

UN GLOBAL COMPACT
COMMUNICATION ON ENGAGEMENT

KEA'S SUSTAINABILITY REPORT 2018 - 2019

kea

COPENHAGEN SCHOOL OF DESIGN
AND TECHNOLOGY



FOREWORD

THE WHOLE INSTITUTION APPROACH
IS THE FUTURE OF KEA

06. Welcome Readers

08. Statement of continued support
to the UN Global Compact by Rector
Steen Enemark Kildesgaard



CAMPUS

MOVING CAMPUS AND
INTERNAL OPERATIONS TOWARDS
A SUSTAINABLE FUTURE

14. About KEA

16. Facilities and maintenance



EDUCATION

EDUCATION FOR SUSTAINABLE
DEVELOPMENT

22. Education for sustainable
development

24. KEA's 10 didactical principles
and a United Lab Strategy

30. KEA Build

36. KEA Design

42. KEA Digital

46. KEA Tech

52. KEA Competence

54. Material Design Lab



APPLIED RESEARCH & INNOVATION

APPLIED RESEARCH AND
INNOVATION TO UNDERPIN THE
EDUCATIONAL KNOWLEDGE BASE
FOR SUSTAINABILITY

60. Applied Research and Innovation
at KEA

62. Applied Research and Innovation
at KEA Build

64. Applied Research and Innovation
at KEA Design

68. Applied Research and Innovation
at KEA Digital

70. Applied Research and Innovation
at KEA Tech

72. PhD Dissertation: Material
knowledge – a missing link to
sustainable design



PARTNERSHIPS & COMMUNITY

STRENGTHENING PARTNERSHIPS
AND COMMUNITY ENGAGEMENT
TO UNLEASH INNOVATION FOR
SUSTAINABILITY

76. Sustainable Fashion Beyond
Borders

78. The Charrette – promoting
sustainability through global
community engagement

80. Strong partnership to promote
entrepreneurship with social
responsibility and sustainability in mind

88. Memberships and KEA's
Sustainability Network



APPENDIX

92. Other examples of projects and
activities related to sustainability
and social responsibility



FOREWORD

THE WHOLE INSTITUTION APPROACH IS THE FUTURE OF KEA



FOREWORD

WELCOME READERS!

WELCOME ALL READERS TO THE COPENHAGEN SCHOOL OF DESIGN AND TECHNOLOGY'S (KEA) – COMMUNICATION ON ENGAGEMENT (COE) REPORT 2018-2019 TO THE UN GLOBAL COMPACT.

This report is KEA's third submitted COE and it is a selection of KEA's work with sustainability and social responsibility in accordance with the 10 UN Global Compact principles, the UN Sustainable Development Goals (SDGs) and other perspectives regarding sustainability. We are proud to state that this report is a result of an interdepartmental effort as almost every department at KEA has contributed. We wish to use this opportunity to thank everyone at KEA for their important contribution.

Through the report you will become familiar with KEA as an institution, its identity and diversity. The selection of cases provided in the report shows the innovative drive of our educators and students, and it highlights the crucial role of educational institutions. As an educational institution we host the change agents of the future – within the Build, Design, Digital and Tech worlds and we are committed to preparing them well to be competent in making changes to advance sustainability within the different industries.

KEA's Management has been deeply involved in the whole process of the report's development; a proof of the commitment that the whole institution has to the sustainability agenda. The COE Report and the work around it also acts

as a point of reflection for KEA to identify and highlight, both internally and externally what we already do well, what we can learn from good practices, and where there is room to still make improvements and think sustainably.

It has been our aim to give the students of KEA a strong voice in this report and include statements and testimonies throughout each section. However, it became a challenge to collect such within the COE deadline due to the COVID-19 crisis and the physical shut down of the KEA campus for a longer period. After the report submission, we will however make their thoughts, voices and initiatives around sustainability heard and visible. It is the DNA of KEA to work with a student-centred approach and we will work towards a stronger involvement of students based on co-creation principles in KEA's work with sustainability.

We hope that this report will serve as inspiration in working with sustainability and social responsibility and we urge other institutions and organisations to contact KEA, should you wish to know more about our work. With this report, we wish to make an open call for the creation of new partnerships in education for sustainability, as it is not a straightforward road to take. It is a trail we blaze while journeying and hence the more experience and knowledge we gain, the more ideas and innovation we can unite around, the better prepared we will be to actually succeed in moving in the right direction at the pace that sustainability calls for – the COVID-19 crisis only highlights that need to pick up the pace.

STATEMENT OF CONTINUED SUPPORT TO THE UN GLOBAL COMPACT

At KEA we are proud members of the world's largest corporate sustainability initiative: the UN Global Compact, and I am pleased to confirm that KEA reaffirms its support of the United Nations Global Compact and its ten principles in the areas of Human Rights, Labour, Environment and Anti-Corruption.

SUSTAINABILITY IS EVERYWHERE

Finally, sustainability is on the global agenda, from high-level politicians to people in the streets. The industries, for which we prepare our students, have realised that they need employees who are innovative, creative and have a sustainable mind-set. They need people who are not afraid of thinking critically and simultaneously outside of the box and are able to experiment to come up with new solutions to problems, which the world is facing.

Our mission for education, which is to equip our students with the theory and hands-on skills needed by the industry, will not change anytime soon. However, the flavour and the skills and competences will change towards being able to drive sustainability. This is what industries are demanding and what our world needs. As an educational institution, we are obliged to push for sustainable development, and we can do this by cultivating our students to be skilled and competent change makers for sustainability.



Our mission for education, which is to equip our students with the theory and hands-on skills needed by the industry, will not change anytime soon. However, the flavour and the skills and competences will change towards being able to drive sustainability.

– Steen Enemark Kildesgaard

FOREWORD

A DEEP UNDERSTANDING OF EDUCATION FOR SUSTAINABLE DEVELOPMENT IS NEEDED AT KEA

At KEA we work with sustainability in its broadest sense – from social responsibility to green solutions and in addition to the UN Global Compact and its ten principles, we also work with the the 17 UN SDGs. The broad scope of the SDGs makes sense to KEA, as we deliver employees to many different industries – from design to ICT to construction to tech.

In working with sustainability and the SDGs, we must refrain from greenwashing and acquire a deep understanding of sustainability in all our programmes. It is crucial that we create space and spend proper time to attain this through reflection, cases and experiments as part of the different programmes and to increasingly initiate research and innovation projects we need to build up the competencies and skills of our teachers. How can we design and produce clothes in a sustainable manner? Should we rethink our approach to lifestyle and production? How can we design buildings that produce less carbon emissions? These are examples of very relevant problems to address that we put forward in our programmes and we need to keep questioning business as usual and new ways of doing things to figure out what is really, actually sustainable and then, crucially how to do it.

HOW TO BE SUSTAINABLE – COMPETENCES AND SKILLS NEEDED IN EDUCATION

We at KEA are educating the work force of the future and sustainability must be a part of all our programmes. Luckily, it is already part of many of them, but we can keep improving and investigate further, how we are to educate for sustainability.

We excel at training in hard skills needed in our relevant industries; however, we must remember to include soft skills when dealing with sustainability. Critical thinking, for instance, is a very important soft skill for sustainable development. For example, as a programmer, you need to know how to work with data and how to code but you should also be able to take a critical stance towards digitalisation and technology and the coding you are doing. How do you code in a sustainable manner?

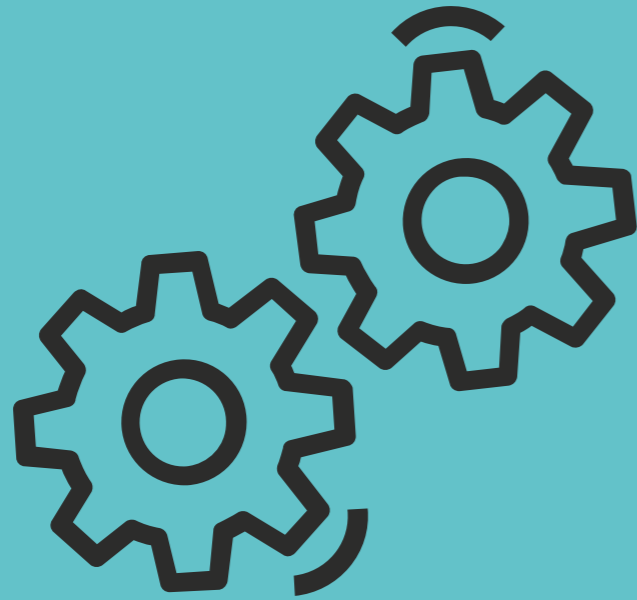
THE WHOLE INSTITUTION APPROACH IS THE FUTURE OF KEA

I am sure that sustainability will be highly ranked in our upcoming strategy 2020-2023 and all the work for sustainability which is already ongoing at KEA shows that it is already well implemented at KEA.

I believe that in order to successfully educate for sustainability we need a whole institution approach and we need to improve our efforts in relation to our campus and maintenance. We need to look at our buildings, our use of energy, waste management and involve the whole institution in how we can - not only educate for sustainability – but also act sustainably in our daily administration.



Steen Enemark Kildesgaard
Rector



CAMPUS

MOVING CAMPUS AND INTERNAL OPERATIONS
TOWARDS A SUSTAINABLE FUTURE

ABOUT KEA

KEA is an academy of higher education that offers more than 30 different degree programmes at Bachelor (BA) and Academy Professional (AP) levels, as well as further/continuing educational programmes.

KEA provides higher education that combines theory with practice and has close cooperation with businesses and educational institutions in Denmark and abroad. KEA offers a wide range of programmes in Danish and/or English within the fields of **Build, Design, Digital** and **Tech**, as well as **Competence** for part-time and continuing education. We have students from more than 70 different nations.

KEA is located in Copenhagen with campuses at Guldbergsgade and Prinsesse Charlottes Gade in the Nørrebro area, and Lygten 16 and Lygten 37 campuses in the Bispebjerg area. Our part-time programme campus at Frederikkevej is located in the suburb of Hellerup.

INCLUSIVE WORKPLACE

As a public educational institution, KEA is governed by Danish legislation which complies with human rights, labour rights and anti-corruption principles.

It is important for KEA to be an inclusive and socially responsible workplace, where we exhibit social responsibility in our hiring practices and in everyday life and operations. KEA has developed a code of conduct which includes conduct rules, safety regulations and house rules. In this conduct it is stated that both students

and staff at KEA must be considerate and contribute to a constructive, open and uninterrupted working environment.

The dialogue between students and staff and between students must rest upon openness, equality and respect for the individual and their attitudes. KEA respects the principle of religious freedom and considers religious practice as a personal and private matter. We value diversity among students and employees, and we aim to create well-rounded individuals.

KEA is working purposefully to integrate employee groups that for various reasons face difficulties obtaining and retaining employment in the labour market. Therefore, we are investigating the possibilities of creating jobs on special terms. We have employees in flex jobs, company internships and payroll / job training.

WORK ENVIRONMENT ORGANISATION

KEA has a strong work environment organisation in accordance with the Danish legislation which governs public institutions.

The organisation is established and functioning well to take care of the working environment at KEA and ensure that management and employees work together on safety and health. It is our intention that with a strong working environment organisation, we create and maintain a cooperation that focuses on a good and safe working environment and the well-being of employees and students.



KEA'S PROGRAMMES

32 FULL-TIME PROGRAMMES AT BACHELOR AND ACADEMY PROFESSIONAL LEVELS

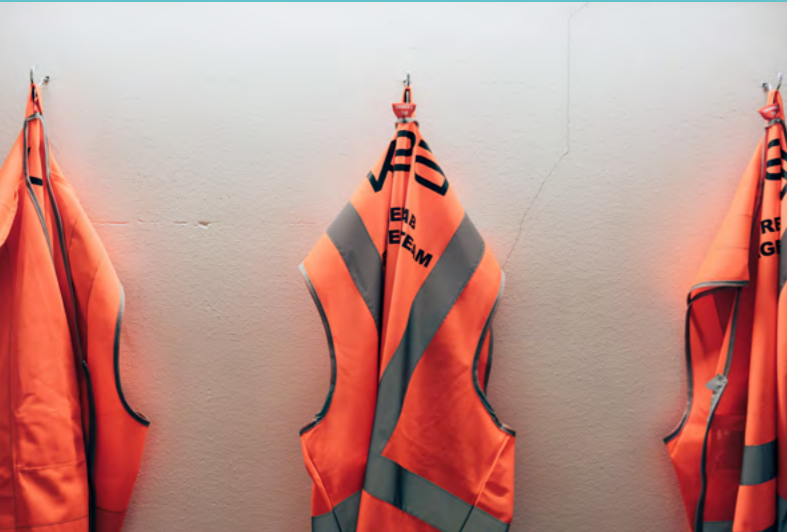
11 OF THE 32 FULL-TIME PROGRAMMES ARE INTERNATIONAL

27 PART-TIME PROGRAMMES INCLUDING MORE THAN 150 MODULES AND COURSES





Engineer Kurt Hansen employed at KEA Facility became the winner of the Golden Thermostat in early 2020. The award was granted by the utility company HOFOR.



CAMPUS

FACILITIES AND MAINTENANCE

KEA Facility is the unit at KEA which handles the daily operations and maintenance related to our campuses and its surroundings. Sustainability and social responsibility are important elements in this work with a special focus on energy, waste management and procurement.

KEA Facility is constantly working to raise awareness on aspects of sustainability within the campuses and its operations among both students and staff to foster a general understanding of the value it brings in taking care of the resources at KEA and pushing for an understanding that it is our common responsibility to promote the sustainable development agenda.

NEW BUILDINGS AND ONGOING RENOVATIONS

In recent years, initiatives have been taken to significantly improve KEA's building stock in order to continuously optimise the use of resources in the supply area. Two Campus Building contracts have been terminated, and these have been replaced by a new lease attached to the large campus at Guldbergsgade in Copenhagen, where contemporary installations are instrumental in reducing consumption in relation to supplies.

Several initiatives have been taken at another of KEA's Campus locations (Princess Charlottes Gade 38) to significantly reduce heat consumption, including: optimisation of the heating plant, a thorough cleaning of all exchangers and filters have been improved. Furthermore, over 300 dynamic radiator valves have been replaced and this provides a much better heat utilisation, which is

further increased by improved control of both heat and ventilation. Due to these initiatives, Engineer Kurt Hansen employed at KEA Facility became the winner of the Golden Thermostat in early 2020. The award was granted by the utility company HOFOR and given towards a person who has made a significant contribution to energy savings and made an extraordinary effort in the work of intelligent energy management.

The older buildings at the various addresses have undergone several major renovations such as an improvement to the building envelope through installation of new front windows and thermo-windows in several of the buildings.

At KEA's Campus at Lygten 16, central heating has been renovated with great importance for improved heat management at the address.

The heat exchangers at all KEA's addresses are "closed" during the summer; all central heating is closed correctly from the beginning of May to mid-October, and this procedure results in a noticeable saving on heat consumption.

From 2018 to 2019, an average of 16% savings on water and heat consumption was achieved at KEA's addresses.

ENERGY OPTIMISATION

Lighting at all addresses is continuously changed from conventional to intelligent LED lighting, where typically a saving of 30-50% of the power consumption is achieved.

CAMPUS

As far as possible, KEA Facility is trying to standardise the lighting with similar luminaires at all addresses and this will in the long term limit the need for different light sources and spare parts, and thus optimise the procurement processes.

Facility management is carried out centrally using various CTS systems at the addresses where the different systems can be observed from a digital monitoring system. In addition, KEA users report service disruptions via the Service Desk, so improvements can be made as soon as possible.

KEA Facility janitor team is continuously trained through courses in operation and maintenance of technical installations, in order to gain a better understanding of everyday energy optimisations at KEA.

In addition, KEA Facility is working to create a common culture at KEA with a focus on energy use, inviting the individual user to understand how him/herself contributes to this by exhibiting behaviour that takes energy consumption into account.

