



Hochschule
Albstadt-Sigmaringen
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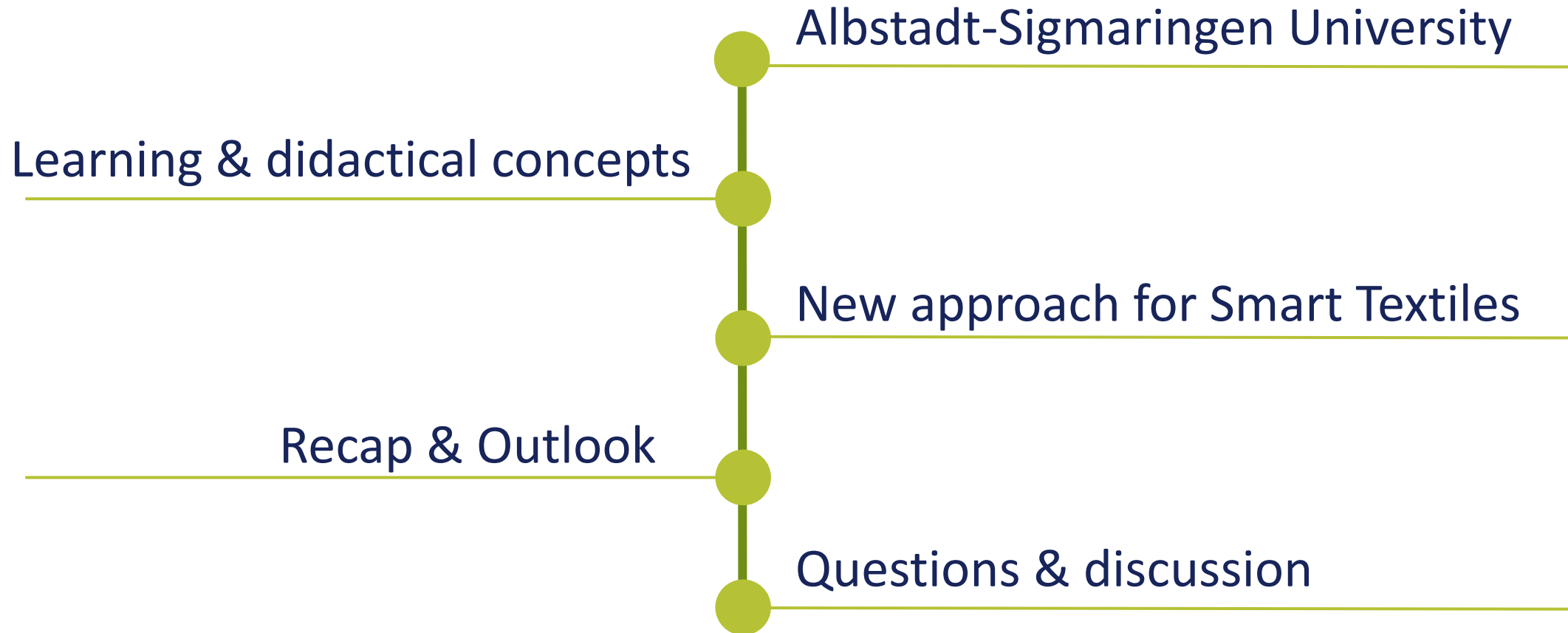
New Perspectives in Science
Education Edition 10 – March 2021
Enhancing Students' Motivation

New Approach to teach Product Development in the Area of Smart Textiles

Prof Manuela Bräuning



Smart Textiles Lab
Innovative Textil- und Bekleidungssysteme



Where are we located and how are we equipped ?

