

EXPLORING THE HOME SCIENCE ENVIRONMENT IN EARLY CHILDHOOD

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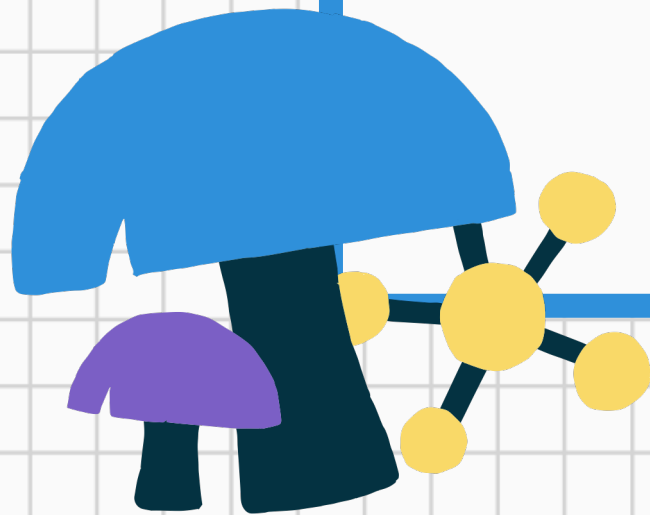
Konferenca e Shtatë Ndërkombëtare për Shëndetin,
Mirëqenien, Edukimin dhe të Drejtat e Fëmijëve
Prishtinë, 2024





INTRODUCTION

- Early childhood
 - critical for rapid development and growth across various domains
 - shaping essential skills, cognitive abilities, and
 - a foundation for future learning.
- Science Education
 - developing critical thinking
 - creating a strong basis for scientific knowledge and the process by which scientific knowledge is established
- Early science experiences
 - Improve children's knowledge, skills, and understanding and
 - prepare them to seek novel solutions to complex problems
- Parental involvement
 - encouraging their children's curiosity and
 - creating a home environment that encourages the child to learn and discover independently



THEORETICAL BACKGROUND

Bronfenbrenner's ecological systems theory (1979)

1. Microsystem
2. Mesosystem
3. Exosystem
4. Macrosystem

Academic socialization theory (Hoover-Dempsey & Sandler, 1997)

1. Social interactions
2. Beliefs
3. Practices

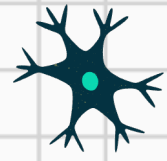
Parental involvement:

1. Role construction
2. Sense of efficacy
3. Perceptions of invitations, demands, and opportunities for involvement

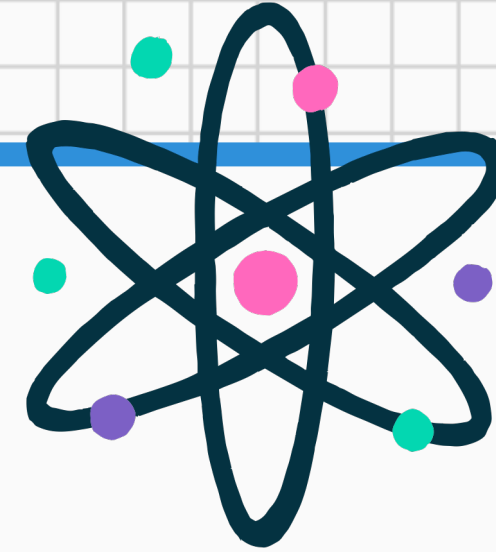
National Research Council (NRC) framework (2012)

1. Disciplinary core ideas (DCIs),
2. Science and engineering practices (SEPs), and
3. Crosscutting concepts (CCCs)





DEFINITIONS



01

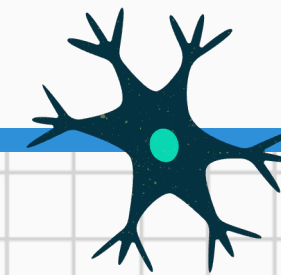
Home learning environment

The educational development of children is supported by three main aspects in the home learning environment: children actively participating in learning activities, the quality of interactions between parents and children, and the accessibility of learning materials (Bradley & Corwyn, 2002).

02

Home science environment

Family educational processes are central to the home learning environment and help connect structural family characteristics, such as home language and parental education, and parental interest in science with children's knowledge (Junge et al., 2021)



RESEARCH QUESTIONS



How often do parents engage in science activities with their young children?

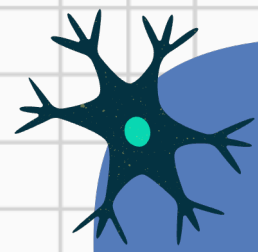


Is there any difference in parental science engagement for SEP versus DCI activities?



