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Introduction

“Haus der kleinen Forscher” Foundation



- 1 Overview of the “Haus der kleinen Forscher” Foundation
- 2 Relevance of Early Computer Science Education
- 3 Professional Basis for the Subject Area of “Computer Science”

1 Overview of the “Haus der kleinen Forscher” Foundation

Since 2006, the non-profit “Haus der kleinen Forscher” (Little Scientists’ House) Foundation has been committed to improving education for children between the ages of three and ten in the domains of science, technology, engineering/computer science, and mathematics (STEM). Together with its local network partners, the Foundation offers a continuing professional development programme throughout Germany that supports early childhood educators and primary school teachers in nurturing children’s spirit of discovery and in facilitating their exploration and inquiry activities in a qualified way. The education initiative thus makes an important contribution to improving educational opportunities, fostering the next generation of professionals in the STEM fields, and professionalising pedagogical staff.

The educational initiative thus makes an important contribution in the following areas:

- qualification of early childhood educators
- quality development of institutions
- development of the children’s personalities, abilities and interests
- promotion of the next generation of professionals in STEM educational fields

The main activities of the Foundation are:

- establishment and expansion of sustainable local networks with the participation of local stakeholders as well as counselling and support of the now more than 200 network partners,
- training multipliers (local trainers) who provide ongoing guidance for local early childhood educators, teachers and leaders,
- development and provision of professional development concepts and materials for early childhood educators, teachers and leaders,
- supporting the quality development of educational institutions based on “Haus der kleinen Forscher” certification, as well as
- the evaluation and scientific monitoring of the Foundation’s activities.

Qualification initiative for educators

The “Haus der kleinen Forscher” Foundation is Germany’s largest early childhood education initiative in the domains of science, technology, engineering/computer science, and mathematics. It supports child-care centres, after-school care centres and primary schools in setting mathematical, computer science, scientific and/or technical priorities and establishing education for sustainable development (ESD), as well as creating a conducive development and learning environment for children. The Foundation’s educational approach builds on the children’s resources and emphasises joint exploration and inquiry in dialogue-based exchange (Stiftung Haus der kleinen Forscher, 2019a). Through its activities, the Foundation also promotes the implementation of the existing educational and framework curricula of the respective federal states in the areas of science, technology, engineering/computer science, mathematics and supports the anchoring of ESD in the educational areas.

The Foundation’s content-related offers include **professional development** for early childhood educators, teachers and leaders, as well as educational materials, an annual activity day and suggestions for cooperation:

- **Educational materials:** For practical implementation in educational institutions, the Foundation provides printed and online materials (available at: haus-der-kleinen-forscher.de) free of charge in its professional development courses, e.g., topic brochures, exploration and inquiry cards, didactic materials and film examples.
- **Website:** The website haus-der-kleinen-forscher.de provides information for all interested parties about the educational initiative: including the educational programme, contact with local training providers, inquiry ideas for children, scientific studies, brochures and picture cards for exploration and inquiry.
- **Campus:** On the online learning platform campus.haus-der-kleinen-forscher.de, early childhood educators, teachers and leaders can take part in open or moderated online courses and on-site training, or exchange ideas with each other in various forums. All of the Foundation’s online services are available free of charge
- **Blog:** The “Haus der kleinen Forscher” blog (blog.haus-der-kleinen-forscher.de) offers a forum for dialogue on good early STEM education for sustainable development. Here, the Foundation presents itself as a player in the national and international world of education and foundations while at the same

time providing a detailed look behind the scenes of the “Haus der kleinen Forscher”.

- **Social media channels:** On Facebook, Twitter, Instagram and YouTube, the Foundation shows what good early STEM education can look like: *@kleineForscher* (on Instagram at *kleine_Forscher*). Here, current reports and studies are shared, videos of ideas and activities for exploration and inquiry are shown and information about the Foundation’s latest educational offers is provided.



