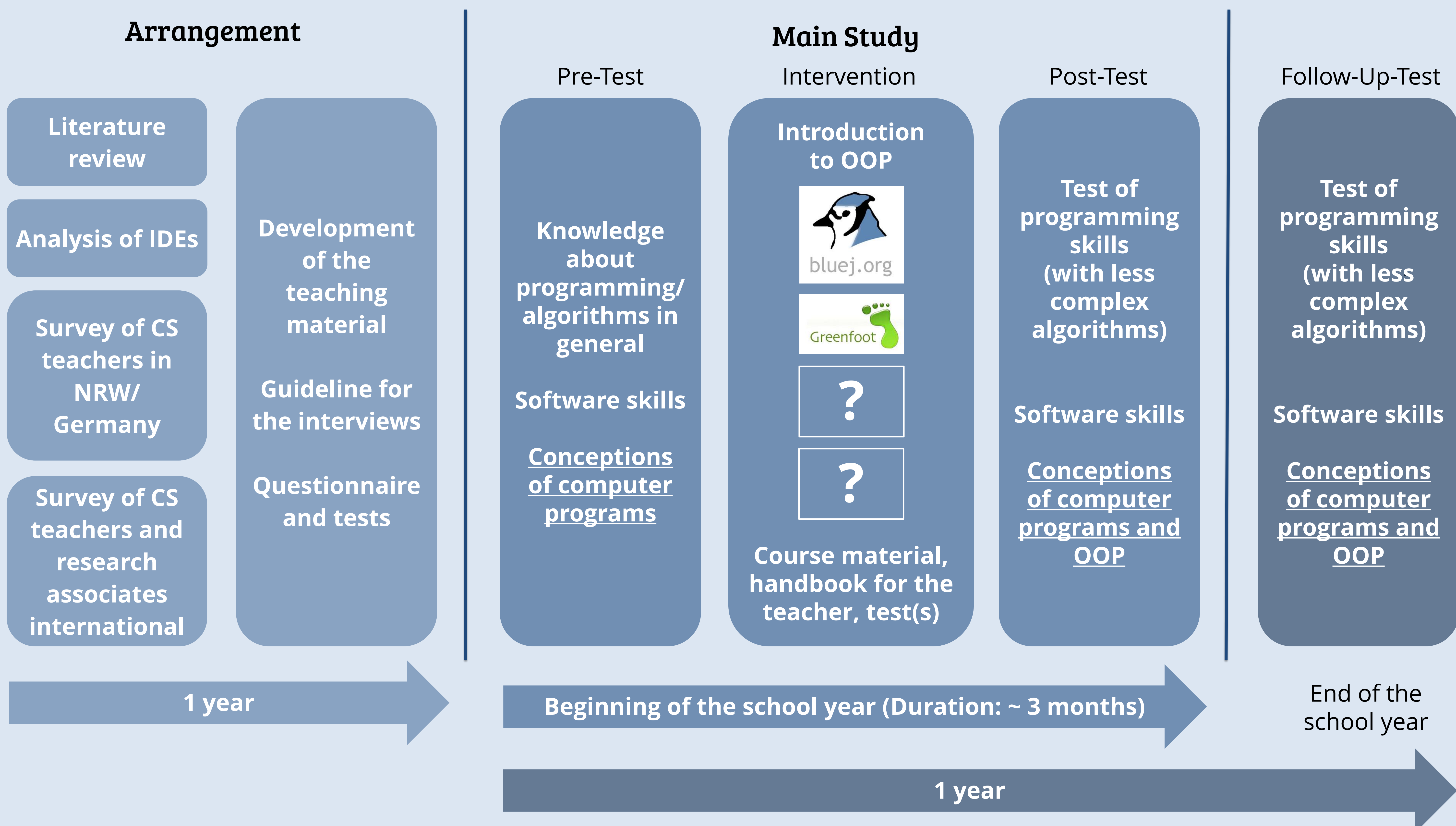


How Does an Educational IDE Influence Students' Conceptions of Object-Oriented Programming?



Design of a Ph.D. Research Project to Explore Secondary School Students' Conceptions of OOP

- programming seems to be challenging for many students
- CS teachers should be competent in identifying and addressing students (mis-)conceptions for creating adequate learning arrangements
- it would be desirable to develop an instrument for teachers from study results to survey students' conceptions of OOP
- more investigations with school students are required
- in German secondary schools object-oriented programming (OOP), especially Java, is compulsory in CS classrooms of the federal state government of North Rhine-Westphalia
- introduction OOP courses are usually taught with educational integrated development environment (eIDE) like *Greenfoot* or *Bluej*

