



# *IMPACT: MEASURING LEARNING*

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# Copernicus Science Center

- **MISSION:** We inspire people to observe, experiment, ask questions and seek answers.
- **VISION:** People shape the world through critical and creative thinking.

# Copernicus: the Audience (3)

## Visitors by region (school trips)

- 7% – Warsaw
- 7.9% – Mazovian Voivodeship outside Warsaw
- 85.1% – other voivodeships



# Where is the impact? The learning: perspectives

milliseconds and below	seconds	minutes to hours	days to months	years and beyond
biological	cognitive	<b>rational</b>	<b>sociocultural</b>	institutional

Time scale of human learning: adapter from Nathan and Alibali (2010)

# Impact: the sociocultural level.

## The science capital

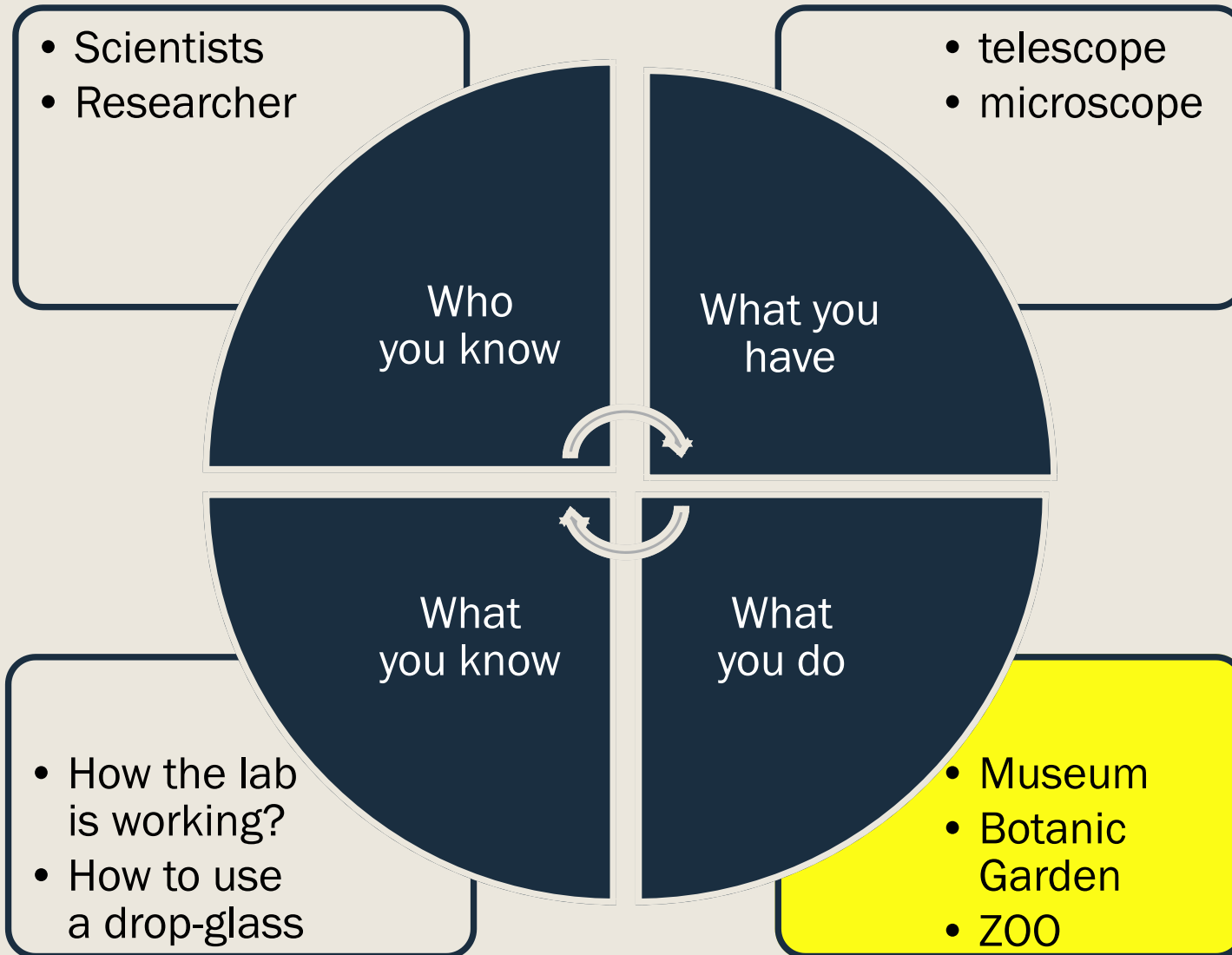
Science-related qualifications, interest, literacy and social contacts) to understand how young people from all backgrounds engage with science and how their engagement might be supported. A conceptual, methodological, and empirical argument for extending Bourdieuian notions of capital beyond the arts

Research evidence shows that the more science capital a young person has, the more likely s/he is to aspire to continue with science post-16 and to see themselves as having a science identity.

