

GUIDED SELF-DISCOVERY OF ELEMENTARY SCHOOL MATHEMATICS: THE MATIFIC PROJECT

Shimon Schocken

IDC Herzliya

Raz Kupferman

Hebrew University

According to Jean Piaget, “whenever we teach children something, we deny from them the ability to discover it on their own”. This workshop explores how carefully designed software and “gamification” can help children learn mathematics, from kindergarten to 6th grade, in a constructive and structured process of self-discovery.

The workshop will focus on the following issues: (i) the pedagogical virtue and cognitive impact of self-discovery, (ii) how to create games and activities that promote self-discovery, (iii) streamlining the self-discovery process: staging, hinting, rewarding, and (iv) The teacher’s role in self-discovery.

During the workshop we’ll discuss several examples of mathematics education games, taken from the Matific project, (<http://www.matific.com>), designed by the workshop organizers and others. Each game uses gamification and constructive learning techniques to promote self-discovery.

Planned Structure (next page)

Planned timeline	Topic	Material / Working format / presenter
0-10 minutes	Self-discovery in mathematics education: introduction and background	Presentation / Schocken
10-15 minutes	Gamification and educational software in early age mathematics education	Presentation / Schocken
15-40 minutes	Demonstration of several math education games that promote self-discovery. We'll start each demonstration by having the workshop participants play the game software themselves, using their PCs or tablets, if available (all games will be available freely, on-line). Next, we will moderate a discussion of the self-discovery nature of these games. Do the games achieve self-discovery? If yes, how? If no, how they can be improved?	Presentation / Schocken
40-70 minutes	Designing an educational game that promotes self-discovery: we'll present several representative topics from the elementary school mathematics curriculum, and ask the workshop participants to divide into teams of 3 participants. Each team will select one of the proposed topics, and engage in a structured process of designing a game that promotes self-discovery.	Paper and pencil / working in groups of 3 / Workshop Participants
70-85 minutes	Presentation of selected games designed by the participants	Presentation, whiteboard / Workshop Participants
85-90 minutes	Conclusion	