PROCUREMENT AND PURCHASE

KEA gives high priority to corporate social responsibility. Vendors related to cleaning services at KEA commit to exercise corporate social responsibility as formulated in the Convention, which underlies the UN's 10 Global Compact principles. All vendors related to cleaning services have to commit to a CSR declaration drafted by KEA before they take on services for KEA. It is the firm intention of KEA that all future procurement through all kinds of vendors will

16% **SAVINGS ON WATER AND HEAT CONSUMPTION WAS ACHIEVED AT KEA'S ADDRESSES FROM 2018 TO 2019**

include specific CSR requirements and all vendors will have to commit to a CSR declaration.

When KEA Facility uses SKI suppliers (the Danish centralised public procurement unit), the tender documentation takes into account the 17 UN SDGs, and the suppliers have thus been tested for their ability to meet these requirements. In addition, KEA Facility limits the number of deliveries by collecting purchases to avoid unnecessary transport. KEA Facility also makes energy-saving purchases focusing on TCO (Total Cost of Ownership), both from an economic point of view and from the overall energy account (CO²).

WASTE MANAGEMENT

Sensors are mounted on waste containers at KEA, which ensures that emptying only takes place when a container is filled, again to avoid unneeded transport which is a waste of resources.

Furthermore, an emptying agreement has been established so that food residues / bio-waste from a tank at the canteen kitchen at the Guldbergsgade campus is

shipped to Solrød Biogas A/S and is converted to CO²-neutral fuel.

Waste sorting is a continued area of focus and coordinated efforts are underway in 2020, with optimisation requiring joint efforts by all stakeholders at KEA.

MAKERLAB

KEA Facility also oversees the daily operations of KEA Makerlab. Makerlab is KEA's prototype workshop and it focuses on both recycling of materials and waste sorting. In the actual print production, the workshop's 3D printers use only bioplastics (PLA), and work is being done on recycling excess ink from textile printers to screen-printing.

Efforts are also being made to integrate sustainable technology into the screen printing process, which, in addition to shortening the process, will also eliminate the use of harmful substances and contaminated water.

KEA HOUSING

KEA Housing offers accommodation for our international students. We practice non-discriminatory administration and allocation of rooms. When matching flatmates we consciously mix students from different national and educational backgrounds.

It is our aim to enhance students' cross-cultural experience, understanding and competencies in a broad sense. We view this as a first and necessary step towards putting an end to discriminatory practices if and whenever our students might come across them in the future.





EDUCATION

EDUCATION FOR SUSTAINABLE DEVELOPMENT

EDUCATION FOR SUSTAINABLE DEVELOPMENT

KEA operates 4 full-time educational departments: **Build, Design, Digital** and **Tech** as well as a part-time department: **Competence**. Within this chapter, you will be introduced to each department's perspectives on sustainability and read about specific teaching cases and projects where educators and students have worked with aspects of sustainability and social responsibility and the cases and projects serve as good practice examples.

In many educational programmes at KEA, sustainability is not just a subject, it has everything to do with practice. It is something that is integrated into the way we produce, select materials, design, disseminate and work within our various technical and design programmes. We believe in a practical approach in the many different forms that sustainable development can bring to our daily work that includes everything from systemic change, accommodating new patterns of conscious consumption, transition to greener business models, and measurable and effective optimisation of products and solutions that minimise environmental impact.

Each programme has its own way of doing so: some have SDGs integrated throughout their whole curriculum and design strategies that maximise focus on changing consumer and production mindsets. Others look at technological solutions and focus on quantified and data driven decisions that help minimise material and energy consumption and climate impacts. Most importantly what we have in common are engaged students and staff who push the agenda forward every day and a commitment to working with sustainability not only as a theoretical concept,

but one that is addressed in practice with companies and organisations in our ecosystem and the world at large.

At KEA an analysis was conducted to illustrate the breadth to which "sustainability" is included in the various full-time programmes as a matter of official coursework, subject matter, and the learning outcomes of the coursework. In the red box are a few highlights from the text analysis.

There is an expectation that in the coming months and years, the breadth of inclusion of sustainability directly into the curriculum will only increase, hopefully building on these numbers. While the numbers speak for themselves, there is always room for improvement. Namely, that there is currently only one programme that have the SDGs specifically integrated into the curriculum's learning outcomes. Despite this, it belies the fact that the way that many programmes choose to frame their discussions about sustainability is specifically centred around and through the use of the UN SDGs. It is our ambition that more programmes will make the choice to explicitly include SDGs into their curriculums. In the least, in our future reporting we will have a more specific measurement of to what degree SDGs find themselves embedded into individual programmes either explicitly as part of the stated curriculum or implicitly as part of the chosen course materials to meet sustainability learning outcomes.

Before we introduce each department, we would like to introduce KEA's 10 didactical principles as these serve as the foundation for all our programmes and how we approach teaching and didactics at KEA.



OF 32 FULL TIME EDUCATIONS AT KEA:

19

EDUCATIONAL PROGRAMMES HAVE SUSTAINABILITY INTEGRATED INTO THEIR STUDY CURRICULUMS AND THE WORD "SUSTAINABILITY" IS USED 182 TIMES

111

SPECIFIC LEARNING OUTCOMES ARE RELATED TO SUSTAINABILITY

30

INDIVIDUAL SUBJECTS OR MODULES ARE RELATED TO SUSTAINABILITY SPECIFICALLY



EDUCATION

KEA'S 10 DIDACTICAL PRINCIPLES AND THE DEVELOPMENT OF A UNITED LAB STRATEGY

KEA's teaching matches the demands of tomorrow's business and industry. At KEA, theoretical knowledge is turned into practice and KEA wants to be able to take technology and digital development into the future.

During 2018 and 2019, KEA has defined a set of pedagogical principles for its staff. The principles determine the didactic efforts and pedagogical progression and make up a common framework for KEA as a whole. The principles help justify the relevance of KEA in a world with immense wide-ranging challenges and create the foundation for innovative thinking and solutions which can promote more sustainable living. The principles entail the build-up of student's competences which to a high degree correspond with UNESCO's - United Nation's Organisation for Education, Science and Culture - definition of competences for sustainability (UNESCO, 2017).

Furthermore, the 10 principles focus on a learner-centred approach and on action-oriented and transformative learning, which UNESCO also highlights as pedagogical approaches necessary to support education for sustainable development (UNESCO, 2017). The work around the principles and the implementation of them has been initiated, as KEA recognises that it is the capital's leading institution of higher education in applied sciences in the overlap between technology, design and business. Therefore, it is the responsibility of KEA to ensure that KEA graduates bring new knowledge and innovation to the industries and have the competences needed to put it into practice.

DEVELOPING A UNITED LAB STRATEGY

To support the implementation of the principles, KEA has made a different range of Labs accessible and available for all programs and has initiated the development of a United Lab Strategy. In the Labs students build knowledge of new technologies, both analogue and digital, and students are trained in practical skills, which are or will be valuable in the labour market and contribute to the development of the industries' practices.

KEA knows by experience that working in Labs increases students' experimental skills, skills in collaboration in their own field and also it enables interdisciplinary collaboration. The Labs simulate the environment that graduates will be part of in business after graduation, however they are offered space and time to experiment in these environments, for them to be able to ask critical questions and to challenge the way the environments are constructed.

Again, this goes back to KEA's will to unleash the innovation and creativity in the students for them to become change agents in the industries for sustainable development. Labs are essential for learning at KEA along with the 10 pedagogical principles.

1

The knowledge cycle

THE LINK BETWEEN OUR PROGRAMMES, RESEARCH AND INNOVATION AND THE LABOUR MARKET

At KEA, we develop new knowledge in close collaboration with other research institutions and the labour market that we are preparing our students for. As an institution of higher education in applied sciences, one of our main purposes is to apply research-based knowledge in close collaboration with business and industry. KEA's teachers take part in research and innovation projects. This way we ensure that national and international research is naturally and continuously integrated in the teaching. In KEA's programmes, the students are part of the connecting link between the labour market and new knowledge. This means that the students are given an opportunity to help create new knowledge and overcome real challenges faced by companies, organisations, other knowledge institutions and international partners.

2

Relevance

RESPOND TO THE DEVELOPMENT OF THE LABOUR MARKET WITH THE LATEST KNOWLEDGE, SKILLS AND COMPETENCIES

At KEA, we match the development of the labour market with relevant competencies. Our full-time programmes are organised so that the students have contacts with the business community on several occasions during their studies. This will allow them to gain the professional skills demanded by the labour market. The learning process of the part-time programmes draws on the students' own practical experiences. The teachers continuously develop their knowledge from the business community and bring this knowledge into play in the learning processes.

3

Practice-oriented teaching

TEACHING INSPIRED BY BUSINESS PRACTICE

At KEA, we know that practice and application-oriented teaching has a positive effect on students' learning outcomes and job readiness. Therefore, the programmes are organised to ensure that the students gain knowledge, skills and competencies that match the professions' practice, now and in the future. Furthermore, all the full-time programmes include internships of at least 10 weeks' duration. Teaching is based on specific issues from industries and professions, and the learning process is case-based and product and project oriented. This means that the students will regularly have to deal with specific issues and cases presented by external stakeholders. Especially in KEA's part-time programmes, the students' specialised experience is used for knowledge sharing and the creation of professional networks across different types of companies and industries.

4

General professional qualifications

AT KEA, WE TEACH AND TRAIN OUR STUDENTS TO BECOME PROFESSIONAL PLAYERS IN THE LABOUR MARKET

Our programmes are organised to ensure that our students gain or strengthen the qualifications commonly in demand. We focus on strengthening students' professional identity. We give the students relevant tools and concepts that will enable them to argue for and understand various industry and work processes. This will help strengthen their professional skills. The teaching is organised in a way that will allow the student to develop their collaborative skills, business understanding, their understanding of technology, their creativity and entrepreneurial skills, their understanding of sustainable production, as well as their global and cultural competencies.

5

Programme organisation

WELL-STRUCTURED PROGRAMMES THAT SUPPORT A PRACTICE-ORIENTED APPROACH WHICH IS TYPICAL OF AN INSTITUTION OF HIGHER EDUCATION IN APPLIED SCIENCES

At KEA, we know that clear and well-structured organisation is useful and ensures a better learning outcome. Our programmes are organised in a way that makes both structure and progression visible and clear to the students.

6

Learning management

CLEAR FRAMEWORK AND EXPECTATIONS

At KEA, we believe that the best learning outcome is achieved when the teachers set the framework for student learning. At KEA we identify the students' learning requirements. We organise learning situations in which the students take responsibility for their own learning and contribute positively to each other's learning. There is a natural match between learning goals and outcome in each module, which is crucial for students' learning outcome. The teachers organise a framework for the teaching which is based on scaffold learning strategies and active student participation. At KEA, the learning activities are teacher-driven as well as student-driven.

7

Varied teaching

AT KEA, WE KNOW THAT VARIED TEACHING HELPS BOOST STUDENT PARTICIPATION AND STRENGTHENS MOTIVATION

The learning process includes a mix of learning activities and teaching methods. This way the students become active learners, which helps them increase their learning outcome. The one thing that the learning activities and the teaching methods have in common is that they support KEA's practice-oriented approach.

8

Formative evaluation, feedback and assessment criteria

AT KEA, WE KNOW THAT FORMATIVE EVALUATION AND VARIOUS ASSESSMENT ACTIVITIES HELP CREATE LEARNING THAT IS RELEVANT TO BUSINESS AND INDUSTRY

Therefore, we focus on scaffold learning. Throughout the entire programme, students get feedback and sparring on their learning, their assignments and results—from fellow students and teachers as well as through self-reflection within a clearly defined framework. It becomes clear to the individual student where they are headed, how far they have come, and what is the next step towards their goal. The formative evaluation also includes student feedback on the teacher and their teaching. Improvement of the teaching must be carried out in a dynamic process. Feedback is part of all learning and assessment activities and is, as far as possible, both process and product oriented.

9

Digital learning technology

AT KEA, LEARNING TECHNOLOGIES ARE A NATURAL AND INTEGRATED PART OF OUR PROGRAMMES

The students can expect digitisation and technology to play a key role in the planned learning processes. It will enable the students to assess where and when the use of technology makes sense. Furthermore, it will help them find out and work with the challenges that technologies can create and solve. In addition, digital learning technologies allow for flexible learning. This means that the teaching is based on relevant and varied learning technology, which will ensure an actual learning outcome that is as good as possible.

10

Student life and learning environment

AT KEA, WE KNOW THAT A GOOD STUDY AND LEARNING ENVIRONMENT STIMULATES STUDENTS' LEARNING OUTCOMES

That is why we at KEA create an attractive and accessible learning environment that stimulates well-being, networking, talent development, creativity as well as professional development. Our programmes are organised so that the students contribute to, and take active part in, creating a good study environment. This means that KEA continuously develops integrated offers to support our students in taking an active role at KEA.

KEA BUILD

Most of the students at KEA Build study the bachelor in Architectural Technology and Construction Management and they become professionals, who are able to participate in and coordinate the building process at all levels from concept to completion in the broadest sense, including new buildings and renovation. The programme teaches how to plan, design and coordinate construction projects, and to combine practical experience with theoretical knowledge on a daily basis. There is a lot of emphasis on working in depth with Building Information Modelling (BIM) and Virtual Design Construction (VDC) in the whole program enabling data driven construction design that can take many factors into consideration among them building design, economy and sustainability.

SUSTAINABLE TRANSITION OF CONSTRUCTION EDUCATION

The need for thinking, designing, constructing, using, reusing and recycling buildings and building materials in new and more sustainable ways has never been more urgent. Construction and usage of buildings are currently responsible for as much as 40 percent of global CO2 emissions, meaning that the role and responsibility of the construction sector and construction education in the green transition, climate reduction and climate adaption, cannot be overestimated.

Realising the importance of sustainability in construction, KEA Build is working towards implementing the UN SDGs into its curriculum. The curriculum already has an emphasis on sustainability but in a broadly defined way, that can be strengthened by taking in the SDGs. The current focus is

primarily on environmental sustainability including concerns with carbon emissions, life cycle assessment, building certification schemes, material knowledge and selection.

How we can build taking the whole product lifecycle of buildings from designing to reuse into consideration, and how we can redesign the way we use concrete in buildings for it to be assembled and disassembled to be reassembled in the next generation of buildings? How we can build in other materials such as wood instead of concrete – and what are the consequences of material choices for carbon emissions - are some of the questions that have been raised, explored and taught at KEA Build in recent years.

These are not only relevant questions in relation to global sustainable development, but also for an European and Danish construction sector that has to partake in reaching bold political climate reduction targets while maintaining growth. There is a huge demand for competent construction management graduates that are able to work towards large goals in specific ways, and almost all students from the programmes at KEA Build are hired when they graduate – a sign of real demand.

INTERNATIONAL IMPACT

While the Danish construction sector arguably has a profound focus on sustainability, this is not the case in many other countries in Europe and elsewhere.

The Architectural Technology and Construction Management programme at KEA has both a Danish

The current focus is on environmental sustainability including concerns with carbon emissions, life cycle assessment, building certification schemes, material knowledge and selection.



EDUCATION

language and an English language course, and the latter International one attracts many foreign students.

The international course has approximately 360 students of which about 200 have an international background. Many of these are exchange students who stay for a semester, but at least half of them are usually full degree students, who study the whole programme of 7 semesters at KEA in Copenhagen. These international, but Danish schooled students take the methods, values and competences they have learned at KEA into the Danish labour market or bring them home to their own construction industries and bring them into play. Thus, they participate in transforming these industries into more sustainable ones.

Below are examples of work at KEA Build which contribute to the sustainability agenda.

CASE 1 FROM GLOBAL GOALS TO LEARNING GOALS

By Lecturer Anne Carlsen Dam, Docent James Harty, Senior Lecturer Peter Støm-Tejse, Lecturer Robert Miller, Lecturer Tom Westergaard Hansen and Lecturer Henrik Oxholm Zigler, KEA Build

Lecturer Tom Westergaard leads this project group, who are researching the industrial and educational work with the SDGs in the Danish construction sector, to gain deep knowledge on how to implement the SDGs into the core of the curriculum for all seven semesters of the Architectural Technology and Construction Management Programme. The project group is not only aiming to change KEA's curriculum, but all institutions in Denmark, which offer the programme, and have invited the other providers to be part of the project.

