About balanced application of CAS in undergraduate mathematics

E. Varbanova

Technical University of Sofia, Bulgaria, elvar@tu-sofia.bg

In the methodology of mathematics teaching and learning [6] the main question is "Why?". It is about the learning outcomes and educational goals as well as about educational values. The chain of questions "What-When-Where-How" is also associated with it. On one side, they can be related to the curricula and courses. On the other side, they are mostly relevant to the teaching-learning-assessment (TLA) process. In the past two-three decades remarkable creative work with application of CAS has been done in undergraduate mathematics concerning these four questions. The care about the Why-question will never end because the world constantly changes. CAS is full of opportunity in this direction as well: for adequate decisions about this question.

In this paper educational goals and values of the TLA of undergraduates mathematics [2, 4] are considered. Based on examples [1, 5] the necessity of balanced application of CAS in education is discussed. The idea is to make what is important CAS supported [3], rather than what is CAS supported important.

References

[1] T. Arens, Hettlich, F., Karpfinger, Ch., Kockelkorn, U., Lichtenegger, K. & Stachel, H. *Mathematik*, Heidelberg, Spektrum (2008).

[2] S. Grozdev, *For High Achievements in Mathematics. The Bulgarian Experience (Theory and Practice)*, Sofia, ADE (2007).

[3] E. Varbanova, *CAS supported environment for learning and teaching Calculus*, CBMS - Issues in Mathematics Education: Enhancing University Mathematics, vol. 14, AMS & MAA (2007).

[4] E. Varbanova, *Calculus - I. Lecture Notes*, Sofia, TU-Sofia (2009) (in Bulgarian).

[5] E. Varbanova, *Calculus - I. Exercises*, TU-Sofia. (2011) (in Bulgarian).

[6] G. Ganchev, Ninova, Yu., Nikova, V. *Methodology of mathematics education*, Blagoevgrad, SWU "Neofit Rilski" (2007) (in Bulgarian).