In the south of Germany...with modern labs

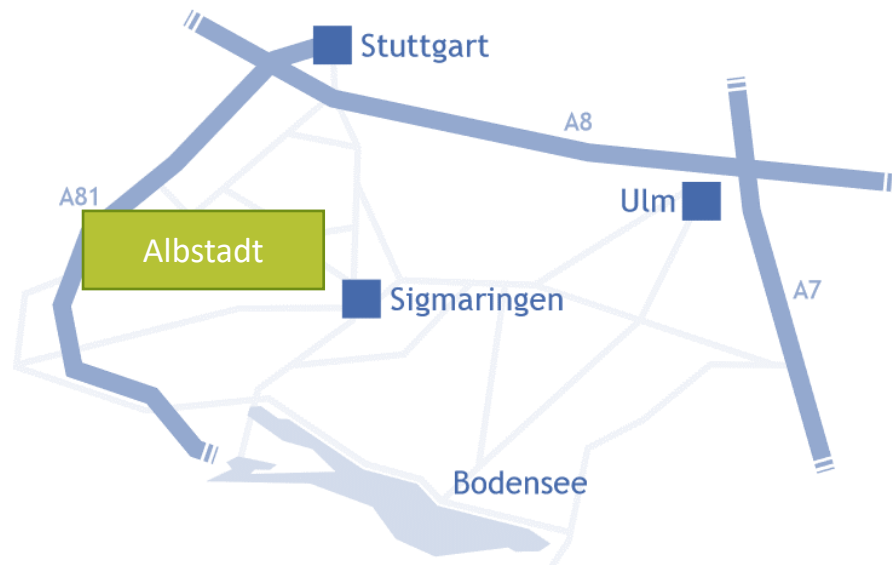


Campus Albstadt
Faculty Engineering / Faculty Informatics



Where are we located and how are we equipped ?

In the south of Germany...with modern labs



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Where are we located and how are we equipped ?

In the south of Germany...with modern labs

chemical
laboratories



textile testing and
analytical laboratory

Where are we located and how are we equipped ?

In the south of Germany...with modern labs

Industrial textile manufacturing laboratories:



Take a virtual tour through the different labs: <https://www.hs-albsig.de/studienangebot/bachelorstudiengaenge/textil-und-bekleidungstechnologie/virtueller-rundgang>

Facts & Figures

Our University



Notice: All numbers are rounded



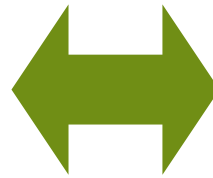
Learning & didactical concepts

Flexible teaching-learning setting: blended learning

Combine advantages of distance learning and presence learning



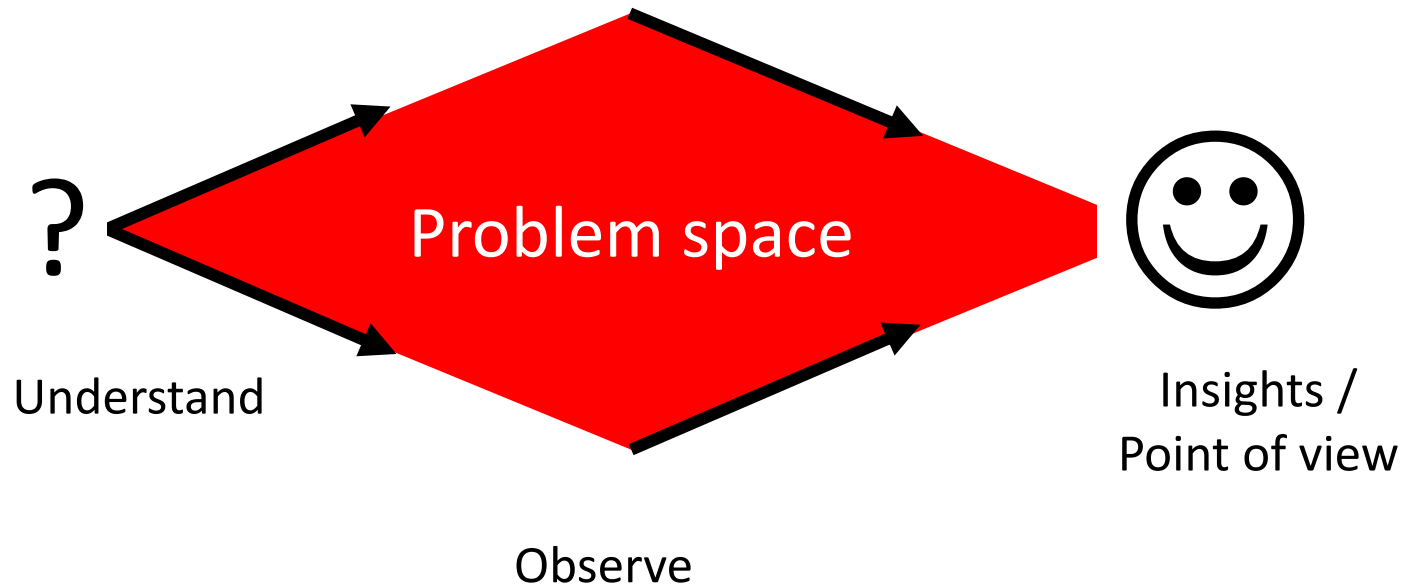
Hands-on work on products and social interaction
between users with different backgrounds



