



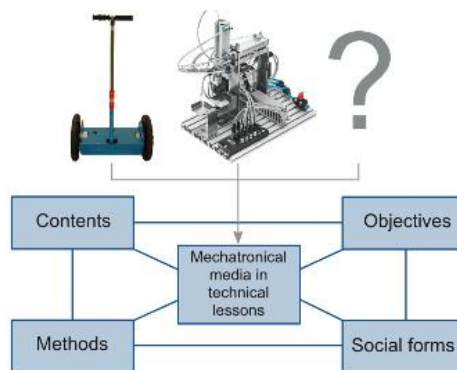
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## Research Projects

Mechatronic systems are not only the basis of virtually every modern industrial production, but can also increasingly be found in everyday items of our leisure and household sector becoming more and more complex in terms of technology. As a result, many everyday objects contain all three technical subsystems (material, energy and data). The complexity of mechatronic systems makes a rigorous and targeted guidance of the lesson planning as well as a target-oriented reduction of the learning contents for the general technical education inevitable. This results in technology-didactic research needs. Moreover, the development of learning media systems focused thereupon is a research-intensive task. Due to the interdependencies between the individual teaching factors already described the specific influence of mechatronic learning topics on these factors additionally needs to be investigated.



With regard to the consequences of the use in lessons the following research questions arise:

- › Do complex mechatronic media systems contribute to the development of technical creativity and to what extent?
- › Does the learners' career aspiration particularly change with regard to the attractiveness of technical professions?
- › Are there any gender-specific differences in the use of such learning media systems in technical lessons? Which conclusions can be drawn for the teaching structure of technical lessons?
- › Which consequences may have any findings for the teacher training and further education?

Thus, there is a huge research demand which we would like to follow up together with committed and interested partners. The following two examples "[Meclab](#)" and "[Wheelie](#)" show projects conceived accordingly.

### The following list provides an overview of the projects recently implemented:

- › "[lüttling.-Wheelie](#)"  
Department of Engineering and its Didactics together with Flensburg Comenius School. Funded by Schleswig-Holstein Innovation Foundation and NORDMETALL Foundation (2010-2012)
- › "[Science X](#)"  
Development and trial of an engineering kit system. Third-party project on behalf of Ravensburger Spielverlags GmbH (2010-2011)
- › **Renewable energies:**  
"Basic" and "Advanced" fuel cell technology.  
Two cumulative, computer-aided courses in connection with experimentation hardware (Lucas-Nülle Lehr- und Messgeräte GmbH, 2009 - 2010).
- › **Competence analysis for career guidance with special attention to technical education**  
(2007-2011)
- › "[Development and trial of the Meclab learning media system in technical or science and technical lessons](#)"  
Third-party project on behalf of Festo AG. (2006- 2007)

The following projects were implemented under the direction of Prof. Dr. M. Burgmer, the former chairholder:

- » **Renewable energies: Wind power plants**  
Computer-aided course in connection with experimentation hardware (Lucas-Nülle Lehr- und Messgeräte GmbH, Vestas AG, 2008).
- » **Airbag and seat-belt tensioner**  
Computer-aided course in connection with experimentation hardware (Lucas-Nülle Lehr- und Messgeräte GmbH, 2008).
- » **"POWER":**  
Expansion of the potential of web-based and hypermedia learning systems through integration of technical experiments and real objects (Volkswagen AG, 2007).
- » **Electrics and electronics in automobiles: The three-phase generator**  
Computer-aided course in connection with experimentation hardware (Lucas-Nülle Lehr- und Messgeräte GmbH, 2005)
- » **DP automobile**  
Development of a web-based, hypermedia training course "Modern data management in automobiles" for utilization in vocational education and advanced training in automotive professions. (2004)
- » **The CAN bus:**  
Computer-aided course in connection with experimentation hardware (Lucas-Nülle Lehr- und Messgeräte GmbH, 2003).

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