Informal Inferential Reasoning: a Computer-based Training Environment

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The logic behind statistical inference is complex and hard to understand for students. There have been a variety of approaches to simplify the basic model situation like nonparametric tests based on re-randomization. Others tried to simplify the basic situation to a (mere) significance test and develop simplified sigma rules for teaching. Recent research focuses on informal and intuitive approaches to statistical reasoning instead of mastery of formal mathematical procedures. We introduce a computer-based training environment („data game") to shape intuition for a particular type of statistical decision problem. In change-point detection tasks, one must decide if a process is running smoothly or if it is out of control. A mechanism produces data sequentially with the same variability but with a built-in shift in location of the data at some point of time. The task for the students is to detect *if* and *when* the mechanism has changed the level of produced data as early as possible but without raising false alarms. The 'data game' is embedded in a data analysis environment. We discuss the game itself as well as its relation to statistical literacy. With reference to a framework by Zieffler, Garfield, & DelMas (2008) it is argued that 'change-point' detection problems are a prime environment to investigate students' informal inferential reasoning.

Key words. Statistics education, intuitive reasoning, statistical literacy, technological learning environment.