any content can be learned and repeated
individually at own pace and at any location

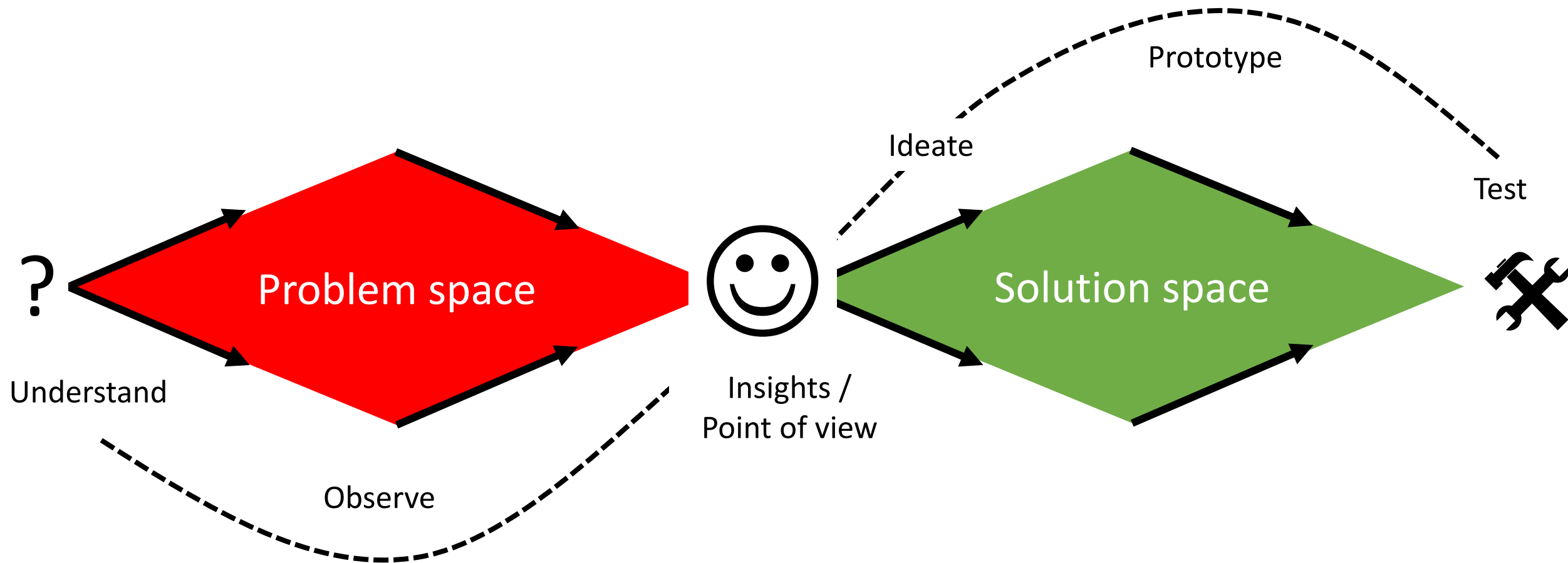
Development approach

Phases of Design Thinking



Development approach

Phases of Design Thinking



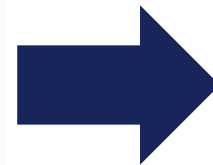
More motivation through gameful experience in learning