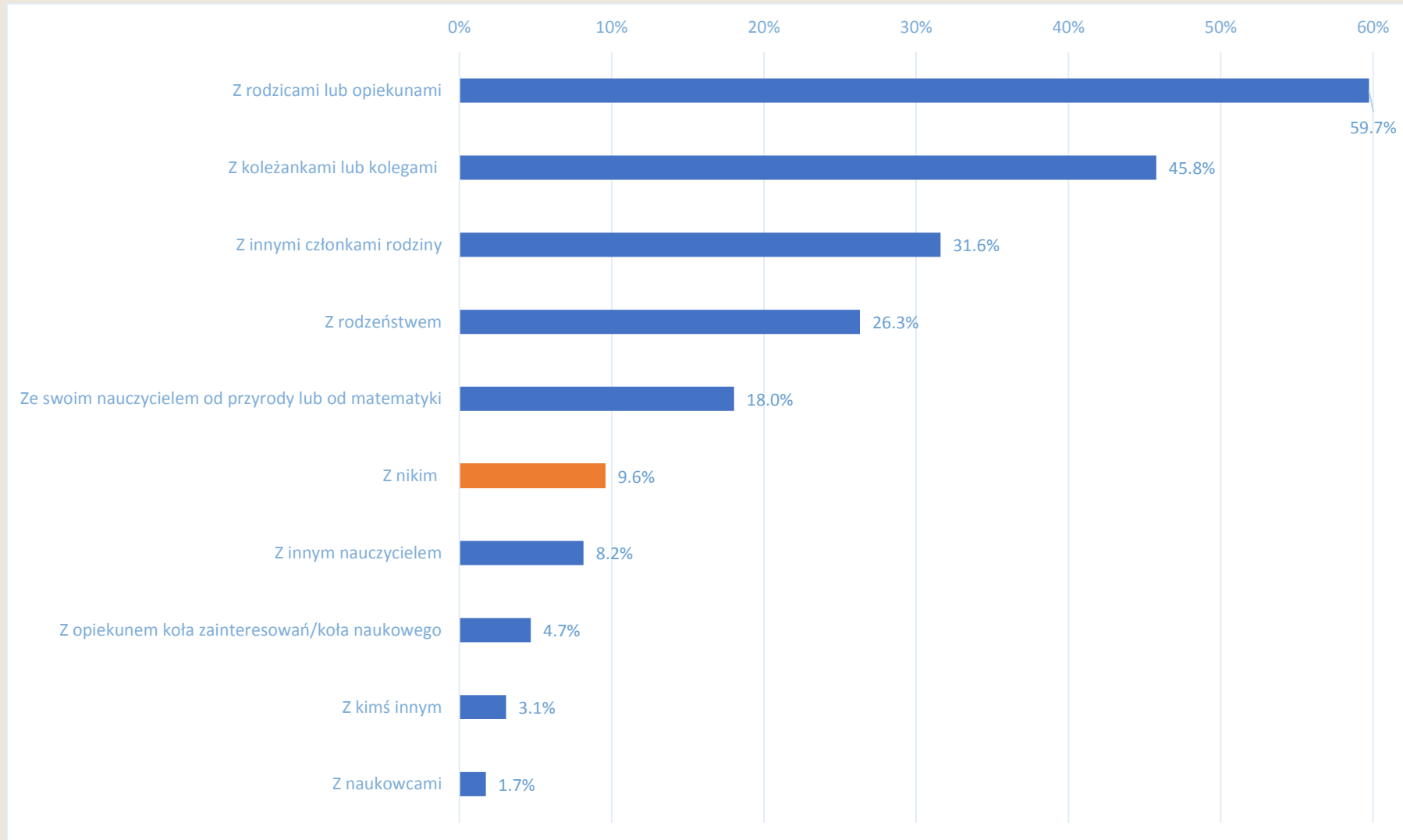


science capital

aspirations



# “Who do you talk with about science: scientists, scientific discoveries, scientific questions and riddles”?



# Rational level: development of the XXI skills

21st century skills comprise skills, abilities, and learning dispositions that have been identified as being required for success in 21st century society and workplaces by educators, business leaders, academics, and governmental agencies.

Learning and Innovation "The 4 C's"	Digital Literacy	Career and Life
Critical thinking & problem solving	Information literacy	Flexibility & adaptability
Creativity and innovation	Media Literacy	Initiative & self-direction
Communication	ICT Literacy	Social & cross-cultural interaction
Collaboration		Productivity & Accountability
		Leadership & responsibility

Table 1 - P21 Skills



# Skills development: the Exploratory Behaviour Scale

- The Exploratory Behavior Scale (EBS): a quantitative measure of visitors' interactivity.
  - More specifically, the EBS is developed from the psychological literature on exploration and play and measures the extent to which children explore their physical environment.