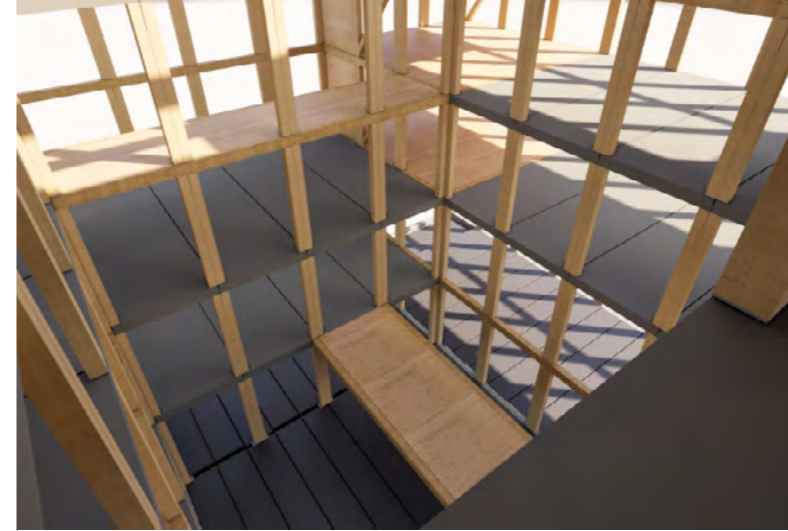
360 STUDENTS OF WHICH ABOUT 200 HAVE AN INTERNATIONAL BACKGROUND

CASE 2 NEW BUILDING SYSTEM FROM CREE TESTED IN THE ARCHITECTURAL TECHNOLOGY AND CONSTRUCTION MANAGEMENT PROGRAMME (2019-2020)

By Lecturer Martin Carlsen Dam, KEA Build

CREE is a timber based building system including structural parts, service appliances and interior fit-out that can be prefabricated as standard products and used as modules, while also catering for customised solutions. The CREE concept and building system offers a qualified response to the challenges of the construction industry in relation to environmental impact and productivity. CREE was developed in Austria but is now widely used internationally.

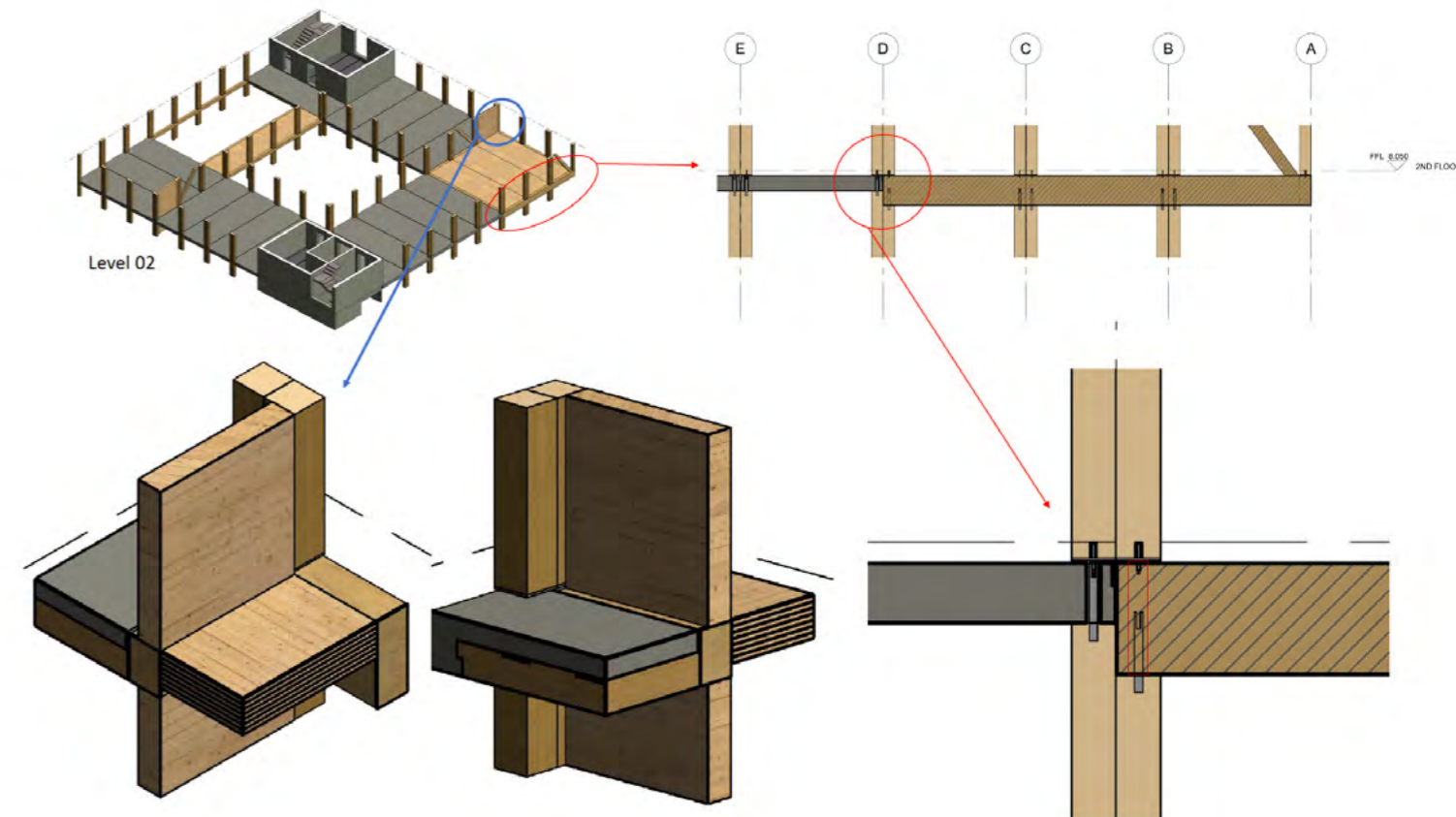
As a business academy, KEA is obliged to keep up with the latest international developments in the profession and to participate in these developments. Therefore, CREE has been explored in an educational context. The focus of the study is the students' learning, their knowledge horizon and competence expansion while working with the CREE system in digital building design compared to other students working with traditional digital building design. The study has been based on project work with fourth semester students.



Case 2

NEW BUILDING SYSTEM FROM CREE TESTED AT KEA
By Lecturer Martin Carlsen Dam, KEA Build

The focus of the study is the students' learning, their knowledge horizon and competence expansion while working with the CREE system in digital building design compared to other students working with traditional digital building design.



EDUCATION

CASE 3 IMPLEMENTING REVIT-ROBOT WORKFLOW AND ENGINEERED TIMBER STRUCTURAL ELEMENTS (DIGITAL FAMILIES) FOR PRODUCTION PROCEDURES

By Senior Lecturer Livio Lamartina, Senior Lecturer Jan Forna, Lecturer Joao Pereira de Sá, and Lecturer Judith Marton, KEA Build

The project is about implementing and testing new tools for Building Information Modelling (BIM) software that enables more data driven building design, by combining structural performance (sizing for load bearing capacity), sustainability of chosen material structures (CO2 footprint) and production drawings. This makes the students capable of developing a 3D virtual structural model from low to high level of development, to correctly choose pre-dimensioned elements from manufacturer's catalogues or eventually to realistically dimension a load bearing engineered timber element, always with an eye towards sustainability. In this way the number of iterations during the design phase can be minimised and the role of an architectural technologist can be more closely interwoven with both structural engineering and production procedures.

STUDENT INVOLVEMENT

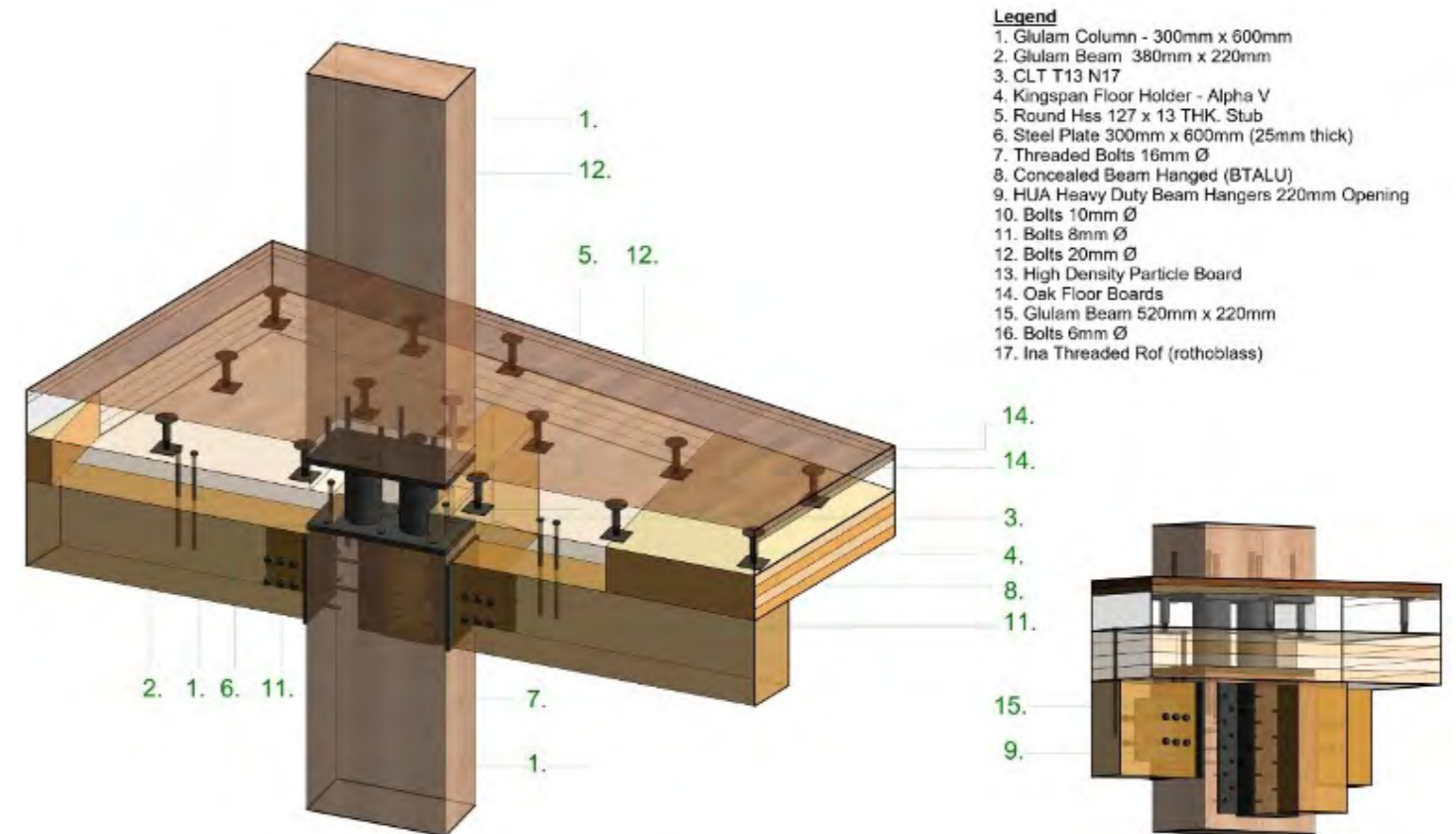
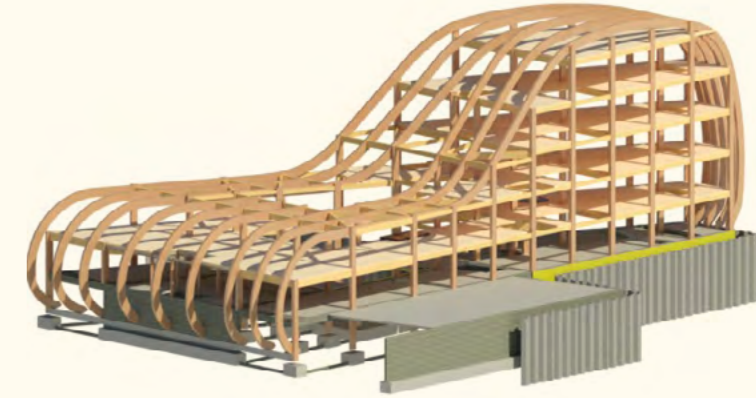
The project has been carried out with students in class who have been co-developing and testing the new tools, which are being implemented in current and future teaching at the Architectural Technology and Construction Management programme.

The aim is to test the effect of structural loads and verify both performance compliance (overall dimension and ratio of a load bearing section) and sustainability (CO2 footprint

in relation of the material involved in the lean processes) combining Building Information Modeling tools and Fine Elements analysis software. This teaching procedure provides a second final set of students' outcomes: production drawings, generated and drawn with a high level of accuracy in conjunction with problem owners from the international construction and building industry.

The teaching technique based on the implementation of Revit and Robot (BIM software) for structural design finds its theoretical didactical background on the theory of didactical situations (TDS) and designs intended learning outcomes. It provides a problem-based learning approach and wish to shape future professional handling techniques in constant development.

The project has been carried out with students in class who have been co-developing and testing the new tools, which are being implemented in current and future teaching.



KEA DESIGN

KEA Design has a long history of working with sustainability and social responsibility in their programmes. When KEA Design launched the specialisation “Sustainable Fashion” for the Design & Business programme back in 2015, many people questioned this bold development. However, one must say that this was a frontrunner move and since then work around sustainability has become a cornerstone at the KEA Design department and its programmes.

The transition to working with sustainability has been happening in a different pace among the programmes but within the last two years, all Design programmes are working actively with sustainability through curriculum, teaching, cases, research & innovation and partnerships.

SUSTAINABLE SOLUTIONS THROUGH DESIGN

Education for sustainability is key to students at Design as they are entering a labour market where they will be asked to come up with sustainable solutions. They are part of a transformation and as designers they have a huge responsibility and opportunity to be the ones who innovate and promote sustainability through design.

KEA Design acknowledges that the field of design has changed, and designers and students of design have to be bold and enter an increasingly political field. Within the last couple of years KEA Design has witnessed a change in students and their profiles. Educators and management experience a stronger sense of activism among design students today. It is not just something that they study; sustainability is part of their lifestyles.

IMPLEMENTING THE UN SDGS

The KEA Design management has during 2018 and 2019 introduced the UN SDGs to all employees at the KEA Design department and encourages work around the SDGs both through teaching, in company cases and in research and innovation activities. In the PBA degree in Design & Business it has in 2019 become mandatory to relate all work to the SDGs. The educators are asked to include and document reflections around how their teaching can contribute to the implementation of the SDGs.

A majority of company cases for students include perspectives about sustainability and increasingly, teachers at KEA Design select company cases based on criteria related to sustainability and social responsibility. The KEA Design management has become aware of the fact that their teachers and students choose to work with companies with a sustainability profile to support these kinds of businesses with the innovation and creative solutions which students can bring with them. The management is pleased with this kind of thinking and engagement and encourages it.

A CRITICAL STANCE TOWARDS WHAT IS SUSTAINABLE

The KEA Design department includes educational settings which aim to promote skills and competencies for sustainability. During the last two years, this has been a focus as students (and educators) need skills and competencies such as being critical, innovative and creative to promote sustainable solutions. And being critical is a core value at KEA Design. What is sustainable is not a clear cut and hence educators and students always include

critical reflections towards new sustainable products, solutions, technologies, models etc. KEA Design has also acknowledged that the field is moving so fast that often teachers and students need to enter a space to experiment together to test and identify what is truly sustainable.

FUTURE DEVELOPMENT: NEW TECHNOLOGIES

KEA Design is undergoing a change in 2020. A change towards including new technologies in curriculum with a focus on digital design tools. Two specialisations at KEA Design's fashion programmes will be merged and be renamed as “Sustainable Fashion Tech.” It will introduce students to new technologies and provide them with digital tools which also makes it possible to produce in a more sustainable way. Hence this development also contributes to the sustainability agenda of KEA Design and the industries which they deliver employees to.

The below examples illustrate the work on sustainability and social responsibility within KEA Design during 2018-2019.

CASE 1 COMMUNICATION DESIGN AS A CATALYST FOR CHANGE

By Lecturer Stine Behrendtzen, KEA Design

In the Communication Design and Media specialisation of the Design & Business BA programme, sustainability is a topic often addressed in the teaching. In 2019, 80-90 students participated in a module called “Communication design for social change” facilitated by PhD. Lene Hald, KEA Research, Career and Relations and Lecturer Stine Behrendtzen, KEA Design.