Changes in the lecture CAD construction 2



Experiences: Get students to draw helps them create links

Example for cognitive maps for technical specifications



Experiences: Changing the teaching environment

..motivates and playing helps to get brings new ideas



Experiences: Changing the teaching environment

..motivates and playing helps to get brings new ideas

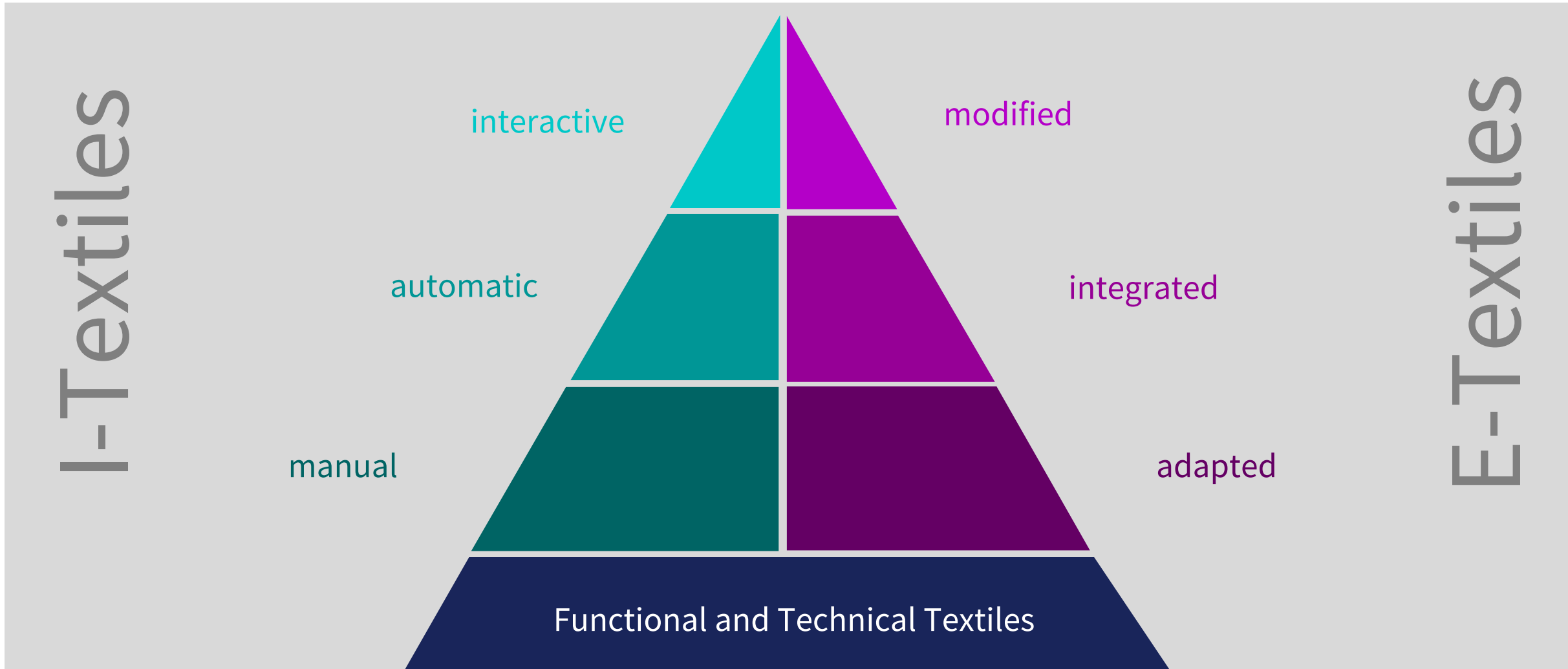




New approach for Smart Textiles

What are smart textiles?