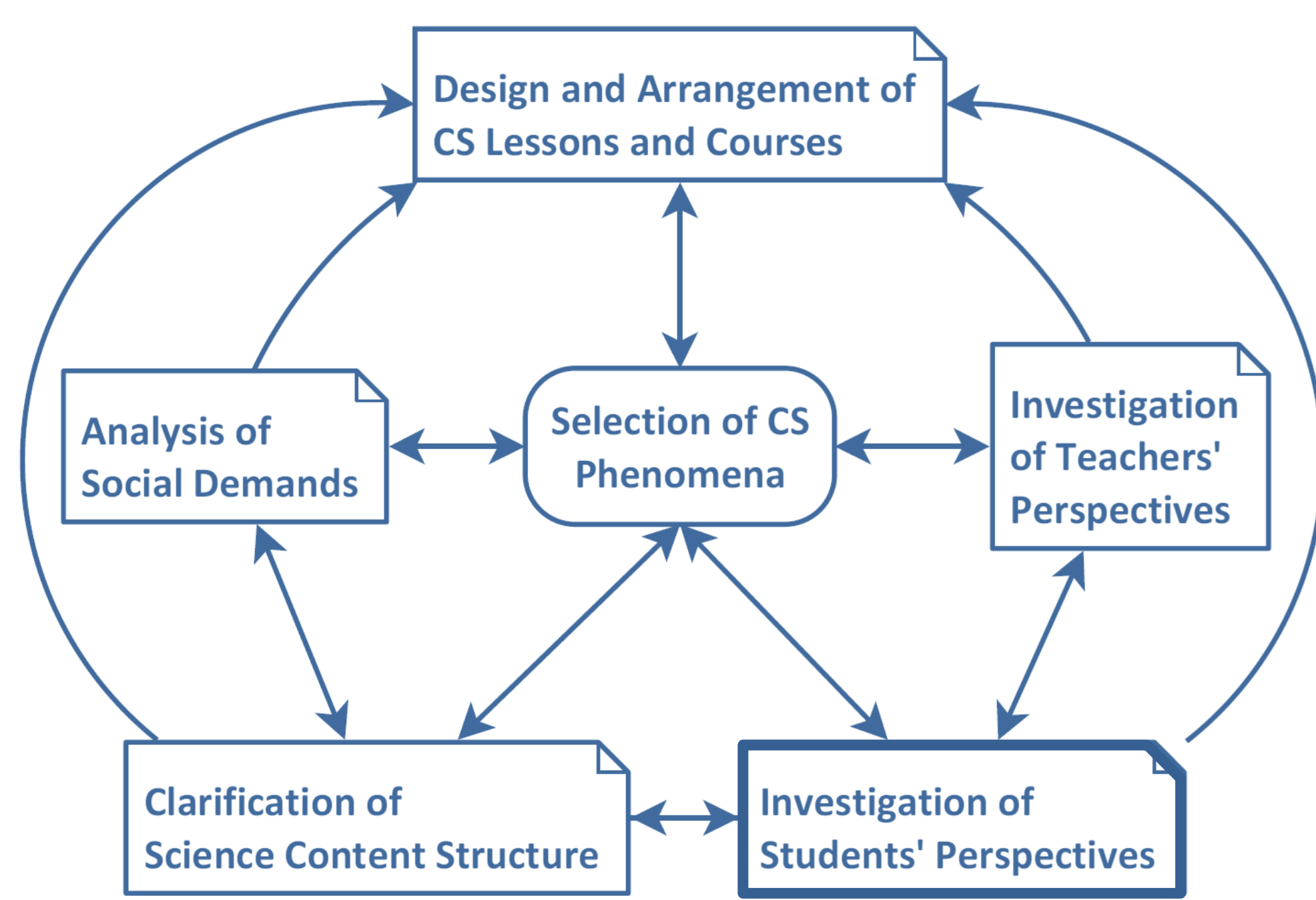


Figure 1. Educational Reconstruction for CS Education. [1]

- approaches for teaching design with attention on pre-instructional conceptions aligned with the scientific domain concepts [1]
- "students exhibit various misconceptions and other difficulties in syntactic knowledge, conceptual knowledge, and strategic knowledge." [2]
- "an integrated language and environment that explicitly supported an object-oriented model and provided visualization and interaction functionality [...]" was designed by Kölling and his team [3]
 - the eIDEs *Greenfoot* and *Bluej* are internationally well known and are used in schools and university courses
- "Developers of educational software might use the research results when deciding on the content: what to present, how to present it and in what order." [4]

[1] Ira Diethelm, Peter Hubwieser, and Robert Klaus. 2012. Students, teachers and phenomena. In Proceedings of the 12th Koli Calling International Conference on Computing Education Research - Koli Calling '12, Mikko-Jussi Laakso and Robert McCartney (Eds.). ACM Press, New York, NY, USA, 164-173.

[2] Yizhou Qian and James Lehman. 2017. Students' Misconceptions and Other Difficulties in Introductory Programming. ACM Transactions on Computing Education 18, 1 (2017), 1-2.

[3] Michael Kölling. 2015. Lessons from the Design of Three Educational Programming Environments. In the International Journal of People-Oriented Programming 4 (1), 5-32.