Case 1

COMMUNICATION DESIGN AS A CATALYST FOR CHANGE
by Lecturer Stine Behrendtzen, KEA Design

Students at Communication Design and Media were encouraged to find new and creative ways to put light on climate issues. Here a group of students have been collaborating with three to explore new ways of expression.



EDUCATION

In this module the focus was on communication design as a catalyst for social change in society - both locally and globally. The module had its foundation in the UN SDGs and emphasised the importance of the communication designer's ability to identify, articulate and participate in solving real life problems.

THE UN SDG 13

The module zoomed in on the UN SDG 13: Climate Action, which is described by the UN as one of the biggest challenges of our time. It is also a theme which is hard to communicate about in ways that engage and motivate action. As Elizabeth Boulton, Researcher on climate and communication at Climate Change Institute at the Australian National University points out:

"(...) climate communication needs to engage people at a philosophical, sensory and feeling level. People need to be able to feel and touch the new climate reality; to explore unfamiliar emotional terrain and be helped to conceive their existence differently. How is this to be done? The world must turn to its artists: storytellers, film-makers; musicians; painters and multi-media wizards, to name a few". (Boulton, 2016)

A NON-ANTHROPOCENTRIC FRAMEWORK

In the setting of a non-anthropocentric framework, the aim with this module was to raise awareness about climate issues. The students created communication products, which inspired new perspectives on these issues and through this aimed to change citizen/consumer behaviour in relation to the environment and climate action for the better.



Case 2

WALK THE TALK: A BUSINESS COLLABORATION WITH THE TRUE GUM COMPANY

By Senior Lecturer & PhD. Helle Haurum, KEA Design

The start-up challenged around 40 international students from the Marketing Communication Design specialisation to create a brand management strategy and a new campaign.



The students made handmade photobooks, podcasts and posters which communicated their concepts. The communication products have been exhibited at KEA in order to engage a wider audience.

UN CITY AND THE WORLD FOOD PROGRAMME

Collaboration with the United Nations was also a part of the module, as a visit at the UN City in Copenhagen was the point of departure. At the UN City the students visited an exhibition centred around the work of the UN organisation: The World Food Programme (WFP) and participated in a talk given by the lead exhibition manager.

Based on feedback from the students involved, this way of working has been very inspiring. A lot of the BA projects at Communication Design and Media in 2019 have since focused on social and environmental issues. As two of the students involved in the module said:

"Seen from a student's perspective the SDGs has been an integrated part of the teaching at KEA".

"I didn't know much about the SDGs before I started at KEA. But I think it is very valuable to have this kind of knowledge that I can use in the future".

CASE 2 WALK THE TALK: A BUSINESS COLLABORATION WITH THE TRUE GUM COMPANY

By Senior Lecturer & PhD. Helle Haurum, KEA Design

Most people do not realise it, but there is plastic and a lot of other nasty stuff in conventional gum. But not in the

Danish True Gum's gum, which is also biodegradable and vegan. This is the message the start-up True Gum wants to spread. True Gum asked students from the Marketing Communication Design specialisation at KEA for help.

The start-up challenged around 40 international students to create a brand management strategy and a new campaign. And collaboration with this company was not a coincidence. At Marketing Communication Design the educators deliberately choose to collaborate with businesses that work with social responsibility as part of their business model.

PUT ACTION BEHIND YOUR FINE WORDS

It was a big challenge for the students working on the True Gum case. The students needed to be very creative to be successful in promoting a brand based on arguments revolving around sustainability in a manner that was credible and trustworthy to consumers. When the students analysed the target audience it became clear that many consumers are tired of hearing about CSR and sustainability as it is often a misused concept. This challenged the students to deeply examine how a company like True Gum can communicate its sustainable products and values in an authentic and credible manner.

Some students highlighted that True Gum should focus at differentiating themselves in the supermarkets. It is after all in the supermarket most consumers buy gum. The students came up with the campaign "Walk the Talk" which argues that when consumers wish to avoid plastic and pollution, they should also be aware of the gum they buy. This resulted in a campaign which emphasised the need to put action behind the fine words, and the campaign took a

EDUCATION

humorous approach to a serious problem without devaluing the sustainability message.

INNOVATIVE, CREATIVE AND THOUGHT-PROVOKING WORK

The True Gum management was very impressed with the students' work. The True Gum managers found the campaign innovative, creative and thought provoking. The students' work showed that the students hold the skills needed to challenge 'business as usual' and to inspire the way companies communicate and market their sustainable products.

The True Gum company implemented key elements from the work of the students. Today the business has experienced an immense growth, and maybe KEA students can take a little bit of credit for that.

CASE 3 COLLECTION & PRINT – DESIGN: THE IMPORTANCE OF SUSTAINABLE FASHION DESIGNERS' CHOICES

By Lecturers Lotte Nerup and Karoline Thilo, KEA Design

In this module in the Bachelor in Design & Business specialisation Sustainable Fashion by the name "Collection & Print - Design", sustainability is defined as the main subject that a Sustainable Fashion Designer should have knowledge about.

The decisions made by a designer influences how high the negative impacts are for a product. Sustainability in a designer's mindset is to know the impact of his/her choices from cradle to cradle and all the way through the value chain. To include aspects of sustainability in the design

phase, the designer needs to be able to ask for sustainable solutions for materials, productions methods, certifications and integration of new technologies. If the designer uses this knowledge the product can be designed and produced in a more sustainable and socially responsible way.

HIGG INDEX AND THE SUSTAINABLE DESIGN CARDS

24 students were involved in this module and were asked to make their own fictive fashion brand. They were asked to use the HIGG index and Life Cycle assessment to measure the level of sustainability and negative impact of their products. In the design process the students also used 'The Sustainable Design Cards' (Designskolen Kolding, 2018) which are aimed at getting the designer to make more sustainable decisions during the design process. Students and educators engaged in dialogue about how the designer's approach to making more sustainable and socially responsible products can be, and what questions to ask internally and externally in the value chain. The purpose was to create change in a business that needs to rethink values and processes to create more good than harm through design.

THE SDGS AND SUB-GOALS

The key driver in the module was the students' individual selection of one of the UN SDGs and related sub-goals. Everything in each project's solution and design process should somehow relate to the chosen SDG's sub-goals. The work with the SDGs contributed to a high focus on innovative sustainable solutions for the fashion industry, integrating sustainable design methods, certifications and sustainable textiles.

In addition, the students worked in groups and analysed Danish fashion brands and their UN Global Compact COP reports. This provided students with knowledge about how different Danish fashion brands report (or do not report) about their work with sustainability, social responsibility and the UN SDGs.

During the module, the students participated in talks given by external guests about working with and using the SDGs. One talk was about how the global federation Action Aid/Mellemfolkeligt Samvirke works with the SDGs given by a Senior Policy Advisor from the NGO. The other talk aimed at giving the students insights on how the UN works with advising companies all around the world to integrate and work with SDGs. This talk was given by a SDG Financing Analyst from the United Nations Headquarters, New York.

FUTURE PERSPECTIVES

The 24 students have stated that they have been very inspired by working with the SDGs and they wish to continue integrating the SDGs in other projects during their studies. Hence, educators at Sustainable Fashion have begun to discuss if the SDGs should already be introduced in the first semester to allow more time to work with them.

This is also highlighted as a need by Sara Krüger Falk, the Executive Director of the Global Compact Network, Denmark when she was interviewed as part of a research project at KEA by the name "Educators! Educate for Sustainable Change". Sara Krüger Falk expressed a need among students to get to know and work with the SDGs as early as possible during their studies.



Case 3

COLLECTION & PRINT – DESIGN: THE IMPORTANCE OF SUSTAINABLE FASHION DESIGNERS' CHOICES
By Lecturers Lotte Nerup and Karoline Thilo, KEA Design

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KEA DIGITAL

KEA Digital is transitioning into working even more with sustainability due to a more strategic focus on sustainability at KEA in general, but also due to a student-driven approach to sustainability. At KEA Digital, it is the experience that more and more students prioritise internships and take on job positions in companies/organisations that work with sustainability.

Furthermore, the sustainable development agenda is driven by educators at Digital who are engaged in sustainability and they select cases and partner collaboration based on criteria related to sustainability – like at KEA Design. It is known that such cases and collaboration ignite more engagement and motivation among the students and in the long run, among educators and an increase in cases related to sustainability has been detected in KEA Digital.

A PUSH FOR SUSTAINABILITY ON THE DIGITAL AGENDA

KEA Digital works closely with businesses and organisations, when planning and creating learning activities for the students. That means that the students are given a specific challenge from a company/organisation, and then the students work on solving the case and pitch their digital solution to the company and get feedback from them. We face a future where digital solutions are needed in order to solve sustainable challenges, which is why KEA and specifically KEA Digital will continue to push for sustainability on the digital agenda.

The following are some examples of case collaborations and the challenges they involve related to sustainability at KEA Digital.

CASE 1 GREENPEACE - A DIGITAL CAMPAIGN ABOUT CLIMATE CHANGE

By Lecturer Ida Winberg Hemmingsen, KEA Digital

In this case collaboration, the students developed a digital user-centred design solution for the non-governmental environmental organisation Greenpeace with the overall purpose to promote the climate change debate among the younger audience in Denmark.

The objective was to develop and build a digital UX-focused prototype of a campaign website - a social media (SoMe) strategy with suggested use and content - as well as producing one or more video(s) to be used as part of the campaign.

50 students of Multimedia Design & Communication (international class) were involved in this case collaboration and had 4 weeks to develop and program the campaign website. The site should be responsive and be able to hold and show user-generated content, videos, pictures, comments, ratings etc. All students created a SoMe strategy and a minimum of mock-ups of 4 SoMe posts.

RESEARCH AND IN-DEPTH KNOWLEDGE OF THE TARGET GROUP AND GREENPEACE

The students were to create a campaign based on a thorough knowledge of - and understanding of the target audience meaning that the students had to research and consider which platforms, formats, content and messages that are most adequate when trying to reach the target

Case 1

GREENPEACE - A DIGITAL CAMPAIGN ABOUT CLIMATE CHANGE

By Lecturer Ida Winberg Hemmingsen, KEA Digital

50 students of Multimedia Design & Communication were involved in this case collaboration and had 4 weeks to develop and program the campaign website.



Team Canvas

Version 0.8 | theteamcanvas.com | hello@theteamcanvas.com

Most important things to talk about in the team to make sure your work as a group is productive, happy and stress-free

Team name Date

PEOPLE & ROLES <small>What are our names and the roles we have in the team?</small> Gea - Videographer/Photographer Megane - Editor Tiffany (Tram Anh) - Designer	COMMON GOALS <small>What do you as a group really want to achieve? What is our key goal that is feasible, measurable and time-bounded?</small> This campaign means a lot to us therefore we don't want to just enjoy it but also to grow as a strong team. We want to make a successful campaign about climate change because it's important to our world.	VALUES <small>What do we stand for? What are guiding principles? What are our common values that we want to be at the core of our team?</small> We value our honesty, communication and teamwork.	RULES & ACTIVITIES <small>What are the rules we want to introduce after doing this session? How do we communicate and keep everyone up to date? How do we make decisions? How do we execute and evaluate what we do?</small> -Communicate through Messenger and keep everyone up to date. -Use timeline to see what we need to do. -Make decisions through discussion and democracy.
PERSONAL GOALS <small>What are our individual personal goals? Are there personal agendas that we want to open up?</small> Gea - deliver a quality final product Megane - get better at pitching ideas Tiffany - to get out of my comfort zone when it comes to the design aspects	PURPOSE <small>Why are we doing what we are doing in the first place?</small> To raise more awareness about climate change to younger audience.	NEEDS & EXPECTATIONS <small>What each one of us needs to be successful? What are our personal needs towards the team to be at our best?</small> We expect all of our team members to deliver within the deadline so we don't fall behind. We also need to communicate whenever we have problems so that we know what's going on and help each other.	
STRENGTHS & ASSETS <small>What are the skills we have in the team that will help us achieve our goals? What are interpersonal/soft skills that we have? What are we good at, individually and as a team?</small> -well organised -everyone is friendly and easy to communicate -we have expertise at different areas that the project require therefore we have a strong foundation		WEAKNESSES & RISKS <small>What are the weaknesses we have, individually and as a team? What our teammates should know about us? What are some obstacles we see ahead of us that we are likely to face?</small> -clash from personal schedules due to work and activities outside of school	

audience and engage them in the campaign. They also researched to find out how much the target audience knew about Greenpeace and climate change in general - how they engaged or not and their point of view in the whole climate debate. All of this research was used to find out what kind of stories best fit the digital campaign to be able to engage the Danish youth in the work of Greenpeace and the climate debate.

Based on the strong focus on user-driven sustainability, it was arranged for the students to meet up with a Danish elementary school class (8th grade, 13-15 years) whom they could interview while developing their digital campaign.

Apart from getting to know the target group, the students also had to gain in-depth knowledge about Greenpeace, their work – mission and vision and their whole approach to sustainability.

Christoffer Skytte Wielsøe was one of the KEA students involved in the case and he explained the following about the topic of sustainability and why it made sense to work with the case:

“Sustainability is an increasingly more important aspect of any business. I think it is important for us, as students, to be prepared for how to handle sustainability and how to apply it properly in our cases. At KEA we are told to always be prepared for what is going on in the real world and nothing is more relevant than sustainability right now... I felt that we were doing something a little more worthwhile when we worked with our sustainability case. I had a sense that we were actually making a difference.”

CASE 2 GLOBAL GOALS JAM

By Lecturer Marie-Louise Brixtofte, KEA Digital

Lecturer Marie-Louise Brixtofte works with the SDGs both during her day to day work as a teacher in Business Economics & IT, KEA Digital and when she plans and conducts workshops and Mini Hackathons which bridge across the departments.

One Mini Hackathon that she conducts every year is called the Global Goals Jam. The Global Goals Jam is an annual two-day event held simultaneously in many different universities and higher educational institutions across the world, where students work together in multidisciplinary teams. The way the hackathon is organised is by using short design sprints for group work using a tailored toolkit. The students create interventions aimed at short term targets in support of the long-term UN SDGs.

REDUCE INEQUALITY

2019 was the fourth time that the Jam was held by KEA in Copenhagen, and the focus was on SDG 10: reduce inequality. The 36 students who signed up for the Jam worked together with Mellempfolkeligt Samvirke - ActionAid.

MS/ActionAid is a global federation working with 25 million people in more than 40 countries for a world free from poverty and injustice. The challenge put forward by MS/ActionAid to the students was the following:

- Design learning pieces using chatbot technology which promote equality

Case 2

GLOBAL GOALS JAM

By Lecturer Marie-Louise Brixtofte, KEA Digital

The Global Goals Jam is an annual two-day event held simultaneously in many different universities and higher educational institutions across the world, where students work together in multidisciplinary teams. The 36 students who signed up for the Jam at KEA worked together with Mellempfolkeligt Samvirke - ActionAid.



GLOBAL GOALS JAM Design 2030 Now!

It was so fun to be part of the Jam and be surrounded by people who were also passionate, enthusiastic and forward-thinking about sustainability.

- Create engaging content around equality (SDG 10) in the chatbot format
- Guide people through a chatbot to make their own communication pieces

The students worked in teams and came up with solutions to the challenge which they pitched in front of a panel of experts.

MS/ActionAid was impressed with the work of the students and has been inspired by their work in how the NGO can develop further their chatbots related to the promotion of equality.

AN EYE OPENER

The Jam was an eye opener for the students towards the existence of the SDGs and how one can be part of the implementation of them.

One of the students stated the following about the Jam:

“It was so fun to be part of the Jam and be surrounded by people who were also passionate, enthusiastic and forward-thinking about sustainability. It was really nice to be part of because it felt like one massive team working together to tackle sustainability.”

For more information visit: globalgoalsjam.org

KEA TECH

In Tech, sustainability is about developing services and production processes and how these can meet the future requirements for sustainability. A 'sustainable production process' can be described as a system of sustainable relationships, work processes and products. At KEA Tech educators and students work, among other things, with automation technologies, energy optimisation, standardisation and certification systems.