- **“Forscht mit!” magazine:** Every quarter, early childhood educators, teachers and leaders receive practical tips on exploration and inquiry at their institution, information on the Foundation’s work and best practice reports from other institutions and networks.
- **“Tag der kleinen Forscher” (Little Scientists’ Day):** On this interactive day, children all over Germany can explore current topics of inquiry. For this purpose, the Foundation provides educational institutions with material and calls on supporters from politics, business, science and society to join in.
- **Suggestions for cooperation:** Interested parents, sponsors and other educational partners support joint exploration and inquiry at the institutions.
- **Certification:** Committed institutions are certified as “Haus der kleinen Forscher” based on defined assessment criteria. All institutions that apply receive detailed feedback with suggestions for further developing joint exploration and inquiry with children.
- **Website for children:** At meine-forscherwelt.de, children of primary school age can access an interactive inquiry garden that encourages them to embark on independent journeys of discovery. Tips are available for educators on how to support learning.
- **Service portal integration:** At integration.haus-der-kleinen-forscher.de, early childhood educators, teachers and leaders receive support in the integration of refugee children at child-care centres, after-school care centres and primary schools through a variety of materials, practical ideas and a stimulating exchange of experiences.

Germany-wide networking

As a Germany-wide educational initiative, the “Haus der kleinen Forscher” thrives on the commitment of a wide range of local stakeholders – the local networks that act as permanent partners and training providers in the regions. There are currently 196 network partners, including municipalities and child-care sponsors, trade associations, science centres, museums, companies, foundations, associations etc. Since 2011, the initiative’s professional development programme has also been open to after-school care and all-day primary schools.

Approximately 86,000 early childhood educators and primary school teachers from around 35,000 child-care centres, after-school care centres and primary schools have already participated in the initiative’s professional development programme; among these are early childhood educators from around 28,000 child-care centres as well as educators and teachers from around 1,700 after-school care centres and around 5,300 (all-day) primary schools.

Across Germany, around 6,000 child-care centres, after-school care centres and primary schools are certified as “Haus der kleinen Forscher”, of which more than 5,400 are child-care centres. Since autumn 2013, after-school care centres and primary schools have also been able to obtain certification. More than 200 after-school care centres and over 300 primary schools have received the “Haus der kleinen Forscher” certificate since then (as of 21 October 2022).

The continuing professional development programme

The “Haus der kleinen Forscher” Foundation focuses on advanced qualification for educators in discovering and exploring mathematics, computer science, scientific and/or technical topics with children. Since 2018, advanced training courses have been offered with a focus on “education for sustainable development” (ESD). The aim is to provide continuous support for early childhood educators, teachers and leaders: Participation in advanced training courses on various topics successively expands participants’ methodological repertoire and deepens the understanding of the Foundation’s pedagogical approach. Alternating between face-to-face training and transfer phases, educators can try out what they have learned in practice and exchange ideas at the next training session.

In addition, the Foundation offers a constantly growing range of online courses which anyone interested can use individually, flexibly and free of charge to refresh or deepen their grasp of the subject matter. These include both open online courses, which can be attended independently at any time, and moderated online courses at fixed times. Here, participants work together on the content while the

moderator supports them. Web-based seminars (webinars) are scheduled for a specific time and include an interactive online talk. There are also topic-specific forums that allow professionals to reflect on their own practical experience together with other early childhood educators and primary school teachers.

To allow as many interested early childhood educators, teachers and leaders as possible to participate in the professional development programme, further qualification takes place via a multiplication model: The “Haus der kleinen Forscher” Foundation trains trainers at several locations in Germany. These trainers in turn offer professional development for educators in their local network (Stiftung Haus der kleinen Forscher, 2019b). By participating in the Foundation’s face-to-face and online training courses, these trainers qualify to offer professional development courses for educators. They receive support in the form of detailed working materials for their task in adult education and also have the opportunity to gain personal feedback through the Foundation’s training observation programme or in the form of video coaching. In addition, an online campus is available for the trainers to allow them to refresh and deepen their grasp of the subject matter. The digital learning platform offers a variety of online learning programmes, as well as content-related information and working documents for the individual training modules. For certain topics, there is the possibility to work independently on open e-learning modules, participate in tutor-led courses and use the online support courses for face-to-face professional development. In addition, trainers can get in touch with each other and exchange ideas in specific forums or open chats. The educational initiative offers different topics for trainers every year.

