During the last eight years we investigated the benefit of modeling notations, e.g. UML and domain specific UML profiles as well as specialized modeling languages (Idiomatic Control Language - ICL) in software engineering (IEC 61131-3) in machine and plant automation with three different experiments and approximately more than 120 participants. The results of the conducted experiments revealed the benefits and the shortcomings of UML in the field of supporting control programming. Furthermore we can show the impact of different modeling notations on software quality (IEC 61131-3) and time consumption for the software development process as well as some results on how to evaluate model driven engineering under usability aspects.