The difference between I- and E-Textiles



Generational shift ...

... to modified textiles



(a)



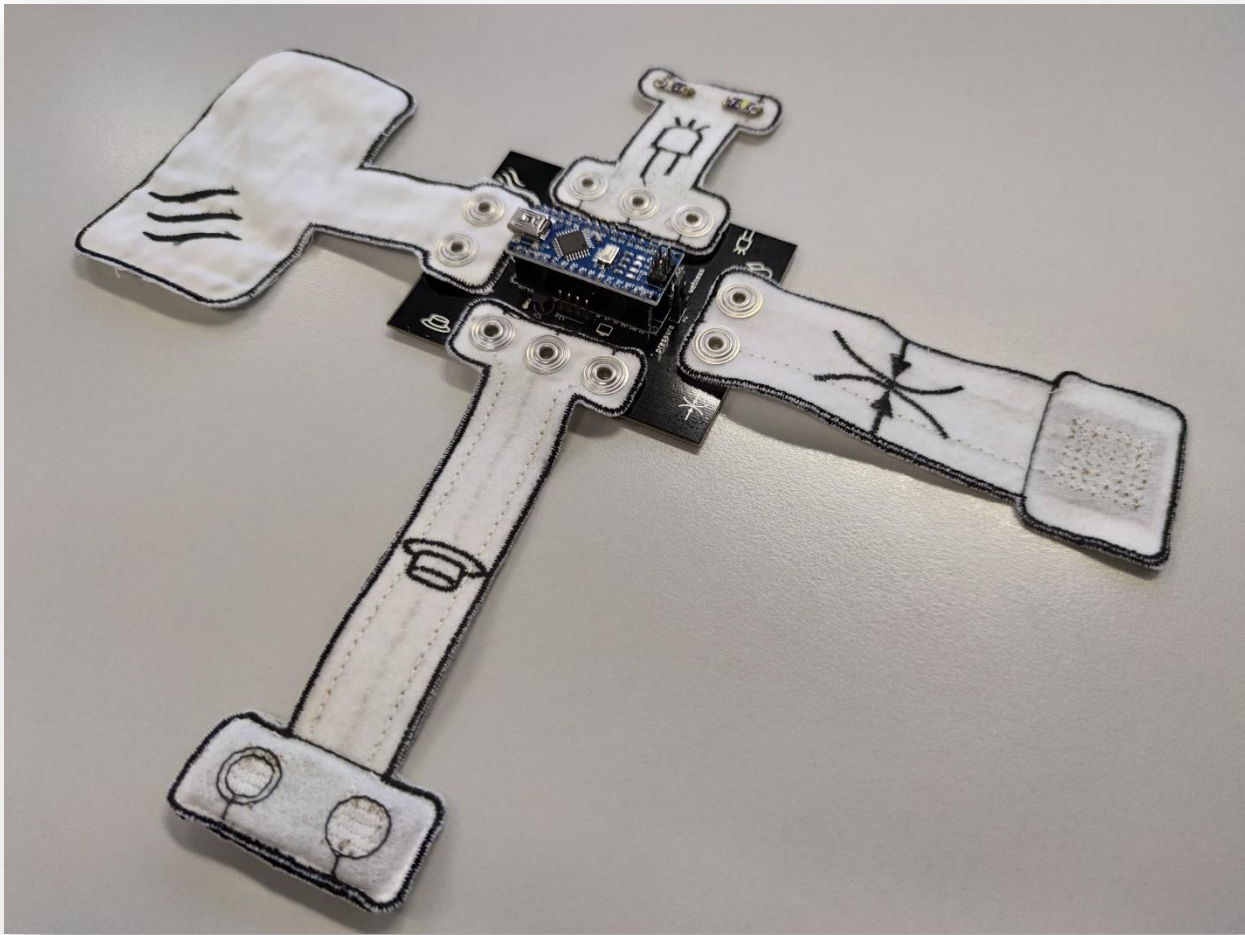
(b)

Smart textiles might sense, process, and transmit data about you – and maybe you can't see it...
That data could be your location, activity, movement, vital signs, and so on...