Since 2017, the Foundation has offered flexible entry to its educational programme for early childhood educators, teachers and leaders, as well as for trainers¹. If the learning support staff see a need to expand their pedagogical competencies or would like to get an overview of the Foundation’s pedagogical concept, they can start with the face-to-face professional development courses “Exploration and Inquiry with Water” or “Exploration and Inquiry with Air”, in which the Foundation’s pedagogical approach is explored in greater depth; or they can attend the seminar or online course “Basic Seminar – The Pedagogical Approach of the ‘Haus der kleinen Forscher’ Foundation”. Likewise, early childhood educators,

¹ *By making the entry to the Foundation’s educational programme more flexible, the Foundation assumes greater personal responsibility for its target groups. In accordance with the notion of the independent learner, which forms the basis of the Foundation’s pedagogical concept, it relies on the fact that the early childhood educators, teachers, leaders and trainers can themselves recognise where they stand in terms of their interests and needs and which topic or format is the right entry point for them to the “Haus der kleinen Forscher” educational programme or which offering they wish to use for their further professional development. In order to support users in their professionalisation as learning facilitators in the best possible way, the Foundation offers targeted educational programmes and continuously develops these further in an impact-oriented and needs-based manner.*

teachers and leaders or the trainers can choose another module on mathematical, computer science, scientific or technical topics or on education for sustainable development as an introduction. The content is offered in different formats: on-site training, self-education formats (such as online courses or printed educational materials) and educational events. The “Haus der kleinen Forscher” certificate also supports quality development of the educational work at the institutions and makes the commitment to good early STEM education visible to the outside world. The Foundation is strongly oriented towards the needs, prior knowledge, previous experience and interests of its target groups.

The approach of providing support that is as individual and needs-oriented as possible – which the Foundation pursues both at the level of children and early childhood educators, teachers and leaders – is also implemented at the level of the trainers through the quality system for further training. The main elements of the system are the application and accreditation at the beginning of the trainer’s activity, qualification phases designed according to needs and re-accreditation every two years. Based on the goal dimensions for multipliers of early STEM education, it systematises and expands the requirements for trainers and makes them explicit (Stiftung Haus der kleinen Forscher, 2019b).

The Foundation’s offerings for early childhood educators, teachers and leaders are also developed based on sound goal dimensions relating to subject-specific criteria. They specify which goals are to be achieved in each case. Goal dimensions for children and early childhood educators and primary school teachers have been developed collaboratively with experts for the individual STEM disciplines, as well as for education for sustainable development and used as an orientation basis for the development of courses (“Haus der kleinen Forscher” Foundation, 2018; Stiftung Haus der kleinen Forscher, 2015, 2017a, 2018a, 2019).

The goal dimensions for early computer science education were developed and published in German for the first time in 2018 and are presented in this volume in English translation. At the beginning of the 2017/2018 academic year, the content of the Foundation’s offers was expanded – to include the educational area of computer science education – with the workshop “Discovering computer science – with and without computers”. In 2021, this was supplemented with the blended learning advanced training course “Computer science education in primary school teaching” (cf. chapter Conclusion and Outlook). All offers were developed based on the present expert report “Goal dimensions of computer science education at elementary and primary level”.

In 2018, the Foundation also expanded its range of training courses, content and materials for education for sustainable development which is aimed not only at early childhood educators and primary school teachers, but also, for the first time, at child-care centre leaders. The latest training programme, “Rethinking