This section introduces two fields at KEA Tech that have changed towards a stronger focus on sustainable development during 2018 and 2019; Energy Technology and Production. Cases which illustrate key aspects of these changes are included following each field introduction.

FIELD 1: AP IN ENERGY TECHNOLOGY – A PROGRAMME FOR SUSTAINABLE ENERGY

Both in Denmark and in the rest of the world there is increasing focus on reducing our energy consumption. The entire two-year AP programme in Energy Technology at KEA Tech is centred on sustainable energy in relation to greenhouse gas emissions and energy consumption.

During the programme, students work in problem-oriented projects concerned with social and environmental impacts, the differences between energy sources and building envelopes, behaviour and carbon footprints.

Energy technologists identify customers' energy loss and CO2 emissions and ensure reduction, both as consultants and project managers for the solutions.

BROADENING THE SCOPE OF THE PROGRAMME

In 2018-2019, substantial changes have been made within the AP Programme in Energy Technology due to revision of the curriculum. This has broadened the discipline from being concerned with buildings to also include industrial processes, agriculture and transport. This broadening has led to a project and teaching collaboration in 2018 and 2019 with the Agricultural School Zealand (read more in case 2 below).

Another change is that the former environmental module has been modified into a sustainability module, which covers selection of materials and other themes. The UN SDGs are also more in focus in the programme, primarily SDG 7: Affordable and Clean Energy, and SDG 11: Sustainable Cities and Communities.

CASE 1 NORDPLUS NETWORK - ADVANCING CIRCULAR ECONOMY EDUCATION (NONACEED)

By Senior Lecturers Stig Esben Maegård Kristensen and Jens Højmann, KEA Tech, Henrik Buhl, Docent, KEA Tech and Andreas Berger, KEA Research, Career and Relations, KEA Global

KEA and the Energy Technology Programme participate in the NORDPLUS-financed NoNACEEd-Network. The network enables students and educators to pay a visit to other Nordic and Baltic countries. The target of the co-operation is to create understanding and appreciation of other Nordic and Baltic countries and cultures, study the diversity of energy production in the region and share



The students work in problem-oriented projects concerned with social and environmental impacts, the differences between energy sources and building envelopes, behaviour and carbon footprints.



EDUCATION

knowledge and ideas on how to deal with the common challenges led by an increasing energy consumption and work towards a circular energy economy. In a circular economy, resource input and waste, emission, and energy leakage are minimised by slowing, closing, and narrowing material and energy loops.

In the spring 2019 KEA hosted the annual week long network meeting where students and Lecturers from the participating universities visited several Danish companies working with renewable energy and the circular economy, among them Amager Ressource center and Copenhill, Solrød Biogas, Gamle Mursten (Old Bricks), Vestas Windpower, Isover (Insulation production) and Vestforbrænding. The next annual meeting is planned for Halmstad in Sweden.

CASE 2 SUSTAINABLE ENERGY AND AGRICULTURE

By Senior Lecturers Stig Esben Maegård Kristensen and Jens Højmann, KEA Tech, Henrik Buhl, Docent, KEA Tech and Anne Winther, Journalist, KEA Communication

Energy technology students from KEA Tech and students from Landbrugsskolen Sjælland (Agricultural School of Zealand) have in 2018 and again in 2019 collaborated on a project to lower energy consumption in pig production. The aim of the project is to make agriculture more sustainable.

The agricultural students gave the energy technologists insight into what it means to run agriculture, while the energy technologists gave their suggestions on how farmers can optimise energy in modern pig production - based on the Frihedslund Lærregård farm. Together they



Case 2

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Energy technology students from KEA Tech and students from Landbrugsskolen Sjælland have collaborated on a project to lower energy consumption in pig production.



have analysed energy processes in agriculture and looked at the possibilities for energy optimisation.

In concluding the project, the energy technologists presented their ideas to the agricultural students and the manager of Frihedslund Lærregård. Solutions showed how it is possible to reduce energy costs and at the same time emit less CO₂ for the benefit of the climate. For example, by installing measuring equipment for monitoring and optimising energy consumption in the stables, replacing the lighting by LED and by recovering the heat that is currently being discharged from the stables with ventilation and using underfloor heating in the stables and climate controlled stables.

“Agriculture is not an industry that we are used to cooperating with, but it can certainly benefit from our expertise. There are many benefits to be gained, for example in heat recovery and electricity consumption in the stables”.

– Energy Technology student Daniel Pless.

“When I finish my education and have to go out and manage a business, I will take many of the inputs that I have received during this project. For example, it is quite obvious to have more measuring equipment installed in different places in the stables, in order for us to monitor and optimise our consumption”.

– Agricultural Economics student Christian Haagensen.

“The project has been crucial when it comes to the formation of students - here I am thinking, not least, the work on the sustainable transformation of our society. The collaboration has also given the students experience in meeting and collaborating with another profession.

In their presentations, the energy technologists focused on economics and the agricultural economists have gotten CO₂ reductions into their accounting. For me, the question is what role agricultural economists and energy technologists can play in sustainable development. Here we have seen that there is a desire and potential for cooperation – as educators, we must continue to work with this.”

– Henrik Buhl, Docent, KEA Tech

FIELD 2: AP PRODUCTION TECHNOLOGY AND BA PRODUCT DEVELOPMENT - DATA DRIVEN SUSTAINABILITY

According to the EU Science Hub's, Sustainable Product Policy up to “80% of a product's environmental impact can be influenced during the design stage”. Just think about that for a minute, of the products that we all use, most of their main impacts are determined before the product even comes to the world. They are impacts determined by design, material selection, and the business model of the products that we develop. But often, these three elements stand at odds with one another and at times the only way consumers can navigate the environmental impacts of products is when choosing what to do with them at their end of life.

This highlights the enormous responsibility shouldered by product developers studying in both the AP Production Technology and BA Product Development and Integrative Technology programmes at KEA Tech. In order to determine what trade-offs are important to undertake, and which impacts are important to reduce in a product, students are taught to use tools sets founded in utilising real data sets and strategies that affect the sustainability of our product design and development.

CHOOSING THE RIGHT MATERIALS

By far the greatest share of environmental impacts is captured in the material selection process, since the primary acquisition and production of materials tend to have the largest footprint of the full product lifecycle. Using advanced software like Granta Edupack, allows us to pre-select materials for products based on a host of quantified parameters and performance indices and compare them for identifying materials that will best support our product goals.

SIMULATING LIFE CYCLES

Full Life cycle assessments of products are the gold standard of the data driven approach to understanding impacts of product lifecycles but are time-consuming and typically the lessons learned from them are first after the product is produced. But how can we manage to create similar clarity before the first ore, the first barrel of oil, or the first tree is ever cut down?

Again, here the key is to rely on Data assets, methods and tools and both programmes make extensive use of the Eco-Audit tool set contained in Granta Edupack. Here the full lifecycle considerations of products based on their material, grade, production, treatment, post-secondary processing, transport, use phase and end of life, can be estimated from industry standard data sets to create a full picture of selected environmental impacts. In addition, the product developer is then taught to use the tool to compare and contrast different scenarios, that might help reduce the overall impact. These scenarios are then compared graphically to represent an overview that can ease the product developer's decision-making process.

It is armed with this data, that better decisions can be made to reduce the overall impacts of products and hopefully create more transparency for the consumer, in the types of products they choose and why.

INTEGRATION OF SDGS INTO TEACHING AND PROJECTS

The current curriculums for the product development related programmes at KEA Tech do not currently explicitly account for learning outcomes that relate to SDGs specifically, however since 2018, the SDGs have been included as part of the fundamental subject matter when teaching learning outcomes that relate to sustainability.

There has been an additional focus to having SDGs included in shorter and longer group projects and they have begun to sporadically appear in final student projects of the student's own accord before graduating to represent part of the theoretical underpinnings that relate to how projects focus on sustainability, and the impacts of projects as they relate to the primary development goal within the framework of relevant SDGs.

It is the ambition of these programmes to apply the Data Driven Sustainability approach as a methodology to be able to actually quantify impacts related to SDGs. Without proper measurement and quantification, then applying the beautiful multi-coloured iconography to projects that do not fundamentally integrate them, is akin to green-washing.

Students are encouraged to account for actual measurable change, instead of just talking about it. This is a demand coming from the industries in which they are entering, and for which the students are prepared.

Case 4

PROFESSIONAL & SUSTAINABLE PRODUCT DEVELOPMENT
by Senior Lecturer Kristian Colvey, KEA Tech



New design impact

Material energy consumption	21 MJ
Material CO2 production	0.7 Kg
Manufacturing energy consumption	5 MJ
Manufacturing CO2 production	0.35 Kg
Transport energy consumption	1.9 MJ
Transport CO2 generation	0.08 Kg

CASE 3 ADVANCED MATERIALS SELECTION IN PRODUCTION TECHNOLOGY

By Senior Lecturer Kristian Colvey, KEA Tech

In 2019 a class was held in Advanced Material Selection. In this class the objective was to experiment with known products in attempting to find new material alternatives to a well-known product, in this case a bicycle helmet. In this approach, students from AP Production Technology were tasked to compare and select more versatile materials and support more focused possibilities towards sustainable design. They utilized the material selection methodology to benchmark a reference product, and then using the Material Design Lab resources at KEA, sought to find material replacements for the more conventional materials of the bicycle helmet.

CASE 4 PROFESSIONAL AND SUSTAINABLE PRODUCT DEVELOPMENT

by Senior Lecturer Kristian Colvey, KEA Tech

Students in BA Product Development and Integrative Technology are tasked with “tearing down” a well-known product in order to understand material composition and selection from a specific case. This helps in facilitating and understating the use of software in order to benchmark a product's lifecycle from material acquisition, manufacturing, transport, use, and disposal. In this case, the chosen product was a travel mug with multiple types of material and components. After a full lifecycle was mapped the students were tasked with employing Eco-design principles to reimagine the cup and optimise its function and use of materials to lower the product's energy and CO2 footprint.

KEA COMPETENCE

KEA Competence is the department for continuing education and training where 3,800 people annually complete short courses or programmes. Unlike the full-time programmes these courses and programmes are based on tuition fees.

Competence's programmes have mainly been concerned with the fields of management, organisational development and human resources, but in recent years several programmes from KEA's full-time educational departments have been modified into continuing education programmes that enables students whom are fully employed to study while working and acquire new theory, perspectives on their profession and tools that they can transfer directly into their work. While entire programmes are available for part-time students, it is also possible to enrol for single subject courses that are either part of a programme or stand-alone.

All programmes and courses are continuously updated through dialogue with companies and business associations in order to keep them relevant and useful.

SUSTAINABLE IMPACT IN PROFESSIONS

As a provider of lifelong learning opportunities for so many professionals, Competence has an impact on many industries. For a lot of the newer courses and programmes this entails contributing towards sustainable transitions within professional practices and industries.

Only a few courses explicitly mention sustainability in their course description or title including "Sustainable

Building Site Maintenance", a part of the Construction Coordinator programme, and "Extended BIM", a course that is part of the Construction Technology programme. Here the students learn how to work with digital building models, and learn how to apply data to visualise the building process and calculate economy, sustainability and operations. Several other courses are concerned with environmental factors or energy savings that contributes to sustainable development.

The whole Energy Technology programme, like its full-time counterpart, is concerned with sustainable energy use as well as the Better Housing Advisor programme in which the student gains competences in advising residential energy optimisation and overseeing the whole building process. The Energy Consultation programme certifies participants to be able to energy label buildings. The Building Automation programme enables the student to understand, monitor and improve upon building automation systems for energy reduction, among other things.

Another example is a 3-day workshop in 3D Virtual prototyping. The workshop is a hands-on introduction in the use of software for virtual prototyping of garments and simulation targeted at the fashion industry. The technology can reduce physical prototypes, time and cost and contribute to a more sustainable development process.

The workshop has been developed as a part of an innovation project (see more in the appendix) and has been tested as a free pilot in 2019. It is planned for launch as a tuition-based course in 2020.



A lot of the newer courses and programmes are concerned with environmental factors or energy savings that contributes to sustainable development.



KEA'S MATERIAL DESIGN LAB

As explained earlier in the report, the access to labs for students and educators at KEA is crucial, as we know by experience that working in Labs increase our experimental skillset, increase competences in collaboration in our own field and enables interdisciplinary collaboration across multiple other fields. KEA has several established labs, and when we talk of sustainability, it is relevant to mention KEA's Material Design Lab.

Sustainability and social responsibility as the backdrop of the circular economy constitute the basis for all activities in the Material Design Lab. They are of utmost importance and are an integrated part of all processes, approaches, and teaching within the Lab. The Material Design Lab offers experimental courses and workshops, where students gain insight into the newest material development and emerging ways of working with materials in their respective professional areas. The didactic approaches focus on experiments and the explorative aspect in all tasks that are posed and developed.

At KEA, we believe that materials and their processes are key for sustainable solutions across all creative construction and production-focused fields.

WHAT IS KEA'S MATERIAL DESIGN LAB?

The ambition with the Material Design Lab at KEA is that it will become an interdisciplinary space for KEA's teachers, students and researchers as well as companies and partners who would like to expand their knowledge about materials. Material Design Lab provides facilities for

hands-on material studies, it offers courses, events and extracurricular activities and insight into current projects and research findings.

Material Design Lab consists of three main physical installations: The Box, which is a resource for learning the basics of materials, The Lab, which enables hands-on experimentation in making materials and using them in shaping prototypes and more artistic creations, and a Material Library with material samples: Material ConneXion.

All lab installations are designed to create an experiential exploration of materials; both technically and artistically.

See more at materialdesignlab.dk

MATERIAL TEACHING

In 2018 and 2019 the Material Design Lab has been collaborating with researchers, interns, teachers, students and companies and has considerably increased its course-activity with programmes at KEA reaching out to several study fields. These study fields have been positively surprised by the impact material teaching has on their idea generation and projects but also their general understanding of the world around them, the issues at hand and the sustainability agenda set by their programme. Furthermore a Ph.D. dissertation by Mette Bak Andersen connected to the Material Design Lab focusing on designing with the material at the core of the design process has been finalised (read more about this work in the Applied Research and Innovation chapter in this report).

Sustainability and social responsibility as the backdrop of the circular economy constitute the basis for all activities in the Material Design Lab.



EDUCATION

Here are some examples of collaborations and projects on sustainable development within the Material Design Lab.

CASE 1 CRASH COURSE IN THE FUTURE OF MATERIALS AND DESIGN

By Lecturer Mette Marko and Senior Lecturer Anke Pasold, KEA Material Design Lab

23 students from Fashion Management and Sustainable Fashion, KEA Design have taken part in this transdisciplinary module covering material understanding, design, product development and sociology. The module is offered once a year to KEA students.

The purpose of the module is that the student acquires knowledge and skills to navigate the materials of the future and the associated new approaches to the design of the physical world across different disciplines and technologies.

With an experimental approach, methods to develop and implement new sustainable materials for products that address resource scarcity and circular economy issues and processes that challenge our previously used design processes are developed and explored.

One of the students involved in the module went on to represent KEA at a stakeholder event from different fields of the Fashion industry at the Danish Embassy in London during the 2019 Fashion Week.

CASE 2 ENTREPRENEURIAL PROJECT

By Senior Lecturer Anke Pasold and Lecturer Mette Marko, KEA Material Design Lab

Material Design Lab supervised a dissertation project by Architectural Technology and Construction Management student Kathryn Larsen. The project entails a circular material approach, that develops pre-fabricated seaweed panels for outdoor/indoor insulation use. Seaweed is a long-forgotten building material with outstanding material properties, and is re-imagined for application in modern construction.

The project has received the Boligfondens Spirekasse Scholarship which allowed further development based on the test results from the material testing station, which Material Design Lab designed and built for this and future purposes.

The project has been presented at the Amsterdam Design Fair, Indaba 2020 among other places, and Kathryn has now created a company around the concept and enjoys continuous media coverage. Kathryn still uses Material Design Lab and its test facilities as an alumnus, and she has created a small built structure on KEA campus. The project, its approach and findings have now become an integral part of the initiating module at KEA Build and is actively used in teaching, demonstrations and presentations as inspiration to a possible alternative approach to materials in the construction industry and a heightened focus on getting in touch with materials and the connected processes.

