

STEM IN PLAY IN THE EARLIEST YEARS

Tunncliffe. S.D.^a

Contact Author: Sue Dale Tunncliffe (lady.tunncliffe@mac.com)

^aIOE, University College London, London WC1H 0AL, United Kingdom

THEME:

Innovative STEM pedagogy and curriculum

BACKGROUND AND AIMS

Children are instinctive investigators. Play is crucial to the development of a child. Informal or free-choice learning is an important influence on the learner's understanding of STEM concepts. Play interactions that involve STEM actions are predominantly forces (pushes, pulls and twists). Through playing, children learn incrementally, constructing ideas from the first observations and interpretations of natural and constructed objects (toys) and interactions with available technologies. Interaction with digital technologies is also play and contributes to creativity and problem solving (Sakr, 2020).

Play is children's work (Roth et al. 2013) and is an apprenticeship for adulthood, observable in different societies. Many play types have been identified (re-enactment, narrative, imaginative, dramatic (Rees- Edwards, 2022). Play moves are STEM in action. The earliest experiences are STEM-E (Experiences) and develop into STEM when skills and actions have been mastered. Different play types occur in parallel with STEM-E and STEM itself (Tunncliffe, 2021).

METHODOLOGY OR PROCESS(ES) UNDERTAKEN

Children aged a few months to 4 ½ yrs (formal school age) were observed over 6 years during a weekly (in term time) Mother and Toddler Playgroup run by a local Church in S.E. England. After a short service in the church attendees moved to the Parish Centre. I was able to observe children's play sequence with toys provided in the room and basic STEM activities (beam balance, blocks, and a water tray). Some adults were present, but children had free choice of what they played with. I had no interaction with the children. Parents / carer permission enabled photographs of interactions to support field notes of children's' actions with objects. Mindful of children with safeguarding issues there was no session in the covid pandemic.

RESULTS AND CONCLUSIONS

A reiterative read-reread technique of thematic analysis was employed to analyse data. Gradually stages of the individual play encounters became apparent. This resulted in the identification of the stages of a play episode and the compilation of the STEM play cycle (figure 1). The definite sequence of interactions forms the Play cycle. There is progression in skills and understanding over time. Recording the stages of each interaction can be used to monitor a child's development.



Figure 1 The STEM Play Cycle (Tunnicliffe, 2021)

The Cycle begins with interest 'caught', inquiry interactions observing outcome, modifying the action or interest lost and leaves. Over sessions they apply previous learning STEM-E progressively building up skills and understanding.

REFERENCES

- Rees-Edwards, A. (2022) Types of Play. In Waters-Davies, J. (Ed.) Introduction to Play, Chapter 3 Pages 26 – 39. London. Sage.
- Roth, W. M., Goulart, M. I. G., & Plakitsi, K. (2013). *Science education during early childhood. A cultural historical perspective*. Dordrecht: Springer. P.14
- Tunnicliffe. S.D. (2021). *Talk and Do Science at Home*. Talk given at Professional Development Institute, Jamaica. Early Childhood Directorate, Ministry of Education, Government of Jamaica. Online, May 20th.
- Sakr, M. (2020) *Digital Play in Early Childhood*, London, Sage Publications