Van Schijndel, T. J. P., Franse, R. K. and Raijmakers, M. E. J. (2010), The Exploratory Behavior Scale: Assessing young visitors' hands-on behavior in science museums. *Sci. Ed.*, 94: 794–809. doi:10.1002/sce.20394

# Exploratory Behaviour Scale

## 1. Passive contact

- A child walks, stands, sits or leans on something and may hold or transport an object. However, the child does not manipulate the object in an active and attentive manner.

## 2. Active manipulation

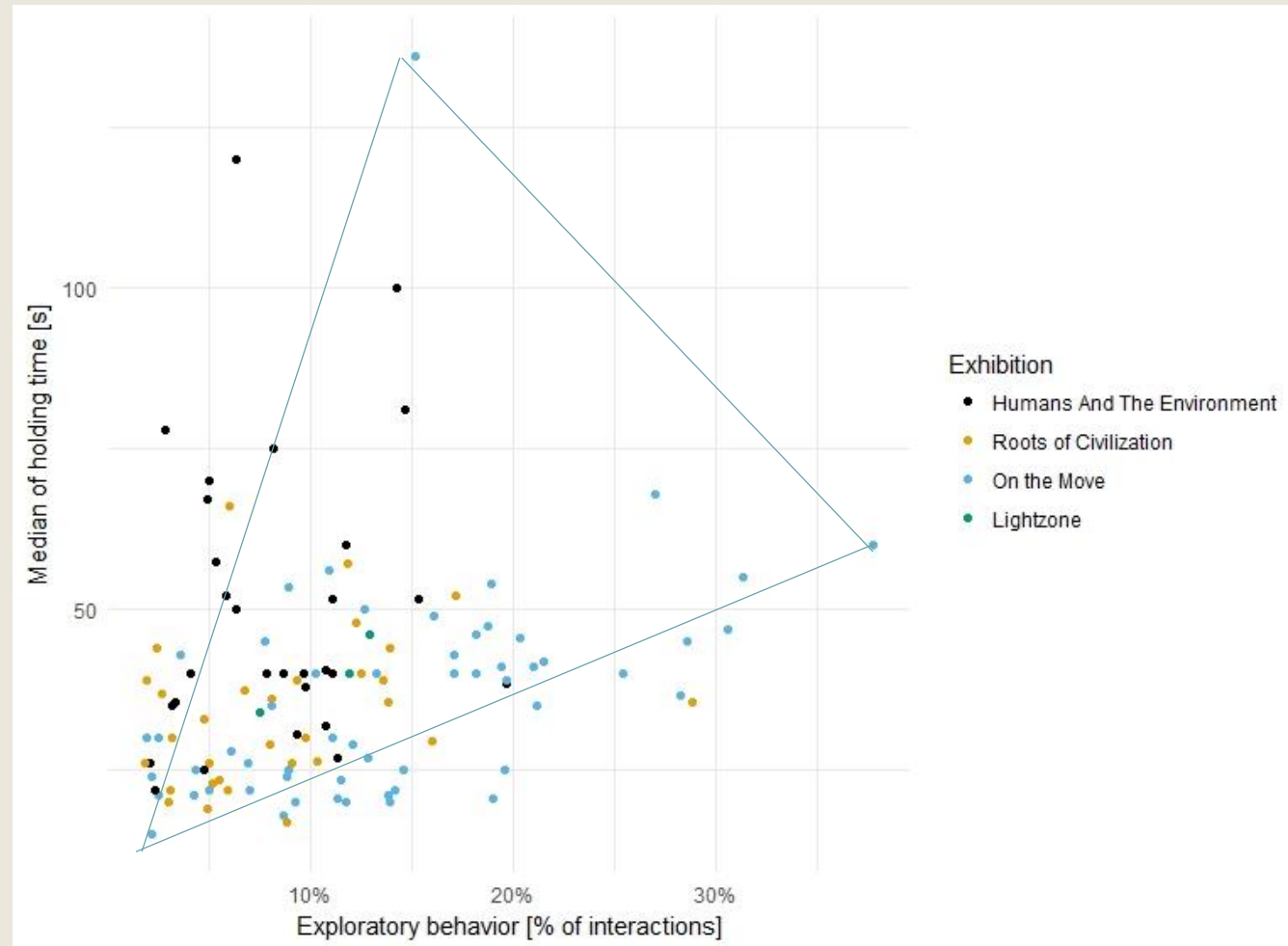
- A child manipulates an object in an active and attentive manner. This implies that the child pays attention to his or her action(s) and the outcome(s) of the action(s).

## 3. Exploratory behavior

- A child manipulates an object in an active and attentive manner (as Active manipulation). In addition, the child applies repetition and variation to his or her actions. “Repetition” implies that the child repeats an action (several times). “Variation” implies that the child performs different actions with one object or performs the same action with different objects. Actions that clearly differ in degree are also considered different actions.

# Involvement

Holding time & exploratory behaviour (% of interactions)





**Thank you!**

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