See more at kathrynlarsen.com/press



Case 2

ENTREPRENEURIAL PROJECT

By Senior Lecturer Anke Pasold and Lecturer Mette Marko, KEA Material Design Lab

Material Design Lab supervised a dissertation project by Architectural Technology and Construction Management student Kathryn Larsen. The project entails a circular material approach, that develops pre-fabricated seaweed panels for outdoor/indoor insulation use.



CASE 3 COLLABORATION WITH THE COMPANY VEJA – INTERDISCIPLINARY COMMUNICATION

By Lecturer Mette Marko, KEA Material Design Lab

35 students from Marketing & Communication Design, KEA Design, were part of an 8-week company collaboration with the sneakers company, VEJA. The task was for the students to understand why and how VEJA has been successful as a sustainable brand. The students had to think critically and create a proposal for what a campaign for VEJA would look like in 2025 in relation to the physical product (the shoe) and how sustainable they are in reality.

The Material Design Lab provided students with among other things:

- Relevant literature on sustainability and circular economy
- Knowledge about sustainability and circular economy when working with a company and their products
- An understanding of materials using the Material Library; Material ConneXion
- An understanding of the structure of a shoe and all the elements and materials a shoe consists of

The teachers involved in the collaboration have gained new knowledge in how to use Labs in their teaching, which for them initially did not seem to be relevant. They also gained new knowledge on sustainability and circular economy. More lab involvement with a focus on sustainable development is planned as part of the Marketing & Communication Design programme in 2020.



APPLIED RESEARCH & INNOVATION

APPLIED RESEARCH AND INNOVATION TO UNDERPIN
THE EDUCATIONAL KNOWLEDGE BASE FOR SUSTAINABILITY

APPLIED RESEARCH AND INNOVATION AT KEA

The core task for KEA is education, and the previous chapter explored our work with sustainability within the educational departments and through different cases, mainly teaching cases.

This chapter will look at trends within applied research and innovation at KEA and provide examples of our research and innovation projects and of a PhD dissertation, which was approved in 2019. The ongoing research and innovation activities at KEA underpin the programmes and their knowledge base.

COLLABORATING IN THE KNOWLEDGE CYCLE

A substantial amount of research and innovation projects at KEA are directly concerned with acting upon environmental, social and economic challenges in the industries we cater for and society at large and to investigate how to pave the way for sustainable transition and accelerate it.

We do this by grounding our research and innovation projects in the knowledge cycle between research, programme and industry. The knowledge cycle consists of academic issues and challenges, as well as professional experiences and examination of the professional reality behind the theories.

This takes place in a dynamic interaction between knowledge workers (teachers and other staff members), students and practitioners. In order to secure the knowledge base, KEA's educational environments must cooperate with relevant professional environments.

This means that knowledge workers at KEA participate in activities with companies and organisations (stakeholder networks), and national development environments, as well as relevant national and international research environments.

The unifying vision is to develop, build and translate an interplay between research, education and practice and between the different actors. The goal is that proactive knowledge is brought into play in the field of practice - thereby contributing to the management of some very important challenges and into the programs at KEA.

The rationale is that KEA participates in and contributes to sustainable development through testing new processes, tools and methods, which must be done in collaboration with other knowledge institutions, public institutions and businesses.

The goal is that proactive knowledge is brought into play in the field of practice - thereby contributing to the management of some very important challenges.



APPLIED RESEARCH AND INNOVATION AT KEA BUILD

By Docent Dr James Harty, KEA Build

Given that buildings contribute up to 39% of carbon emissions and account for 35% of energy consumption, removing these from the equation makes the education critical in addressing the Climate Crisis. Sustainability has long been incorporated in the curriculum of the Architectural Technology and Construction Management programmes, signing up to 2030 Architecture pledge in 2006 and actively applying the Nordic Built Charter in 2012.

Since the oil crisis of the 1970's and 1980's, buildings have been reducing their energy footprint from c.352 to 61KWh/m²a (for a near zero energy building). This was primarily achieved by better insulation and better building practices, realised by measuring U-Values, and making constructions better with regard to thermal bridging. We implement these methods as part of the course in all semesters of KEA Build's Danish and International Architectural Technology and Construction Management programmes.

BUILDING INFORMATION MODELLING RESEARCH

With the adoption of Building Information Modelling in 2006, KEA Build has been able to analyse, simulate and test performance, moving towards what is commonly known as digital twins today. Carbon is also being embraced through methods to measure the embodied carbon and the carbon emissions of chosen constructions. These methods are underpinned by research in these

areas and several research papers contributing to the sustainability agenda within Build have been reviewed and presented at international conferences by staff members.

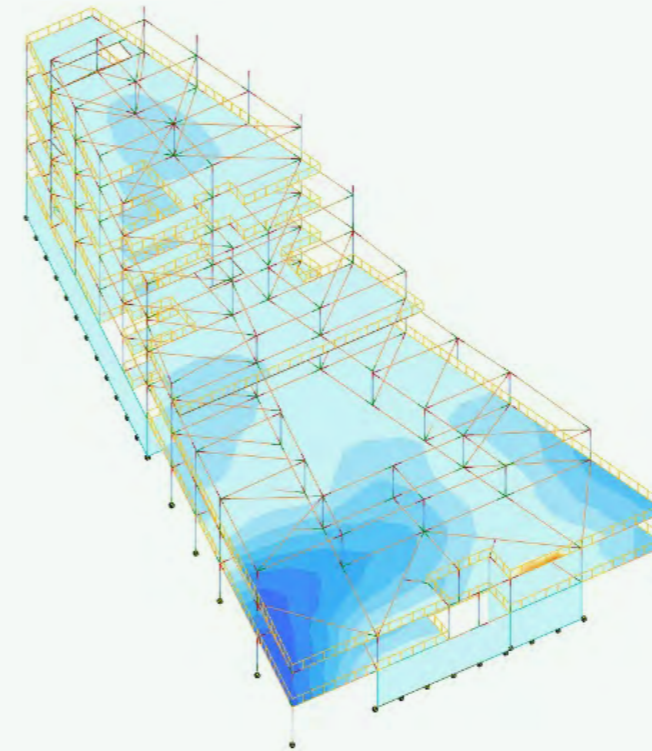
In October 2019, three research papers were presented at the 3rd International Conference on Building Information Modelling (BIM) in Design, Construction and Operations, organised by the Wessex Institute.

Docent James Harty, Build, presented an invited paper, "Rewarding Performance in Construction" which looked at encouraging methods to promote better building practices in carbon and energy using blockchain to reward such work.

Lecturer Pablo Hector Gonzalez Alfaro, Lecturer Judith Marton both from the International Architectural Technology and Construction Management Programme, and Docent James Harty presented "Exploring BIM intelligence further with iTWO", which combine the drawings and geometry with the quantities and time, so that there is a predictive model to benchmark the actual project.

Senior Lecturer Livio Lamartini and Lecturer João Pereira de Sá both from the International Architectural Technology and Construction Management Programme presented "Structural pre-analysis through implementing Revit Structures and Robot to develop and compare engineered timber structural families", which potentially provides a new course stream where structural elements can be sized by a technologist (see case 3 in the build section of the education chapter). All were peer-reviewed and well received.

With the adoption of Building Information Modelling in 2006, KEA Build has been able to analyse, simulate and test performance, moving towards what is commonly known as digital twins today.



PROJECT WORK AT BUILD

During 2018 and 2019 teachers at KEA Build have organised in research and innovation project groups who meet regularly to work on their projects, and there are several on-going projects concerned with sustainability and social responsibility concerned with several and very different topics at KEA Build.

One group looks into "Residential Buildings in Timber", in the project large residential buildings in timber are explored through research and visits to Austria and other places that are already building in wood – a material enabling CO₂ storage in buildings. Another group works in a project investigates what new building rules, which enables digital work processes and integration of the SDGs in Danish construction among other things, means for the construction architect profession and the programme.

APPLIED RESEARCH AND INNOVATION AT KEA DESIGN

By Docent DA Petra Ahde-Deal, KEA Design

Applied research and innovation projects at KEA Design are of a vast variety. KEA Design has three main focus research areas; Circularity, Smart and Culture. Whilst having focus on these specific areas, the projects also typically handle sustainability and future skills. All of the projects are conducted in collaboration with other institutes or companies. In this report, the focus is on the projects related to sustainability and future skills. We see that both consideration of and learning about future skills is an essential part of educating for sustainability (see also SDG 4).

The fashion industry is the second largest polluter in the world. Anything that can be done to mitigate and reduce this, must be done immediately. Consequently, we need to change the fashion education to react quickly to the pollution issue thoroughly. Therefore, the education needs to be altered to create readiness for the future graduates to carry the change in fashion industry and fashion consumption in a less polluting direction.

A GAP IN THE LABOUR MARKET

At KEA Design there is a focus not only on teaching sustainability but also in how to get the graduates as future sustainability professionals in the right positions in the labour market. The responsibility of education is to target the right needs and provide skills and competencies required to meet those needs. Sustainability has been in focus in teaching, especially in fashion, for the last 10 years at KEA. However, we see a gap in the labour market in

employability of graduates, and with the actual realisation of sustainable actions in the industry. Namely, KEA Design has been providing more advanced competences within sustainability than the employees have been able to utilise. This gap has naturally narrowed within the last couple of years due to awareness of sustainability issues within the consumers and brands. However, there is still a lot to do before sustainability skills and competences are utterly integrated throughout the labour market.

HARD SKILLS AND SOFT SKILLS AND COMPETENCIES

In the research and Innovation projects at KEA Design, it is found to be very important to focus in both the 17 UN SDGs and in the soft skills and competencies which UNESCO defines. Several research and innovation projects with emphasis on both are running with KEA Design. UNESCO has defined six soft skills, also called, transversal skills. All skills that are essential in the labour market in addition to hard skills (technical and job-specific skills). Traditionally, KEA is an excellent provider of the hard skills, but as the labour market seems to require have more emphasis on the transversal skills, we have decided to look into those more closely.

EDUCATORS' SUMMIT: A CRITICAL APPROACH TO EDUCATION FOR SUSTAINABLE FASHION

A forum was created in 2016 within KEA Design called Educators' Summit to critically discuss sustainability for fashion education and at the industry internationally. Within this forum it is possible to narrow the gap between the



KEA Design has three main focus research areas; Circularity, Smart and Culture. Whilst having focus on these specific areas, the projects also typically handle sustainability and future skills.





To influence the industry, companies and influencers among educational institutions are invited to Educators' Summit to discuss and share experiences on sustainability skills and competencies.



APPLIED RESEARCH AND INNOVATION

skills and competencies provided by education, and the industry. The Educators' Summit is both focusing on the future skills and competencies which should be taught and promoted to influence the industry to be ready for the graduates provided. To influence the industry, companies and influencers among educational institutions are invited to the Educators' Summit to discuss and share experiences on sustainability skills and competencies.

Educators' Summit is a yearly event tackling specific topics within sustainability in fashion education on zeitgeist. Since 2019, a team of teachers and researchers within KEA Design has worked on an e-book about future skills and competencies within fashion. There will be articles with different viewpoints to sustainability within fashion education in the book. All of them focusing on narrowing the gap between the needs of the industry and what the educational institutions are providing. The book will be published in spring 2020. Please email educatorssummit@kea.dk to request for a copy of the e-book.

The 'Educators: Educate for Change' project at KEA Design (Educators Summit and the e-book are also part of this project), is looking into the transversal skills as future global competencies. Educators have conducted qualitative interviews with high level directors, managers and HR professionals in a global fashion corporation in order to understand their expectations within transversal skills of their future employees. The aim is to work on learning to emphasise transversal skills in education together with hard skills. The "Educators: Educate for Change" project has been running since 2019 and it is expected to gain applicable visions of the project within 2020 in order to integrate those in teaching in the near future.

At KEA Design questions about future skills and competencies are being browsed in parallel projects. We are learning what the future employees are looking for in our very close collaborations with various companies. We are building knowledge of what to teach through these collaborations within different research and innovation projects, and teaching cases. It is fundamental to have critical though tight dialog with the future employees in order to, both, give them readiness to employ our students, and to learn about their needs. It is not only the future employees who are influencing on what we teach, but it is also the students and fellow educational institutions together with our steering group, we get inspiration from.



APPLIED RESEARCH AND INNOVATION AT KEA DIGITAL

By Docent Per Halstrøm, KEA Digital

KEA Digital is in the process of identifying main focus research areas and hence do not have a specific research area on sustainability or social responsibility. However, from the research projects initiated and ongoing in 2018 and 2019 one can trace an interest in topics such as the promotion of health and well-being and inclusion.

One research project is concerned with incontinence among women. This problem is explored by conducting design oriented ethnographic research among Danish mother groups. Also, the project explores possibilities of working with IoT solutions that may promote pelvic floor training among the most vulnerable groups for the health issue, which is postpartum women (i.e. after giving birth). The project aims to promote the well-being of vulnerable groups through digital means.

Another project focuses on making museums more inclusive for those citizens who tend not use the museums as much as other citizen groups. Questions are explored on how to make digital products work as means of inclusion. This may include the means of including citizens in the process of making exhibitions or as means of communicating exhibitions outside of the museum buildings. The project aims to promote social inclusion of all citizens related to cultural offers.

All in all, the management and teachers at KEA Digital are aware of the potential of digital tools to promote the SDGs and social responsibility however they are also aware of

the risks within the digital world of abuse of rights, criminal activities etc. Hence it is crucial to link up with relevant partners to conduct research within the field and the Digital department will continue to do so.

One pipeline project is focused on ways of coding sustainably. This project is looking into how certain ways of coding among smaller businesses can be improved in terms of energy use and sustainable coding. This research could provide important new knowledge which will help smaller businesses save money while at the same time use less energy which is more responsible and sustainable.

KEA Digital is aware of the potential of digital tools to promote the SDGs and social responsibility however they are also aware of the risks within the digital world of abuse of rights, criminal activities etc.



APPLIED RESEARCH AND INNOVATION AT KEA TECH

By Docent Henrik Buhl, KEA Tech

The Tech educational department is in the process of continually developing its research and innovation capacity by defining and elaborating upon three interdisciplinary focus areas / themes to leverage the research and innovation projects as well as the further development of Tech programmes and their future knowledge base.

Defining and developing focus research areas at Tech are part of the strategic work with applied research and innovation, and is a process initiated in 2019 stretching well into 2020.

Three focus areas have been identified which all correspond well to the sustainable development agenda:

- **Installation & Energy:** A focus area primarily targeted towards teachers from the Energy Technology, Electrical Service Engineering, and Service Engineering (Plumbing Technology) programmes, in order for synergies and cross-disciplinary collaborations to develop between the closely connected disciplines. A shared interest in the focus area is to optimise energy use and flows in the built environment.
- **IoT & Data:** Teachers from almost all Tech programmes have come together in this focus area due to interests in exploring digitalisation in their own fields and the potential in certain technologies. Some of the teachers' interests in the focus area lies within using technology to optimise energy consumption or to enhance

sustainability. The area is a truly transdisciplinary field with relevance for KEA's other departments and programmes and it could potentially become a shared focus area at KEA.

- **Production & Materials:** A focus area primarily for the product development and production-oriented programmes at KEA Tech, Production Technology and Product Development and Integrative Technology, as well as Automation Engineering. The focus on materials refers to a concern about material choices and technologies to in relation to more sustainable production that both teachers, students and the industry demand and that is already being explored at KEA, which can be seen in the Education chapter, KEA Tech section and in the Material Bridge description in the Appendix of this report.

The plan is that during 2020, the focus areas have been thoroughly analysed and elaborated upon by each group with inputs from external stakeholders and businesses in order to start up strategic work within each area.



KEA Tech has identified three focus areas which all correspond well to the sustainable development agenda: Installation & Energy, IoT & Data, and Production and Materials.