[4] Mariana Teif, Orit Hazzan. 2006. Partonomy and taxonomy in object-oriented thinking. In Proceedings of the Working Group Reports on ITiCSE on Innovation and Technology in Computer Science Education. Bologna (Italy), June 26-28, 2006. Working group reports. New York, N.Y.: ACM, 55.

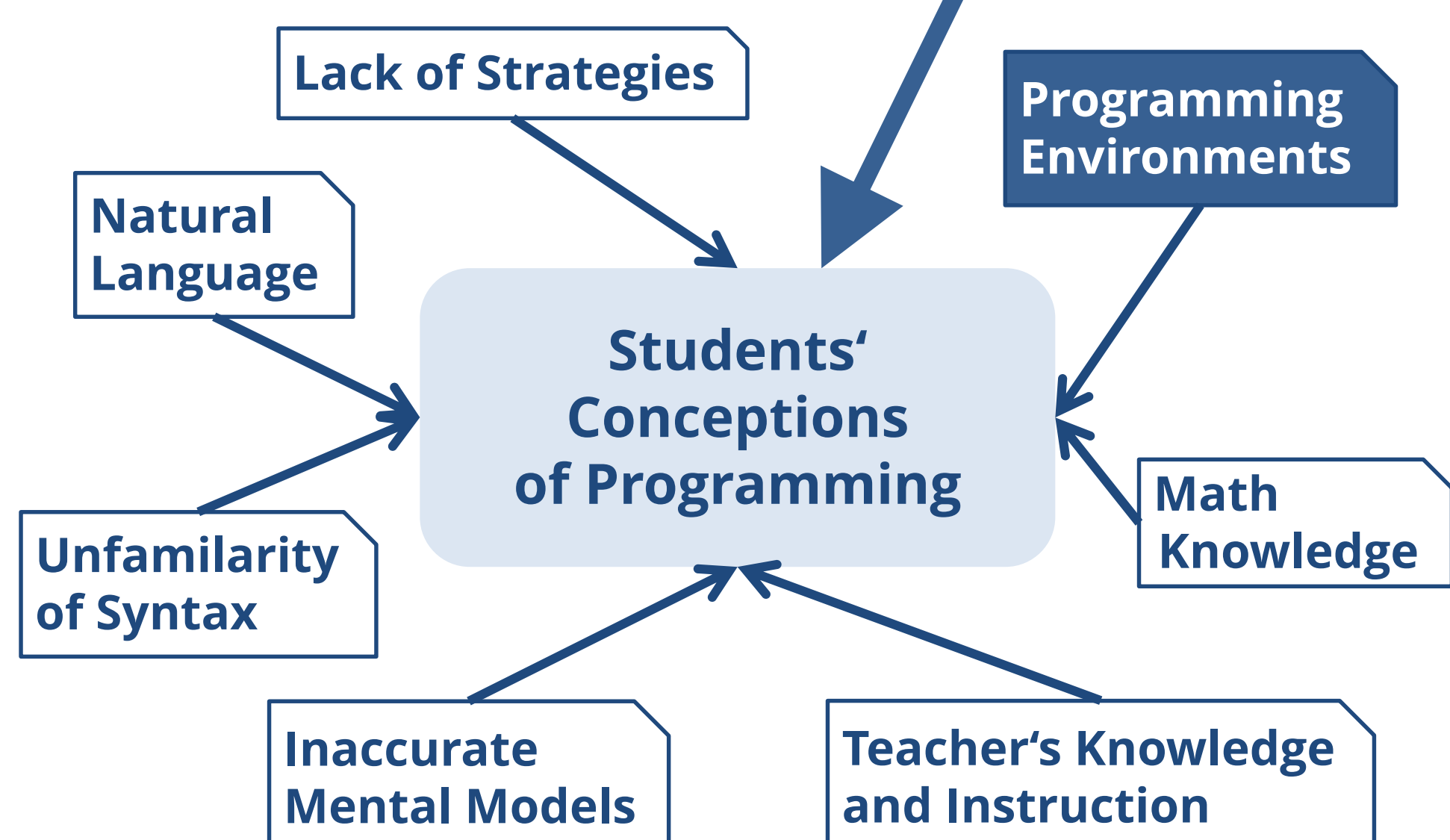
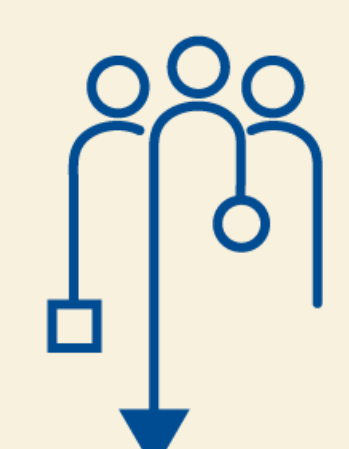


Figure 2. Factors which are related to students' (mis)conceptions and difficulties in programming. [2]

Fatma Batur
 University Duisburg-Essen
 Computing Education Research Group
 fatma.batur@uni-due.de
 http://uni-due.de/fb



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