EDUCATION FOR SUSTAINABLE DEVELOPMENT IN INTERDISCIPLINARY TEAMS OF STUDENTS AT DHBW

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Abstract *This paper presents the Centre of Interdisciplinary Education and Research (INDIS) of the DHBW with its concept for teaching and learning. In addition to the teaching and learning formats, the cycle and the sessions in which the students work on thematic challenges are also addressed. The challenges are based on education for sustainable development (ESD) and can be assigned to three of the UN's Sustainable Development Goals. The student teams are interdisciplinary and study in the fields of health, social services, engineering and business. The impact on the development of the competencies of management students is therefore additionally emphasized.*

Keywords interdisciplinary, Education for Sustainable Development (ESD)

1 INTRODUCTION INDIS

INDIS is a multi-location and cross-faculty centre at the DHBW. It represents interdisciplinary cooperation in teaching, (teaching-integrated) research and transfer. The centre is coordinated by the DHBW Stuttgart and has offices at the DHBW Mannheim and the DHBW Villingen-Schwenningen [1].

The main objective of INDIS is to promote interdisciplinary competencies, cross-faculty and multi-location cooperation, as well as the implementation of interdisciplinary teaching and research. On the basis of real application-oriented topics, the look beyond the edge of one's own discipline is made possible [1]. The INDIS does not exclusively refer to students. Teachers receive support in the implementation of interdisciplinary cooperation between students. The Dual Partners (Partner companies) profit from a systematized theory-practice transfer, from new exchange opportunities and from interdisciplinary trained students and graduates [1]. The INDIS also cooperates with other centres at the DHBW to promote university-wide networking. The resulting findings are in turn processed for further development of the INDIS.

2 THEORETICAL FOUNDATION/TEACHING IMPLICATIONS
CONCEPT TEACHING AND LEARNING IN INDIS

(HIGHER) Education for Sustainable Development

Education for Sustainable Development (ESD) is a holistic and transformative educational concept of UNESCO [2]. For this purpose, the National Action Plan for Education for Sustainable Development for all areas of education was published in 2017 [3]. This incorporates the 17 Sustainable Development Goals of the 2030 Agenda of the United Nations as a basis for shaping sustainable development in accordance with social justice, on an economic level and the ecological limits of the earth. This means that in addition to research activities on sustainability, to the various guidelines or to anchoring

sustainability in structural and development plans, sustainability must also be taken into account in teaching in higher education. Students and graduates should be encouraged and supported as central shapers of sustainable development and be able to seriously participate (field of action IV [3]). One of the goals here is the full integration of ESD/sustainability into the curricula of the study programs in interdisciplinary and interfaculty courses for the acquisition of the necessary competencies.

Through ESD, INDIS aims to prepare students to actively deal with problems of sustainable development and to find common solutions. Hereby technical, ecological, social, health-related, economical, and cultural aspects are included [4]. The topic of sustainability plays a role in many areas and is suitable to be worked on in interdisciplinary teams.

Cycle and Sessions

The implementation of the INDIS components intra- and extracurricular teaching is based on the concept of approx. 6-12 months long cycles depending on the time budget or ECTS points (European Credit Transfer and Accumulation System) be obtained from affiliated modules [1]. The five central components to the implementation are challenges (topics/research focus), coaching (individual online supervision of a student team), sessions (online impulses or lectures with workshop parts), products and outcomes (artifacts to solve the challenge) and milestones (major INDIS events in presence[1]). External experts are invited to the sessions, who give impulse lectures for the students and relate thematically to the challenges (figure 1).
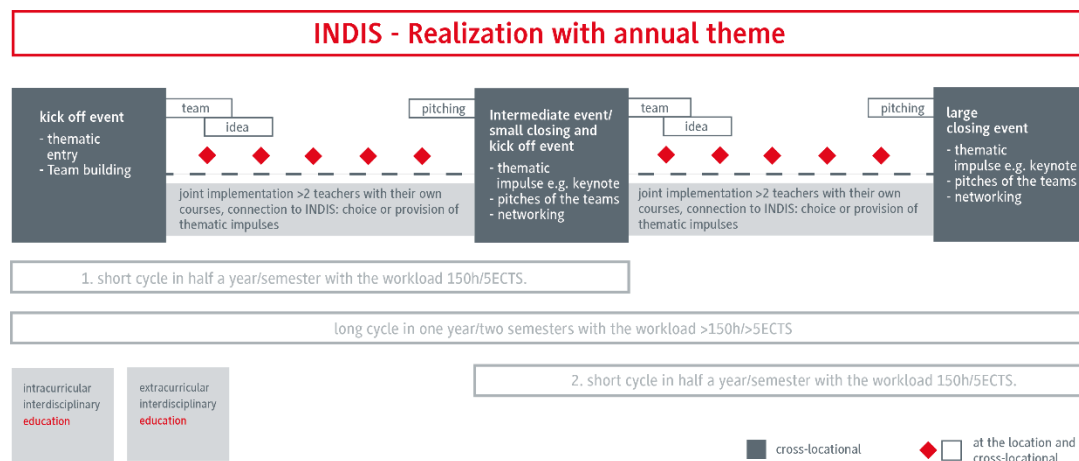

figure 1: INDIS cycle 2021/22 [1]

In addition, there are workshops in which skills such as presentation techniques or design thinking are taught. The student teams present their work progress in regular intervals within the INDIS sessions to get feedback from external experts and fellow students. The feedback will be implemented by the INDIS project teams during the sessions working phase, where the teams may ask for help from the

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[1] If events in presence are not realizable due to the pandemic the events will be held online.