Picture source: https://www.researchgate.net/figure/The-comparison-of-the-two-generations-of-Wearable-Health-Systems-WHS-a-Wearables_fig1_303555837/; 18.11.2018

WEARIC Smart Textiles Kit

Promoted as the world's first do-it-yourself package with textiles sensors



The set includes as core piece an expansion board with an Arduino nano-controller.

Furthermore textile-based sensors and actors for

- pressure
- wetness
- heating

In addition there are push-buttons and sewable LEDs.

Experience

- a good entry point to the topic of smart textiles, but impossible to realize own products
- System cannot be integrated in an advanced prototype as it is too big and not washable.

A closer look

Example: Textile based pressure sensor



Set up

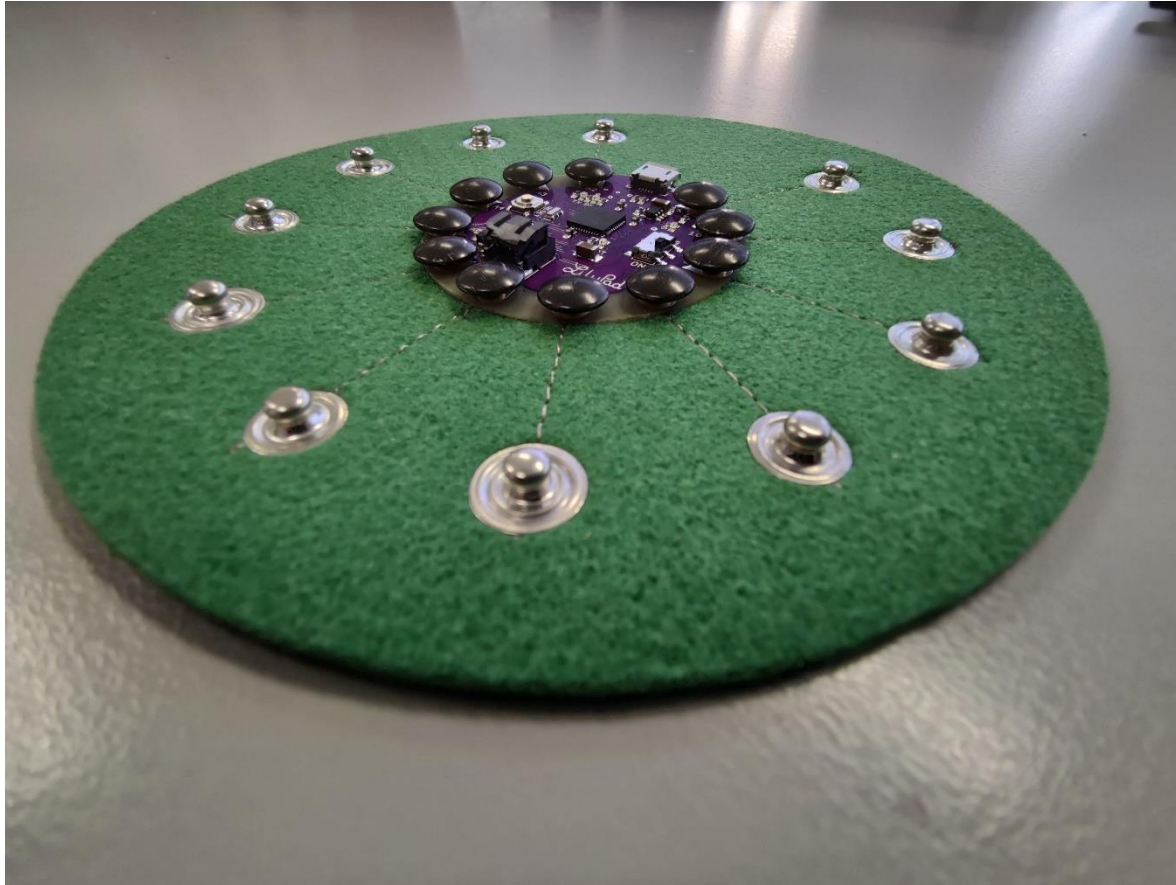
- embroidered net
- distance fabric

Application

- Occupancy detection e.g. on chairs,
- pressure distribution e.g. in shoes
- weight measurement
- Use for gamification in teaching



