SCIENCE IN THE SPOTLIGHT: DIDACTIC RECONSTRUCTION OF CURRENT RESEARCH FOR CHEMISTRY EDUCATION

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INTRODUCTION

Good communication between science and society is of vital relevance and interest to both groups. Currently, the subject of chemistry is often perceived by students as "abstract" and "lifeless" and over 70% of students cannot imagine taking up a STEM profession [1]. The examination of current research within exciting contexts and with a high level of relevance to everyday life offers a high didactic potential to address this challenge. Future-oriented topics and their associated research methods can be made accessible to school chemistry education through the didactic reconstruction. This offers students as well as teachers not only motivating learning opportunities and contexts, but also enables participation in social discourses in the sense of a scientific literacy and reveals new career perspectives. It offers the interested public the opportunity to encounter future technologies to obtain comprehensible first-hand information and to participate in scientific and educational policy debates.

CATALIGHT: SHEDDING LIGHT ON CHEMISTRY

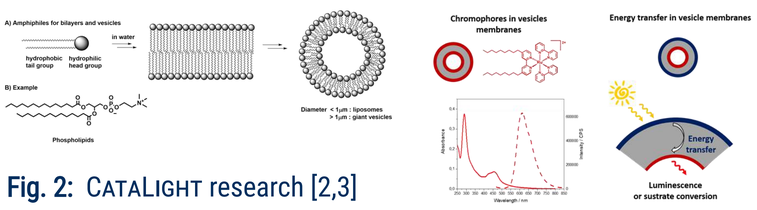
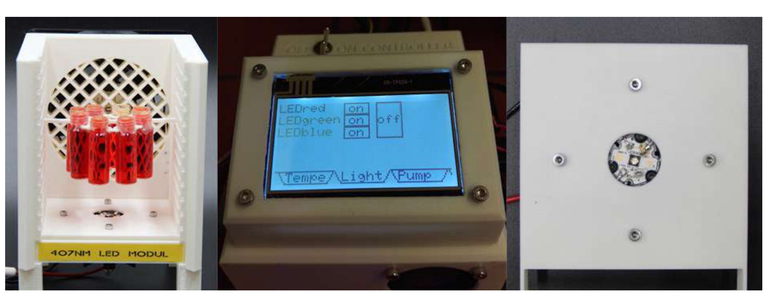


Fig. 2: CATALIGHT research [2,3]



Reactions driven by (solar-) light are the main focus of the German transregional collaborative research center 234 CATALIGHT, hosted by Ulm University and Friedrich-Schiller-University Jena. To pave way for a broad usage of abundant solar energy, CATALIGHT develops molecular light-driven chromophores and catalysts, and establishes concepts for their integration into soft matter matrices. This thematic orientation offers excellent opportunities for school chemistry education.

Since chemical reactions with solar light represent the basis of numerous processes of life in the biosphere, they also have broad applications in everyday life, science and technology, ranging from photocatalytic wastewater treatment to light-emitting diodes (LEDs) and beyond. Due to their great importance in the present and future, and the possibilities for interdisciplinary considerations, they offer as much potential for teaching in formal as in non-formal educational programs.

DIDACTIC RECONSTRUCTION

For a successful transfer from CATALIGHT research into schools, we address two main challenges

1) Didactic Reconstruction: Due to its high specialization, current (fundamental) research is usually very demanding and difficult for learners to comprehend. Especially for the understanding of light, there are inaccurate preconceptions or misconceptions on the part of the learners, which have to be addressed. For the research process, the model of didactic transfer research [2] is used as a foundation, which opens a structuring framework for the scientific development of the contents. **Figure 3** visualizes the three main sections, which include (1) the didactic reconstruction of the contents in cooperation with scientists, (2) the development of teaching materials in a cyclical process of conception, testing, evaluation, and optimisation and (3) the final dissemination of the tested materials into science and teaching practice.An example of a practical implementation of the model can be found at [3].

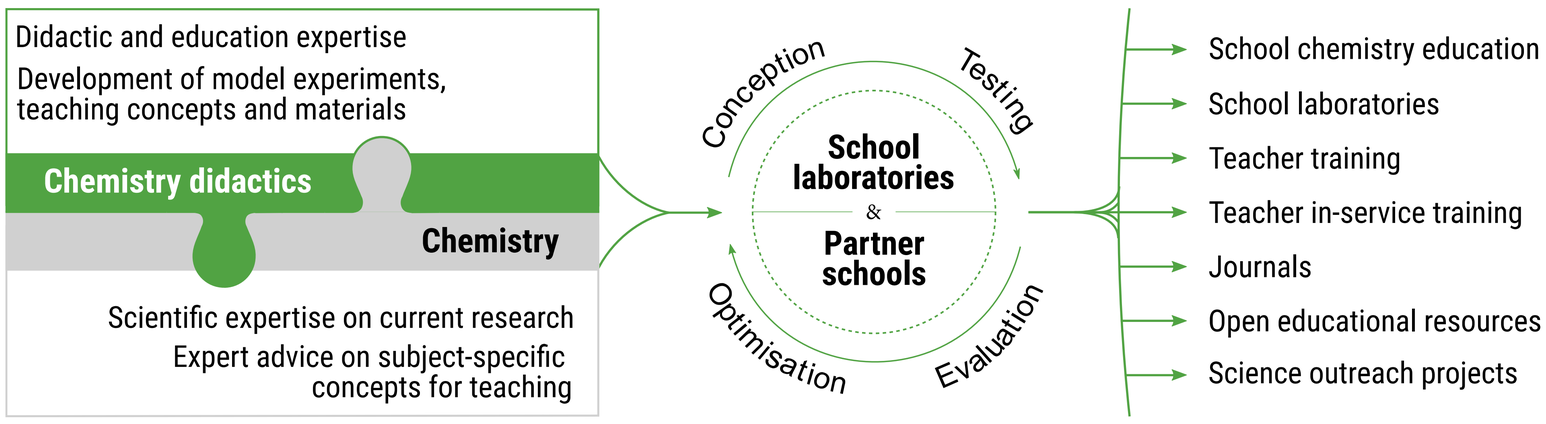


Fig. 2: Model of didactic transfer research

2) Low-Cost-Analytics: To provide simple analytical tools to schools, we apply the digital measuring station **LabPi**. LabPi is an open platform on which a multitude of measuring variables can be recorded. This is achieved by combining single-board computers with miniature sensors. With an adapter board and corresponding software, measurements of pH, temperature, conductivity as well as photometric investigations are possible, providing the low-cost and robust analytical methods for chemistry teaching.

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