INDIS project team. The final results will be presented during an interim and closing event, depending on whether the six- or twelve-month cycle was chosen.

Challenges

The INDIS cycle's motto is: „INDIS – takes action for Sustainability ". Guided by the United Nations Sustainable Development Goals as a framework for our work and challenges, this year's cycle orientates on the following SDGs (figure 2).

figure 2: The three Sustainble Development Goals of the INDIS cycle [5]

INDIS distinguishes between project challenges and impulse challenges. In project challenges concrete problems are worked on and the goal is defined beforehand. The Impulse Challenges give students more freedom for creativity and allow them to set their own goals within the context of a topic area. In addition, students, teachers and (dual) partners as well as external experts can also contribute their own ideas for challenges. All Challenges address a real life problem and contribute to a more sustainable future through innovative solutions (table 1).

table 2: Challenges in INDIS cycles 2021/22 (status: February 2022):

Project Challenges	Impulse Challenges
• Beverage delivery with e-scooters • More green areas in cities • Exoskeletons in real estate • Sustainable financing options for a safe bicycle storage solution	• Sustainable social space development to promote intergenerational and intercultural exchange and civic engagement • Making cities more inclusive, safe, resilient and sustainable

Teaching and Learning Formats

At INDIS students obtain new knowledge and competencies through a combination of academic studies and applied learning – in line with the mission of the DHBW [6]. Therefore, didactic formats that focus on academic research on real problems such as research-based learning, problem-based learning, evidence-based learning and service learning come into use [7]. A special feature of INDIS is that practice-oriented teaching and learning is basically implemented in online formats rather than in face-to-face sessions. The online formats offer a number of advantages for INDIS: It is the only way to bring students and lecturers together across locations and courses of study on a regular basis. Experts can be selected and invited according only to their expertise. Travel routes and travel times do not matter. By using main and breakout rooms the online sessions offer an appropriate way to implement

the mix of impulses, lectures, workshops and group work. And last but not least, in the online sessions tools can be used that enable and facilitate collaborative and project-related work within the student teams and with the lecturers, f.e. Concept Board und Mozilla Hubs. In addition to online teaching and learning formats, students and teachers of INDIS use the Moodle platform to exchange documents and announcements.

Development competences of management students

In INDIS, students of management learn the perspectives and methods of the other disciplines. Through the interdisciplinary problems of the challenges, they come to a holistic solution together with students from other courses of study. Students take away an understanding of other ways of working and personalities for their future work in management. Thus, the INDIS develops not only the interdisciplinary skills of the students but also the social-personal, methodological and operational skills. In addition, management students and graduates want to be encouraged and supported as key designers of sustainable development and be able to participate seriously.

3 OVERVIEW OF THE WORKSHOP AND SESSION DESCRIPTION

In our complex world, higher education institutions are faced with big challenges and transformation, in education. Due to internal and external developments, upcoming trends and a new generation of students and societal shift, there is a significant need for changes in students' perspectives of the world of work and how they prepare for this, as well as in the higher education systems themselves [8]. All over the world, teachers in higher education institutions face major challenges in adequately preparing students for the future while keeping societal and professional challenges in mind. In the face of challenges, educators need to develop innovative approaches to create contemporary, relevant and engaging teaching and learning. They need to strike a balance between the need to deliver a standardised curriculum and meet the expectations of various stakeholders as well as society.

The goals of the 90-minute workshop are to accelerate ideas and to create a network of individuals who are interested in these topics and, moreover, are willing to enhance the theoretical and practical knowledge of the participants of the MOBTS conference.

A round table discussion is planned. Initially, the INDIS centre and its pedagogical framework will be described, and best practice approaches will be presented. In this format, MOBTS participants from different international organisations and universities will have the opportunity to give feedback to the INDIS approach and to present their approaches in the field of cross-curricular collaboration and sustainability orientation, including their methods and use of innovative tools as accelerators for more personalised learning that facilitates global teaching. In the presentations, participants will describe their role and teaching responsibilities within their institutions, the particular challenges they face in their daily work and the approaches to overcome these challenges. They also describe how their teaching and learning formats develop the interdisciplinary skills of management students. There will be a moderated discussion and visual documentation by the INDIS team during the exchange.

This INDIS roundtable discussion will interactively demonstrate how teachers from different countries can address and tackle these challenges and how interdisciplinary collaboration across degree programmes can be used to pioneer new socially relevant ideas, better teaching and collaborative learning in the classroom. Participants will return with great ideas and profound insights to improve

student engagement and achievement by applying innovative tricks and tools and gaining access to a supportive network of international colleagues.

4 CONCLUSION AND OUTLOOK

In general, project-based and interdisciplinary learning in higher education helps to increase students' sustainability awareness and engagement in solving social, environmental or societal problems in the world [9]. The INDIS round table discussion will describe the pedagogical framework of this innovative project and highlight best practice approaches. Furthermore, concrete recommendations for educators will be addressed and the implementation of interdisciplinary work on real-life challenges and project-based learning in the regular curriculum will be discussed. The application of this innovative format at other international universities or with other student groups is recommended. In this case, the project presented must be adapted to country-specific requirements and needs.

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