Source: <https://eveprocom.de/shop/sonstige-eventmodule/hau-den-lukas-kaufen/> ; 25.11.2020



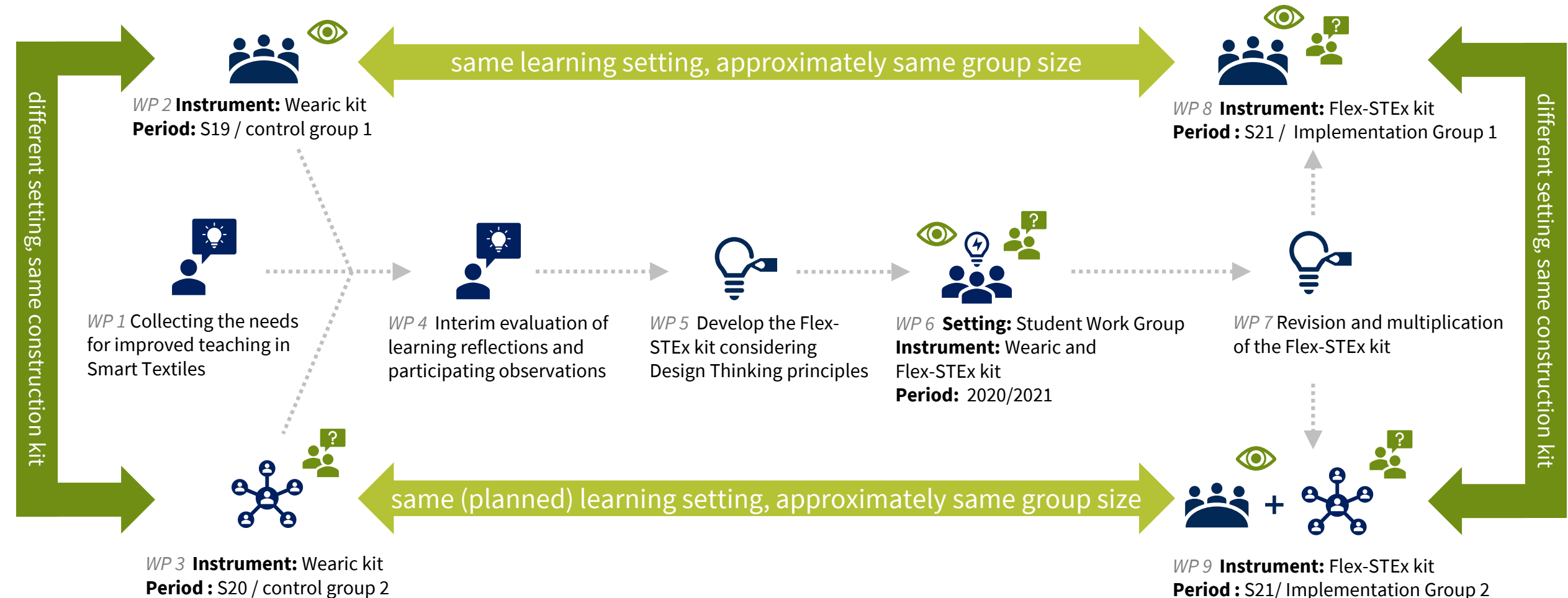
- Tests with conductive yarn (different products with different machines and various settings)
- Examination of the conductivity of different snap fasteners and different materials
- Use of hollow rivets for contacting and fastening of circuit boards
- Textile based components with advanced functions (heating, elongation, environmental parameters, etc.)



Recap & Outlook

Overview development

Professional expertise for the development of Smart Textiles products





Questions? Comments?

Please get in touch via braeuning@hs-albsig.de