Does parental science engagement in SEP and DCI activities differ for younger versus older children?

METHODS



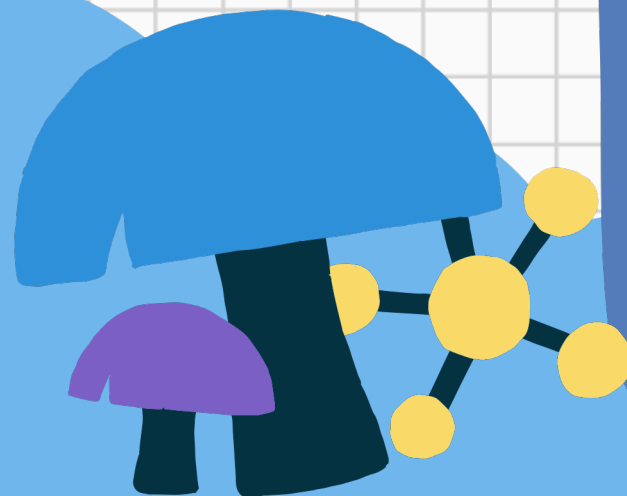
PARTICIPANTS

Home science environment of 436 children aged 4-5 years old

- 219 girls (50%), 217 boys (50%)
- Mothers: 272 (62%); Fathers: 159 (37%); Others (stepparents/legal guardians): 5 (1%)

Recruitment

- Parents located in the U.S.
- Age range: 18-75 years old
- Identified as U.S. citizens
- English as first language
- Parents with children born between 2015-2021



PROCEDURE

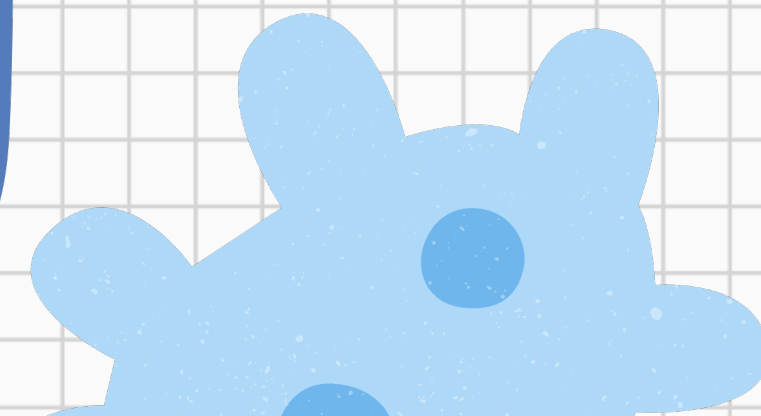
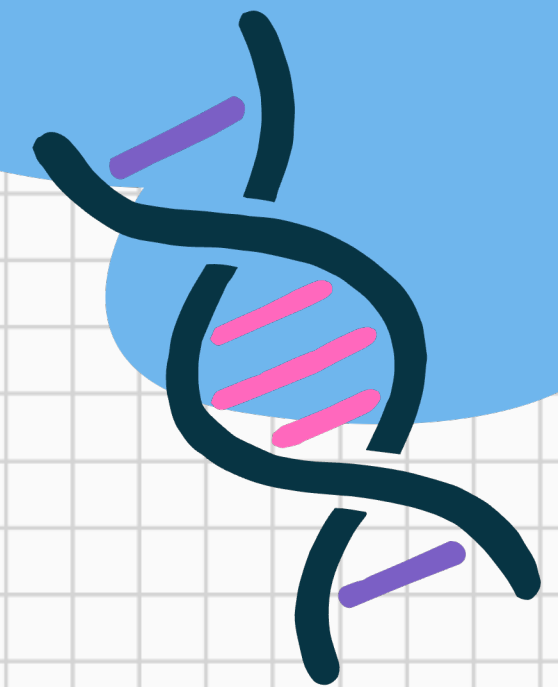
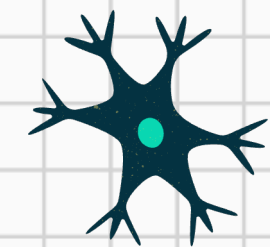
The Early Home Learning Environment Dataset (Ellis et al., 2022)

Parent reports via Profilic

Survey Duration: Approximately 30-45 minutes

Compensation: \$8.90 per hour

Data Collection Period: December 15, 2021, to January 20, 2022



PRELIMINARY FINDINGS

EFA: two factor structure was retained (DCI and SEP)

DCI

SEP

- Talk about insects and bugs
- Talk about plants
- Talk about animals
- Talk about what objects are made of
- Talk about moving objects
- Talk about planets, stars, or outer space
- Use tools like scales, magnifying glasses, magnets, measuring cups, telescopes, binoculars, cameras, or thermometers
- Talk about the weather
- Talk about or compare the weights/masses/heights/densities of objects
- Read books about science

- Identify problems and try to create or find the best solution
- Provide their own explanations for “how” and “why” things happen
- Ask your child to predict/guess what might happen when trying something new
- Test and/or retest ideas to find out new information or to answer a question
- Observe, describe, and ask questions about what is happening in the world around them
- Share discoveries or findings with others

FINDINGS

RQ1: How often do parents engage in science activities with their young children?

