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In both personal and professional spheres, Cultural-Historical Activity Theory (CHAT) has proven valuable, particularly in research and teaching. Currently, I serve as an assistant professor at the University of Ioannina in Greece, focusing on science and museum education for early grades, along with participatory teaching methods.

My introduction to CHAT began during my PhD, which I completed in 2018. Throughout my journey, I encountered various challenges and contradictions. Initially, CHAT inspired me to transform science education by integrating informal distance learning methods, such as museum kits and virtual tours, into traditional remote classroom settings. I organized workshops for future and in-service preschool teachers with the intention of implementing these ideas. Despite positive outcomes and enthusiastic participants, limitations such as school infrastructure constraints and teachers' technological proficiency hindered widespread adoption.

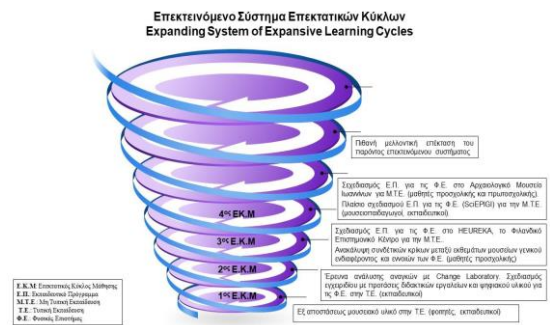
Subsequently, I looked deeper into teachers' real-world challenges on science education by implementing a change laboratory involving pre-service and in-service teachers, along with school counsellors, directors, parents, and students. Only the initial three phases were completed within the allocated time frame (Kornelaki & Plakitsi, 2018). The contradictions encountered served as a reminder: while educational struggles often extend beyond the scope of science education, our ability to effect fundamental change is hindered by technocratic and political discourses in education.

My focus then shifted to non-formal education, seeking greater flexibility. As an intern at Heureka, the Finnish Science Center in 2016, I gained valuable insights into informal education program design. During my stay in Finland, I visited a number of museums, scientific or not and I had the privilege to meet and discuss with people responsible for museums' educational programs.

After my visits, I came to realize that educational programs in various types of museums (city museum, natural history museum, art museums), often incorporate scientific or technological elements (Kornelaki & Plakitsi, 2022a). Returning to Greece, where science museums are scarce and predominantly located in major cities, I began thinking how this insight could inform my research. Consequently, I started exploring connections between science education and exhibits in non-scientific museums, recognizing that science and technology exist in every aspect of human life. That led me to design and implement a science education program at the Archaeological Museum of Ioannina over a two-year period (Kornelaki & Plakitsi, 2023; Plakitsi et al., 2018).

The implementation of the program was documented through video recordings, with the research aiming to explore whether non-scientific museums can effectively serve as fruitful learning communities where science meets culture. In this study, CHAT served a dual role as both a design and analytical tool, providing a comprehensive framework through which teaching practices were examined, analyzing both the individual structural components and their interactions among them, within the activity system. The second and the third-generation activity theory was used having two different activity systems, the formal and non-formal education, the school and the museum. The successful implementation of the program led to the design of a methodology (SciEPIMGI) for those who wish to create their own science education program to be implemented in non-scientific museums. The methodology's theoretical framework is CHAT which also serves as an analytical tool for program evaluation.

The detailed account of my journey serves to illustrate how expansive learning has transformed me as a researcher, providing valuable tools for self-reflection and professional growth. The research process outlined above can be best characterized as a spiral course of consecutive expansive learning cycles, depicted in the graph. It's important to note that the misused term 'expanding system of expansive learning cycles' signifies a trajectory of development building up to the creation of a culturally transformative activity, as extensively described in my thesis (Kornelaki, 2018).



Due to the locality of the research, in post-doctoral level, a teachers' training program was designed and delivered to teachers following the SciEPIMGI methodology (Kornelaki & Plakitsi, 2022b). During this training, teachers were encouraged to employ CHAT as a lens for reflecting on their teaching practices. The aim was to introduce a new teaching mindset grounded in the principles of CHAT, prompting educators to adopt a teacher-researcher role.

In my teaching endeavors, CHAT has guided me towards a deeper exploration of the historical context of activities, enriching the content of my courses and enhancing their relevance for students. For instance, I now emphasize the significance of nature, history, and philosophy of science, aiming to illuminate the foundational aspects shaping the discipline and drawing parallels between renowned scientists and our own experiences.

Another aspect I explored in my research involves Vygotsky's concept of the 'ideal' and present forms, as they relate to scientific and everyday concepts in science education. Vygotsky (1998) posits that a child's social development occurs through interactions between these two forms. Consequently, teachers aim to assess students' current developmental stage by identifying their everyday concepts. They then introduce scientific concepts in a manner that fosters interaction between every day and scientific ideas, often employing play-based methods within specially designed environments (Kornelaki, 2023).

Additionally, I'm a member of the STEM ISCAR Thematic section and I belong to a research group, @FISE (Activity Theory in Formal and Informal Science Education) group (<https://atfisegroup.ccedu.uoi.gr/?lang=en>), which focuses on expanding CHAT in Formal and Informal Science Education. Recently, our group conducted research on how its members use CHAT in order to identify patterns that could inform the design of an advisory guide for newcomers. This analysis involved examining completed theses within our group, considering CHAT as a frame of reference, methodological tool, and its application in formative interventions, mediating tools, and different types of education. The latter led to the development of SCOPES, (Systems of activity, Contradictions, Outcomes, Praxis, Expansive learning, Science education), a new methodological tool for educational research (Kolokouri, Kornelaki & Plakitsi, 2022).

My future ambition is to foster greater collaboration with the university and other educational (or not) institutions, with the aim of advancing the principles of the fourth generation of activity theory.

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