innate sense of wonder and a desire to explore and understand the world around them. As educators and caregivers, it's our job to **foster and encourage that curiosity**, particularly in STEM fields. By creating a safe and stimulating environment where children can freely ask questions, experiment, and make discoveries, we can help lay the foundation for a **lifelong love of learning**.

Furthermore, it's important to recognize that Early Childhood Education is not just about academic preparation; it's also about social-emotional development, creativity, and play. Children at this age are learning how to interact with others, express their feelings, and develop a sense of self. **Play-based learning** is a crucial component of this process, as it allows children to explore and experiment in a way that feels natural and engaging to them[5].

5. Pellegrini, A. D., The role of play in human development. Oxford University Press, 2009

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PROJECTS IN FOCUS

In this edition of the Scientix Newsletter, we introduce three projects which can help teachers of Early Childhood Education and Care, and also can prove useful to engage children in STEM education.

PARTICIPA: Professional Development Tools Supporting Participation Rights in ECE

Young children's participation is key to developing a culture of human rights, democracy, and rule of law. Therefore, young people's active participation and decision-making in society must be protected and encouraged from an early age. Even though children's right to participate is key to education quality, its implementation in early childhood education (ECE) remains a challenge. To support high-quality ECE through the implementation of children's right to participate, the Participa project proposes a multilevel professional development approach.

More information: https://child-participation.eu/

BE-CHILD

The main aim of the Be-Child project is to boost quality of ECEC educators' for a successful development of SEC for pre-school children. Mainly to help them fostering awareness in relation to equality and diversity, handling a good transition from different levels and types of education.

The project aims to innovate in the elements of creativity, inclusiveness and collaboration.

More information: https://bechild.hi.is/

STEAMERs: STEAM and Educational Robotics in PrePrimary Education

STEAMERs

As more aspects of daily life are tied to technology-based sySTEAMs, the need to improve and expand STEAM education is considered key to maintain a competitive edge in the 21st century. With more emphasis on STEAM education, a meaningful STEAM curriculum is often introduced to the youngest students, beginning at the preschool level.

This project identifies through desk and field research specific lack of knowledge that early childhood teachers have on implementing STEAM and educational robotics in their lessons. Its aim is to achieve the Development of Knowledge, Skills and Key Competences of STEAM and Educational Robotics of Teachers in Pre-Primary Education (STEAMERs).

More information: https://steamersproject.eu/

Photos: @elventhorncreations on unsplash.com, @oksun70 on gettyimages.com, Graphics: @ivandesign on canva.com

Scientix is managed by European Schoolnet, a consortium of 33 Ministries of Education in Europe. Since its founding in 1997, it has become one of the key organisations in driving innovation in teaching and learning, and fostering pan-European collaboration of schools and teachers. It is based in Brussels, Belgium. **www.europeanschoolnet.org, Rue de Trèves, 61 | 1040 Brussels, Belgium.**

Contact Scientix scientix@eun.org www.scientix.eu @scientix_eu groups/ScienceTeachersEurope

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