

DOCTORAL SCHOOL OF INFORMATICS  
COMPLEX EXAM SUBJECT

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**The Teaching Methodology of Information Technology (main subject)**

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Themes, Possible Questions and related literature

**Learning and Teaching:**

National Academies of Sciences, Engineering, and Medicine. 2018. *How People Learn II: Learners, Contexts, and Cultures*. Washington, DC: The National Academies Press.

<https://doi.org/10.17226/24783>.

Free: <https://www.nap.edu/catalog/24783/how-people-learn-ii-learners-contexts-and-cultures>

*Questions:*

*What are the strategies that support motivation, the learning process itself, retention and assessment of learning? How can technology help in this process?*

**Emergence of Computational Thinking:**

Papert, S.: *Mindstorms: Children, Computers, and Powerful Ideas*. Basic Books, Inc., New York (1980)

<http://worrydream.com/refs/Papert%20-%20Mindstorms%201st%20ed.pdf>

Kalas I., Blaho A., Moravcik M. (2018) Exploring Control in Early Computing Education. In: Pozdniakov S., Dagienė V. (eds) *Informatics in Schools. Fundamentals of Computer Science and Software Engineering*. ISSEP 2018. Lecture Notes in Computer Science, vol 11169. Springer, Cham [https://link.springer.com/chapter/10.1007%2F978-3-030-02750-6\\_1](https://link.springer.com/chapter/10.1007%2F978-3-030-02750-6_1)

Brennan, K., Resnick, M.: New frameworks for studying and assessing the development of computational thinking. In: *Proceedings of the 2012 Annual Meeting of the American Educational Research Association, Vancouver, Canada, (2012)*

[https://web.media.mit.edu/~kbrennan/files/Brennan\\_Resnick\\_AERA2012\\_CT.pdf](https://web.media.mit.edu/~kbrennan/files/Brennan_Resnick_AERA2012_CT.pdf)

Francisco Buitrago Flórez, Rubby Casallas, Marcela Hernández, Alejandro Reyes, Silvia Restrepo, Giovanna Danies.: *Changing a Generation's Way of Thinking: Teaching Computational Thinking Through Programming*, Volume: 87 issue: 4, page(s): 834-860 Article first published online: May 23, 2017; Issue published: August 1, 2017

<https://journals.sagepub.com/doi/full/10.3102/0034654317710096>

*Questions:*

*What are emergent computational practices and how can thinking perspectives be improved and assessed?*

**ICT Competences and algorithmic Skills:**

László Zsakó, Péter Szlávi (2012): *ICT Competences: Algorithmic Thinking*.

[http://dppd.ubbcluj.ro/adn/article\\_5\\_2\\_6.pdf](http://dppd.ubbcluj.ro/adn/article_5_2_6.pdf)

Bernát Péter, Zsakó László: Methods of teaching programming – strategy (2017), In: Szerk.: Veronika Stoffová, Szerk.: Roman Horváth New methods and technologies in education and practice: Proceedings of XXX. DIDMATTECH 2017.. Trnava: Trnava University in Trnava Faculty of Education, 2017. pp. 40-50.

<http://didmattech.truni.sk/2017/proceedings.pdf>

Mária CSERNOCH, Piroska BIRÓ, János MÁTH, Kálmán ABARI : Testing Algorithmic Skills in Traditional and Non-Traditional Programming Environments Informatics in Education, 2015, Vol. 14, No. 2, 175–197, 2015 Vilnius University, DOI:

10.15388/infedu.2015.11 <https://files.eric.ed.gov/fulltext/EJ1079009.pdf>

*Questions:*

*What is the difference between Computational Thinking and Algorithmic Thinking? What are the methods to improve Algorithmic thinking? What does research say on the levels of Algorithmic Thinking of university students entering Computer Science studies?*