MATERIAL KNOWLEDGE – A MISSING LINK TO SUSTAINABLE DESIGN

PhD dissertation "From matter to form - Reintroducing the material dialogue from craft into a contemporary design process" by Mette Bak-Andersen, Material Design Lab, KEA in collaboration with the Royal Danish Academy of Fine Arts, School of Design, KADK

By now there appears to be a consensus amongst researchers in sustainability that in order to confront the environmental crisis, we must change the way we design and produce things. During the last decades a number of books, articles and reports have been written about design for sustainability. These provide detailed and valuable information about the system of sustainability and define the criteria the products must meet. However, to design sustainable products entails more than a good holistic understanding of the system of sustainability and knowledge about the criteria for sustainable products. To design for material circularity and sustainability requires a profound knowledge of the physical matter that constitutes the product. Designers must not just know of materials but know how to manipulate them and work with them creatively. This kind of knowledge cannot be acquired solely through lectures or reading and therefore, it affects not just how we design, but also how we learn to design.

Materials have been central in the design process and design education before, but since then the didactic approach in the design schools have changed noticeably. Likewise, the materials themselves and the manufacturing process have changed radically in numbers and complexity. Therefore, when reintroducing working with materials, the didactic approach may need to be altered and the physical workshops and laboratories cannot simply be divided and set up as they used to be. Letting the material inform, inspire and restrict

the design and development of a product is intrinsic to a craft process and can be seen as a craftsman's 'dialogue' with a material. This research project explores ways of bringing back the material dialogue from craft into a contemporary design process.

The research was conducted as research through design (RtD) and included six design trials. Five trials took place in the Material Design Lab at Copenhagen School of Design & Technology, KEA and one trial was placed at the Master in Design for Emergent Futures at Institute of Advanced Architecture of Catalonia, IAAC. The findings from the trials show that letting design students systematically explore and experiment with materials can provide them with the type of material knowledge required to design for sustainability. However, the findings also reveal that reinstating working with materials in design education may challenge both theories of learning and curriculum as well as the physical spaces. Furthermore, it was found that reintroducing materials could affect established conceptions of design, by transferring the design activity into a cross-disciplinary field predominantly defined by art, technology and the natural sciences.

The KEA Material Design Lab has been developed continuously based on the findings of Mette Bak-Andersen's research, both the physical framework and the learning theoretical approach to experiment with design and materials. This means that the research to a large extent lives on through the activities ongoing in the Material Design Lab, in which both teachers, students and external partners participate. Mette Bak-Andersen is still part of the Material Design Lab team and is currently (2020) working on developing teaching materials for the Design programmes based on her research findings.

Letting the material inform, inspire and restrict the design and development of a product is intrinsic to a craft process and can be seen as a craftsman's 'dialogue' with a material.

– Mette Bak-Andersen





PARTNERSHIPS & COMMUNITY

**STRENGTHENING PARTNERSHIPS AND COMMUNITY
ENGAGEMENT TO UNLEASH INNOVATION FOR SUSTAINABILITY**

STRENGTHENING PARTNERSHIPS AND COMMUNITY ENGAGEMENT TO UNLEASH INNOVATION FOR SUSTAINABILITY

In accordance with SDG 17; “Strengthen the means of implementation and revitalise the global partnership for sustainable development” KEA works with partners from all over the world. KEA recognises that the challenges revolving around sustainability which the world faces can only be met through strong global partnerships and exchange of students. By pooling knowledge, experiences and curiosity across continents, nations, cultures and communities, we can unleash innovation by students and educators and promote sustainable development.

Below are some cases to highlight how KEA engages in partnerships and how we seek to nurture international students and their well-being in Denmark.

CASE 1 SUSTAINABLE FASHION BEYOND BORDERS

By International Coordinator Hanne Vang Hansen, KEA Research, Career and Relations, KEA Global

Since Winter 2019, KEA has been offering an exchange semester in PBA Design & Business – Sustainable Fashion as one of the programmes available to exchange students from a wide array of partner schools around the world. The Sustainable Fashion exchange semester is built on the same foundation as the Danish specialisation in Sustainable Fashion, in which sustainability is at the core of everything from the didactic and pedagogical elements to the content being taught. With a focus on sustainable fashion from a semi-cross-disciplinary approach, the programme is open

to students from both traditional fashion design, pattern design, fashion business, fashion management and fashion promotion study backgrounds, which contributes to eclectic perspectives on the topic as well as comprehensive solutions elaborated by the students. The SDGs are the starting point of all modules and these are translated into a learning situation with a design focus. The pedagogical and didactic approaches are based on building up sustainability competences and focus on a learner-centered approach, action-oriented and transformative learning (please refer to section on KEA’s 10 didactical principles in this report).

WHY THE IMPORTANCE OF OFFERING SUSTAINABLE FASHION TO EXCHANGE STUDENTS?

First of all, the Exchange Semester in Sustainable Fashion was created in the wake of the dimensioning of International-track programmes (2016) as a means to continue to offer this particular subject to KEA’s many exchange partner schools within the field of fashion. In order to retain the option to send KEA students from Sustainable Fashion on exchange at the given schools, KEA needed to be able to continue to offer this subject to incoming exchange for the purpose of balance.

The popularity of this particular subject stems from the pioneering role KEA has undertaken to integrate the sustainability approach in fashion education – a bold and challenging, yet extremely crucial move, which KEA has achieved much recognition for amongst fashion partner schools around the



Case 1

SUSTAINABLE FASHION BEYOND BORDERS

By International Coordinator Hanne Vang Hansen, KEA Research, Career and Relations, KEA Global

With this programme, KEA is facilitating the exchange of knowledge, perspectives and various local challenges with regards to the adaptation to sustainable fashion approaches.



Case 2

THE CHARRETTE – PROMOTING SUSTAINABILITY THROUGH GLOBAL COMMUNITY ENGAGEMENT

By International Coordinator Anne Dibbern, KEA Research, Career and Relations, KEA Global

The Charette is an international, interdisciplinary design workshop that takes place every year at KEA. The theme revolves around urban development and sustainability, but with different angles.



PARTNERSHIPS & COMMUNITY

world. In fact, many of our partnerships with international fashion design schools are based on this recognition and derived interest in sending their students to KEA.

The major challenge of making fashion education sustainable is clearly that the identity or DNA of the fashion industry can be seen as inherently opposed to the sustainability agenda. That being said, fashion is here to stay, so what is needed is an innovative and renewed approach to fashion, which takes sustainability, circular economy etc. as a starting point. And this is what KEA has developed with the Sustainable Fashion educational programmes, in a belief that the sustainability agenda needs to primarily rely on education.

THE SIGNIFICANCE OF THE INTERNATIONAL SYNERGIES

Changing our habits to adjust to climate change is a global challenge and not something to solve locally. We need the perspectives from all over to make sure all aspects are taken into consideration. With this programme, KEA is facilitating the exchange of knowledge, perspectives and various local challenges with regards to the adaptation to sustainable fashion approaches that the experienced lecturers who teach within the framework of the Danish fashion industry are currently adjusting to. Denmark is progressive on this front, but we need the input from other corners of the world to reach comprehensive sustainable solutions. The international students contribute with their local perspectives, they create global networks of progressive fashion professionals, and they set a new global agenda for the fashion industry. The international and intercultural discussions are invaluable in this setting.

In addition, the idea is that these students adopt elements

of the Danish progressive approach to fashion and bring these with them back home after the exchange to influence the approach at their home location.

In the future, the Sustainable Fashion exchange semester will have a greater focus on new technologies as a driver for sustainable change. With an increasing interest shown in this opportunity amongst partner schools, KEA is excited to see this successful programme continue and grow over the coming years, in which the demand for sustainability will inevitably increase across all sectors.

CASE 2 THE CHARETTE – PROMOTING SUSTAINABILITY THROUGH GLOBAL COMMUNITY ENGAGEMENT

By International Coordinator Anne Dibbern, KEA Research, Career and Relations, KEA Global

The Charette is an international, interdisciplinary design workshop that takes place every year at KEA. Around 80 students from around the world and 40 tutors gather to work in groups on a concept around a central theme and a local partner in Copenhagen. Every year, the theme revolves around urban development and sustainability, but with different angles.

CHARETTE 2018

The Charette's 2018 theme was "Connecting Communities - Inclusive Design in the Northwest District" and focused on social sustainability in the Northwest District in Copenhagen also called Bispebjerg.

Here, students worked with local organisations to solve a

PARTNERSHIPS & COMMUNITY

problem with a design concept including as much of the local population as possible to (if possible) help small local organisations and communities connect.

“Our project is about building a network between people, families and communities and to connecting these individuals to other support networks within Copenhagen”
– participant 2018

Social sustainability is important for communities to thrive and a significant element of sustainability. Excess and strong social cohesion translate faster to committed efforts in the local area that, for example, give green initiatives a stronger foothold and popularity.

Participating organisations:

- The Trampoline House – a welcome house for refugees in Denmark
- Lygten Station – a culture house and venue
- FabLab NV – an open fablab located in Copenhagen NV
- Goldschmidt Academy and TEMPI – community organisations working with folk music and culture
- Beboerprojekt Puls – a housing organisation for residents

The groups were free to create any solution they felt would work for their collaborating organisation. Learning how to work with Service Design principles in order to identify the best solution was an important part of the Charrette week, but also at the heart of the KEA Charrette groups would have to harness the knowledge and creativity of diverse group members to come up with a final concept.

See more at kea.dk/charrette

CHARRETTE 2019

The theme for the 2019 Charrette was “Unlikely Partnerships - Connecting with Circular Design” focused on the Northwest District in Copenhagen. Circular design means thinking in regenerative material, economic and social loops, minimising waste and trying to cater for unintended consequences while designing.

Again, students worked with organisations and companies in the Northwest District and had to develop a concept that focused on circular design to the greatest extent possible. The groups also looked at the possibility of forming a partnership with a company or group or organisation that could optimise the circular concept.

CASE 3 STRONG PARTNERSHIP TO PROMOTE ENTREPRENEURSHIP WITH SOCIAL RESPONSIBILITY AND SUSTAINABILITY IN MIND

By Project Manager Lotta Salling, KEA Research, Career and Relations, KEA Applied Research and Innovation

NORDIC ENTREPRENEURSHIP HUBS 1.0

At KEA, we encourage our students to become entrepreneurs. The idea is not to learn about entrepreneurship, but to practice entrepreneurship and turn good ideas into sustainable businesses. To support this idea KEA’s Applied Research and Innovation unit has run the EU Interreg project, Nordic Entrepreneurship Hubs 1.0 (NEH 1.0) from September 2016 to September 2019 in collaboration with DTU Skylab (unit of the Technical University of Denmark) and LUInnovation (unit of Lund University).



A good system of sharing ideas and using each others’ skills.

I think it is a very positive thing to experience a viewpoint that isn’t your own.



– Charrette participants 2018



Because we were only women, it also made it easier to talk openly about some of the things that only concern women.

– Julie Blyitgen, KEA graduate
PBA Design & Business, Sustainable Fashion

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NEH 1.0 was carried out with good results and this was in particular due to the strong partnership between the 3 institutions. 515 students from the three institutions have been inspired or helped in their early start-up development phase and a high number of student entrepreneurs - not least female - gained greater faith in their abilities.

PROMOTING GENDER EQUALITY WITHIN THE ENTREPRENEURSHIP LANDSCAPE

The entrepreneurial demographics in both Sweden and Denmark show that startups are typically initiated by men. For example, the proportion of women entrepreneurs in Denmark has for many years been approx. 26-28% and among growth entrepreneurs¹, women account for only 10%. Several studies and trends show that the low number of female entrepreneurs over the age of 30 is largely due to socio-economic factors, such as the fact that women are seen as better suited to be employees due to their living conditions with children and family. In addition, women typically start businesses in stores and trade, where they experience increasing competition from large chains.

Hence a core element of the NEH 1.0 project was the principles of equal treatment and non-discrimination to promote gender equality within the Danish and Swedish entrepreneurship landscape. NEH 1.0 has worked on gender equality in different ways and specific tools to promote gender equality in project activities have included:

- Equal distribution of male and female speakers and educators where possible
- Continuous special adaptation of activities aimed at the principles of equal treatment and mainstreaming of equality

- Equal representation of women and men in the project's marketing materials, cases, role models, promotional material etc.
- Use of self-efficacy theory as a measurement tool to ensure that the accelerator program developed by the project was equally suited for both genders

In the short term, the project continuously evaluated and measured:

- Participants' gender distribution by project activities
- Gender distribution on the presenters used by the project
- The gender representation of the marketing materials used

BELIEVE IN YOUR IDEAS: COME ALONG FOR A WEEKEND OF INSPIRATION!

VentureLab at Luinnovation has over the last 10 years successfully inspired more female students to become entrepreneurs. One of the activities with an ongoing and increasing success rate is a yearly 'startup inspirational weekend getaway for females only' (Believe in your ideas) designed by VentureLab.

As "Believe in your ideas" has proven to inspire more female students to become entrepreneurs, the startup getaway was adopted by NEH 1.0 and twice "Believe in your ideas" was offered to female participants across the partner institutions to inspire them to take a leap into entrepreneurship. The workshops included female speakers who had started their own businesses, workshops in idea generation, pitching and networking and marketing – all the

1. Yearly in Denmark approx. 20.000 new ventures are initiated. Of these only 0.5% will become growth entrepreneurs

PARTNERSHIPS & COMMUNITY

basic tools one need for a good start. All kinds of female students were welcome, and it was free of charge. In total 60 women participated in these kinds of workshops and gained useful knowledge and access to a strong network of women.

As one of the participants Julie Blytgen owner of WellHonestPreOwned and a KEA graduate from PBA Design & Business, Sustainable Fashion stated:

"Because we were only women, it also made it easier to talk openly about some of the things that only concern women. For example, how women can strategically take into account the biological cycle in relation to important presentations or investor meetings. In this way, one takes into account mood swings and one's emotional life, which is quite natural, but rarely an issue in entrepreneurial circles".

KEA and VentureLab have jointly prepared a booklet on 'how to' with a variety of tools and working documents that educational institutions can use to set up start-up bootcamps only for female student entrepreneurs.

The booklet is free to download from the project website: nordicentrepreneurship hubs.com

NEH 2.0 WITH AN INCREASED FOCUS ON SOCIAL RESPONSIBILITY AND SUSTAINABILITY

In December 2019, Interreg confirmed a new grant which will secure the good project collaboration behind Nordic Entrepreneurship Hubs.

Over the next 2½ years, KEA, DTU Skylab, LundInnovation

and a new project partner – CPH Business - will research, test and develop activities that can support institutions and young entrepreneurs from the early start-up phase to a viable establishment.

NEH 2.0 will develop training courses, methods and tools to be used in training regarding mindset and entrepreneurial skills related to scaling and growth. Subjects such as team composition, team development and recruitment related to growth, development of an incubator program for viable startups and mapping of ecosystem players in the region are in focus during NEH 2.0.

NEH 2.0 will specifically work on sustainable development and social responsibility at several levels. Much of the current research and teaching at the partnering institutions are related to sustainability with a special focus on the UN's 17 Sustainable Development Goals.

Thus, NEH 2.0 will also seek to include the SDGs and social innovation in the project's awareness events and training courses such as knowledge of material understanding, understanding of technologies, green and climate friendly products, suppliers, waste management, transport and CO2 footprint. It can also relate to impact awareness or Global Compact related topics. In addition, the project will focus on an SDG 'Train the trainer' training which will prepare the entrepreneurial staff of the partner institutions in relation to being able to communicate and support the trends and opportunities that the transition from philanthropy to business or from business to impact offers.

The following are examples of businesses established by NEH 1.0 student entrepreneurs.



Understanding how to transform the knowledge from KEA into practice was a difficult process for us, but here Ignite was a great help.

– Christian Cordius & Jacques Nørbo
Founders of Banana CPH





The support from mentors and other entrepreneurs gave me even more confidence in my business.

– Freja Loewe
Founder of Freja Loewe



PARTNERSHIPS & COMMUNITY

BANANA CPH

Green entrepreneurs, Christian Cordius & Jacques Nørbo started Banana Cph as part of the NEH start-up program Ignite. Banana is an organic, sugar-free, vegan ice-cream concept inspired by the Hawaiian Islands. Today they are serving hundreds of people daily in Torvehallerne Copenhagen, and are present at festivals, fairs and events.