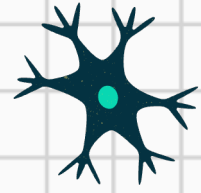
The majority of parents engaged over 2-5 times per week in facilitating science activities at home.

RQ2: Is there any difference in parental science engagement for SEP versus DCI activities?

Parents engaged more frequently in facilitating home activities related to science and engineering practices than the science and engineering disciplinary core ideas [$t(405) = 12.86$, $p < .001$, $d = .86$]

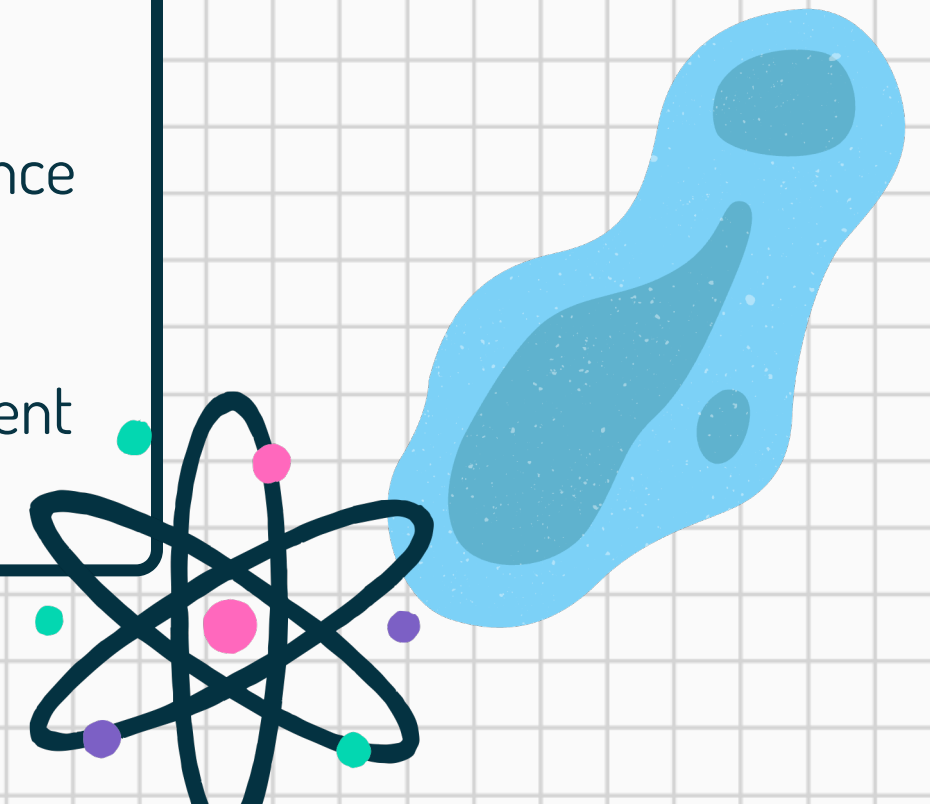
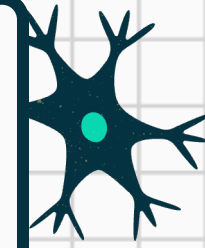
RQ3: Does parental science engagement in SEP and DCI activities differ for younger versus older children?

Parents of younger children were more likely to engage in both SEP [$F(1, 404) = 7.14$, $p < .01$, $\eta^2 = .02$] and DCI [$F(1, 404) = 9.81$, $p < .01$, $\eta^2 = .02$] activities at home than parents of older children



CONCLUSIONS

- Parents engage in science activities with their young children 2-5 times per week
 - Moderate but not extensive level of involvement.
 - Awareness of the importance of early science education and the practical accessibility of such activities within their home routines
- Parents engage more frequently in facilitating science and engineering practices (SEP) at home compared to the disciplinary core ideas (DCI)
 - SEP activities are more hands-on, interactive, and easier to implement in a home setting.
- Parents of younger children are more likely to engage in both science and engineering practices (SEP) and disciplinary core ideas (DCI) activities at home compared to parents of older children
 - Younger children benefit more from direct parental involvement and hands-on learning experiences.



THANK YOU!



Any questions? Don't
hesitate to contact us



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