This "definition" of didactical physics was originally written in Finnish in January 1997 for the Faculty of Science of Joensuu University to support the argumentation in an invited evaluation of the scientific competence of a researcher who's main field of interest was within the field of didactical physics. It has been refined and revised on the basis of subsequent experience on research in the field, particularly on guidance of masters, licentiates and doctors theses on the field.

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DIDACTICAL PHYSICS AS A DISCIPLINE OF SCIENCE

1. The starting point of the research in didactical physics is the cognitive-conceptual and methodical-processual structure of physics. Didactical physics does not search for new knowledge on the structures and laws of nature like the "ordinary" physics or new technological applications of such knowledge, but it studies the structures and nature of such knowledge and its creation and development from the special viewpoint of finding their significance as models for teaching and learning physics, and, more generally for any knowledge transfer on the field of physics and related technology. This is ***theoretical*** research of didactical physics with the aim of improving our understanding of the nature and principles of knowledge transfer by analysis of its conceptual and processual structure. Its justification as scientific research is based on its nature as well-founded structural concept formation and development of conceptual structures.

2. The concrete aim of the research in didactical physics is primarily the development of physics teaching, or more generally, transfer of knowledge on physics and related technology. Procedures and methods, projects, organizational and other arrangements and measures related to such activities, like teaching approaches, curricula, textbooks and any published material working methods *etc.* are evaluated on the basis of the conceptual and processual structures of physics, and new solutions, innovations and improvements are planned, constructed and developed on this basis. This is ***applied*** research of didactical physics. Its justification as scientific research is based on its nature as applied research in general, based on conscious use of a theoretical frame of reference. Any products born as results of such applied research, including proposals for curricula, textbooks or other teaching material, course or project plans, working methods, *etc.* are *applications* of didactical physics. They will possess scientific value (*e.g.* as scientific merits) to the extent their connection to the theoretical basis it is made evident.

3. Didactical physics is a highly interdisciplinary field of science. Awareness of concepts and methods of various fields and ability to interdisciplinary co-operation are important elements. In theoretical and applied research of didactical physics support need or may be sought at least from philosophy, linguistics, cognition science, sense and brain physiology, science of education and sociology, since all these have their own essential viewpoints to the concept formation, build-up of the meanings of concepts and to their position in the processes of learning. In ***experimental*** research of didactical physics testing the usability and efficiency of the principles and applications, *e.g.* in evaluation of learning results, research methods of the educational science, psychology and sociology are inevitable.

4. Didactical physics has a special national significance, because often the national school institution is its primary target. Therefore, in evaluation of a scientist's competence in this field, products in the national language must be given more weight than is practicable in "ordinary" physics.

5. Didactical physics is, however, international, like all science. Thus, the scientific value of even the national results and achievements must be judged from the viewpoint of the international development of the field, and they must be submitted to the evaluation of the international science community through publication in international scientific journals and presentation in international scientific meetings.