

# Active learning methodologies and their contribution to differential and integral calculus teaching

Lívia Santana Fontes (liviam.fontes@ueg.br)

Cleyton Hércules Gontijo (cleyton@unb.br)

Universidade de Brasília

**Abstract.** The Differential and Integral Calculus discipline has been, historically, responsible for high rates of failure and evasion, in many degree courses of exact and natural sciences. Among the justification for this fact, the deficient teaching in basic education, the lack of motivation on the part of the student and the unsatisfactory professor-student interaction, are in the studies on this problematic. Other than these, the inadequate teaching methodology is also considered responsible for this situation, since the traditional teaching conception, which permeates the exact sciences degree courses, does not meet the needs of the current social and educational context. In this conception, also called technician, the accumulation of information for later reproduction it is valued, which is understood as insufficient to promote the student's success in this discipline. One of the possibility for teaching, in a different perspective from the technician one, are the active methodologies that can be understand as ways of developing the learning process, used to conduct to the individual's critical formation, favoring their autonomy, wakening the curiosity and stimulating decision making. The present paper presents the doctoral thesis research project, which aims to validate active learning methodologies in Differential and Integral Calculus, in order to promote the student learning. The approach proposed for research is qualitative, with an approximation to the phenomenological method, since our intent is to research the reality through its manifestations, without restricting us to quantifiers. The investigation will take place with students of this discipline, in a public institution of higher education, with the execution of activities planned and conducted by didactic engineering, which is characterized by a scheme based on didactic achievements in the classroom, and on case study records. We believe that active methodologies can contribute to the development of the subject as a whole, provide autonomy, stimulate creativity and prepare them to face new and challenging situations.

## References

- [1] Bicudo, M. A. V. Pesquisa Qualitativa e Pesquisa Qualitativa Segundo a Abordagem Fenomenológica. In Pesquisa qualitativa em educação matemática;
- [2] Borba, M. de C., Araujo, J. de L., Eds.; Autêntica: Belo Horizonte, 2004; pp 99–112.
- [3] Artigue, M. Ingeniería Didáctica. In Ingeniería didáctica en educación matemática. Un esquema para la investigación y la innovación en la enseñanza y el aprendizaje de las matemáticas; Artigue, M., Douady, R., Moreno, L., Gómez, P., Eds.; Grupo Editorial Iberoamérica: San Rafael, 1995; pp 33–59.
- [4] Moretto, V. P. Prova: Um Momento Privilegiado de Estudo, Não Um Acerto de Contas; Lamparina: Rio de Janeiro, 2007.
- [5] Oliveira, M. C. A. de; Raad, M. R. A Existência de Uma Cultura Escolar de Reprovação No Ensino de Cálculo. Bol. do GEPEM 2012, 61, 125–137.
- [6] Santos, R. M.; Borges Neto, H. Avaliação do desempenho no processo de ensino-aprendizagem de cálculo diferencial e integral (o caso da ufc) <http://www.multimeios.ufc.br/arquivos/pc/artigos/artigo-avaliacaodo-desempenho-no-processo-de-ensino-aprendizagem.pdf> (accessed Dec 7, 2014).