"As green entrepreneurs, Ignite was an important tool in our process of getting our business, Banana Cph up and running. Understanding how to transform the knowledge from KEA into practice was a difficult process for us, but here Ignite was a great help. Especially a big thanks to Gunnar Näsman, for knocking us through hard but important workshops in order to work better together, communicate as a unit and to execute on selected tasks".
- Christian & Jacques, Founders

"The food industry is constantly evolving. As the population grows globally, solutions and methods are needed to enable us to consume more efficiently and responsibly. It is not just the politicians' responsibility to change the bad habits created by an unruly consumer society. It is also companies and private persons who must show the way, and we hope that Banana can be an example of the great value in what we already have."
- Christian & Jacques, Founders

See more at bananacph.com

CHEESEITYOURSELF

Helps conscious consumers who want to re-define their conventional diet without compromising their taste

preferences, by providing them with a plant-based ingredient mix in a powder format to produce a plant-based cheese at home out of their legumes' food waste.

"Multidisciplinary, lovely people filled our meetings with brilliant ideas and nice conversations. It was a spherical introduction into the entrepreneurial world, where the "torch" of some start-ups was as a matter of fact "ignited" as it was meant to be!"
– Panagiota Dima

See more at cheeseityourself.com

FREJA LØWE

Freja Løwe creates plant dyed textiles for the body and home, where Scandinavian aesthetics meet traditional Balinese textile traditions.

The brand was founded as an antidote to the fast paced fashion industry, and seeks to reestablish our connection to nature through natural dyes, fabrics and handmade elements.

"The ignite program gave me some helpful tools to look at my business from new perspectives. The support from mentors and other entrepreneurs gave me even more confidence in my business, and it was great to discuss the different stages of starting a business with likeminded people".
– Freja Loewe / Founder

See more at frejalowe.com

MEMBERSHIPS AND KEA'S SUSTAINABILITY NETWORK

KEA has numerous relations and are part of several networks and associations related to the different professional fields that KEA educates for. But KEA also has a few memberships directly related to social responsibility and sustainability in education.

KEA has since its inauguration been a member of the Global Compact Network, Denmark that was established in 2017, and has since collaborated with them in research and innovation projects and taken part in their conferences as well as their general assembly. Currently in April 2020, KEA has put forward a candidate for the Board of Directors.

KEA is also a long time member of RCE Denmark: a regional center of expertise on education for sustainable development. Originally founded in UNESCO's decade of education for sustainable development (2005-2014), RCE Denmark works for more sustainability in education and society across all educational levels. During the last year RCE Denmark has initiated a movement with educational institutions from ground schools to universities, civil society organisations, companies and political parties to demand for sustainability to be integrated into national educational legislation at all levels.

A group of passionate educators and consultants working at KEA has for some years worked to integrate sustainability even more into KEAs programmes, research, operations and governance, among other things by writing KEA's Communication on Engagement reports for the UN Global Compact. In the fall of 2018 the group launched KEA's Sustainability Network for interested staff

members and have in the fall of 2019 written a proposal to the top management with numerous ideas for strategic development concerned with sustainability.

As this COE is written, KEA is developing a new strategy based on co-creation methods to take into account perspectives and inputs from most of the employees at KEA. The strategy has a special focus on sustainability!

An exciting time awaits us at KEA during the coming years.



A group of passionate educators and consultants working at KEA has for some years worked to integrate sustainability even more into KEAs programmes, research, operations and governance.





APPENDIX

OTHER EXAMPLES OF PROJECTS AND ACTIVITIES RELATED
TO SUSTAINABILITY AND SOCIAL RESPONSIBILITY

OTHER EXAMPLES OF KEA PROJECTS AND ACTIVITIES RELATED TO SUSTAINABILITY AND SOCIAL RESPONSIBILITY

This collection of examples have mainly been identified through KEA's internal online project platform: **KEAViden.dk**

THE MATBRIDGE PROJECT (2019-PRESENT)

By Senior Lecturers Kristian Colvey & Christian Lystager and Lecturers Jon Emil Stenz & Dina Jacobsen, KEA TECH

The matBRIDGE project looks to discover and reengineer the successful elements that provide a valid data driven material selection process with the flexibility of using new materials for which such data might not yet exist. It explores what types and thresholds of data might be needed before a quantifiable valid material selection can be made when using new materials. The approach here involves professional oriented developments by academic staff, combined with the data collection efforts of students in their attempts to extract valid and accurate data from new material producers. Of interest here is what data is available, what data is accessible and how much data is needed before one can reliably compare it with another material. The process of this data gathering is important in establishing insights that could possibly transform our professional practice, not just in product development, but throughout professions using material selection as a tool to drive sustainability.

THE JOURNEY TO MAKE LCA FASTER AND MORE ACCESSIBLE

At KEA, especially in the educational programmes AP

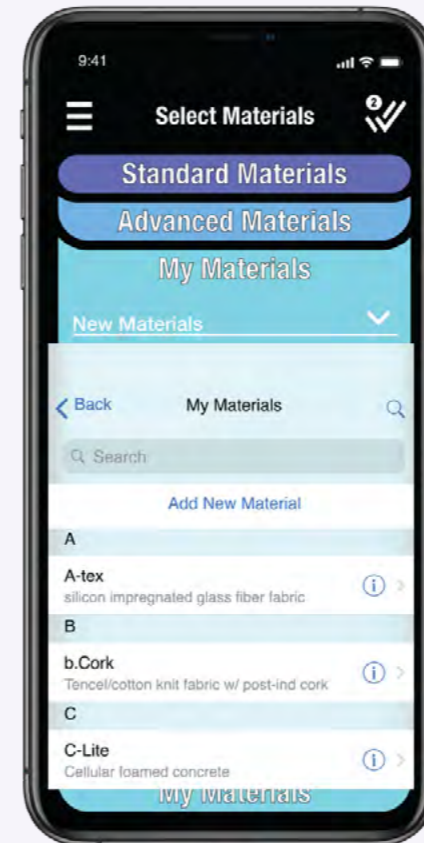
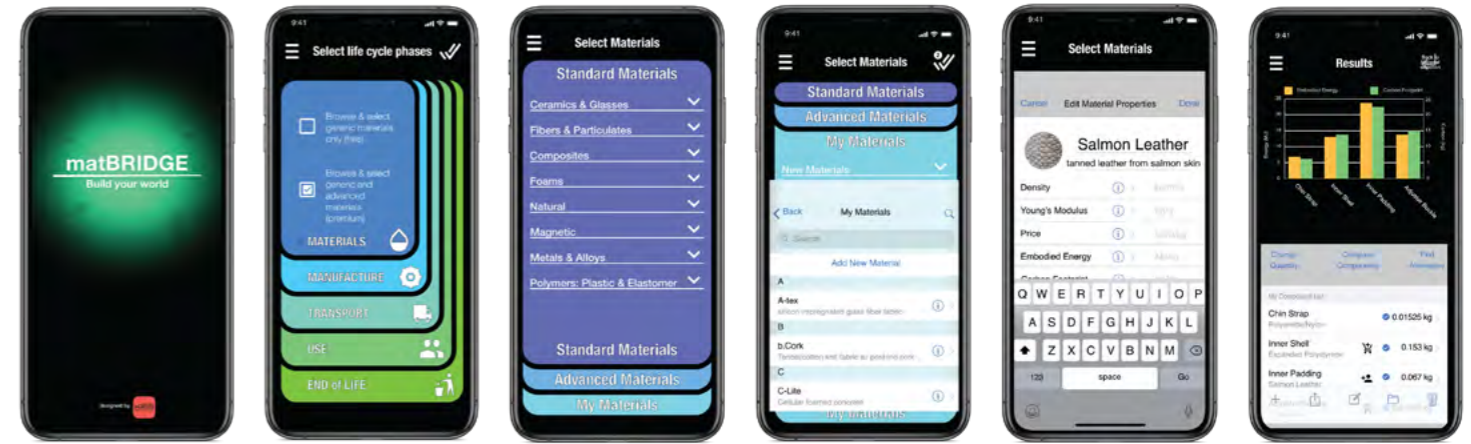
Production Technology and BA Product Development and Integrative Technology, we subscribe to a data driven sustainable mindset, meaning that we understand that our decisions related to designing, redesigning or optimising a product must be founded in having as much and as accurate data as possible, both from the point of view of what meets the demands of the user, the market and the societal and political landscape.

For the most part, the decision-making process and methodologies used for students studying a technical education is related to the use of tools and practices related to our professional field of practice. We focus on the development process using different materials and production processes but cannot ourselves commit to doing full-fledged LCA and material characterisation studies of the type that dedicated R&D apparatuses do. Instead we rely on readymade databases and software using large datasets to be able to compare and contrast differing materials in consideration for products.

BRIDGING TWO MATERIAL WORLDS

We have two assets at KEA that help us in our material selection process. The first is GRANTA Edupack: an industry standard materials database, containing extensive physical, mechanical, and eco data for up to 4000 differing materials commonly used in manufacturing and production.

The main issue is that by virtue of the database's



The matBRIDGE project explores what types and thresholds of data might be needed before a quantifiably valid material selection can be made when using new materials.



The second main asset we use is the Material Connexion Library. This is both a physical and digital ever-changing library with some of the world's newest and most innovative materials.



APPENDIX

widespread use and nature, relying on such a database alone in our material selection phase creates a tendency to stick to choosing materials that are well known and established, so how do we go about finding new materials that might be interesting for our products?

The second main asset we use is the Material Connexion Library. This is both a physical and digital ever-changing library with some of the world's newest and most innovative materials from various small and large suppliers containing new and interesting natural materials composites, that from a circular economy and recycling eco standpoint, could potentially have a lot to offer in lifecycle impact reductions if used in products. These however do not provide the same extensive quantifiable information and therefore it makes them difficult to validate as interesting materials from a life cycle perspective.

The question is how do we take the best of both worlds, the reliability of accurate material eco data and combine it with new innovative materials to drive our sustainable product development into the future?

The research process, in this project, relies heavily on case studies, exploration of algorithms, data visualisation, establishing partner and supplier relationships and trust, digital development, and primary and secondary data collection. The hypothesised solution is visualised as an app / digital tool that allows individual designers, students, and professionals without an engineering background to more quickly assess the environmental impacts of their products and development in the design stage. The user would be able to quickly compare well known materials and grades together with new materials. Users could create

new material records, from a methodology developed from the student's and academic staff's experience with data collection of eco data from new materials producers.

TAKE-BACK OF TEXTILES (2019-2020)

by Lecturers Susanne Guldager and Jennifer Poczka Ibsen, KEA Design

The project is part of a larger research project led by the Life-Style and Design Cluster: Take-back of textiles, with Else Skjold, PhD. as project manager. The focus is on mapping existing knowledge in the field of take-back as well as the development of take-back solutions within three key areas: Fashion, workwear and interior. Lecturers Jennifer Ibsen and Susanne Guldager are responsible for the sub-project on workwear. The project focuses on how resource flows within workwear can be optimised between key players in the sector, which are primarily made up of producer, laundry and buyer (public or private). The methods are primarily based on qualitative studies in the form of interviews and observation.

3D VIRTUAL PROTOTYPING IN THE APPAREL INDUSTRY (2018-2020)

By Lecturer Lotte Nerup and Senior Lecturer Berit Konstante Nissen, KEA Design

The project examined 3D Virtual Prototyping in the apparel industry in relation to relevant technologies. Of interest was the experience that lies in selected Danish and international companies as well as Danish and international educational institutions. During a test workshop with KEA students, the competencies and skills that are needed to work with 3D

APPENDIX

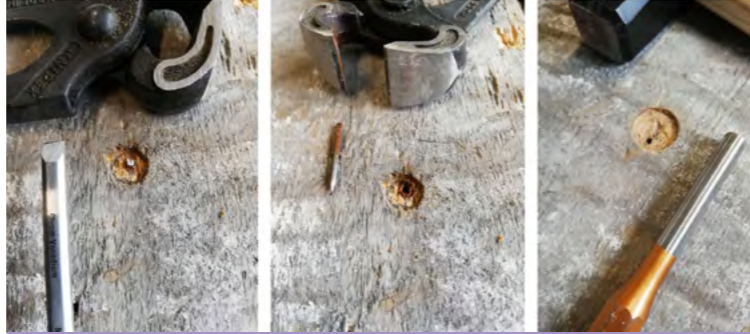
VP have been examined. For the planning and execution of the workshop, 5 lecturers from Sustainable Fashion and Pattern Design have taken part in the project. The result of the workshop illustrated how and when 3D VP should be included in the syllabus of the programs. By involving 3D VP in the design and construction process, one will be able to save up to 60% of the samples. It will produce more sustainable production as less energy, transport, materials and more will be used.

Based on the project findings and recommendations, 3D Virtual Prototyping tools have been integrated at KEA Design in elective modules in the spring on 4th and 6th semesters for both Sustainable Fashion and Pattern Design students and will furthermore be used in modules on Pattern Design on 2nd and 6th semester. The elective module on 6th Semester was an exploration of 3D virtual prototyping possibilities with a focus on the UN SDG 12 – Sustainable consumption and production. The students used 3D tools along with sustainable design approaches in the development and presentation of their collections. Pattern Design students will continue to use the tools to tackle the issue of pre-consumer waste in a project called Sustainable Pattern Design in their final module on 6th Semester. From August 2020 3D virtual prototyping tools will be an integrated part of the new sustainable fashion tech designers' toolbox throughout the entire programme at KEA Design.

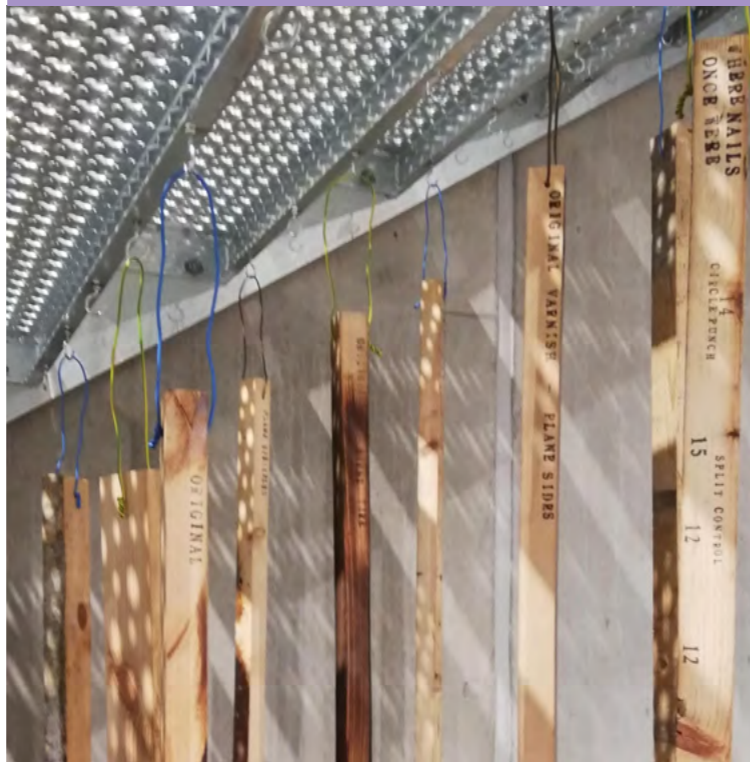
MATERIAL LONGEVITY

By Lecturer Jeremy Walton, KEA Design

It is evident that when repurposing old materials, it is time consuming to disassemble and remove additional elements



The focus of Material Longevity is to use design explorations to bring out the qualities of old wood and in doing so question its perceived value versus logistical cost.



such as metal nails, resulting in repurposing old materials being uncompetitive for companies. The focus of this innovation project is to use design explorations to bring out the qualities of old wood and in doing so question its perceived value versus logistical cost. Collaborating with Sydhavn Genbrugscenter Testlaboriet, which has been set up by the municipality of Copenhagen to facilitate and support start-up companies in exploring the potential of circulating the material flows from public recycling centres, the project is a direct first hand reality check of working within a circular economy initiative.

While the project is about the re-use of wood fractions found at the recycling centre, for evident environmental gain, the context of the project is within the economics of small start-up companies (labour intensive, dirty and physically punishing). It is in fact about the labour involved in working in this field. Both the time, pleasure, health and physical strain that small-scale businesses experience when starting up circular material initiatives.

THERMAL ADAPTIVE ARCHITECTURE (2019-2020)

By Senior Lecturer Anke Pasold, KEA Material Design Lab

Humans respond subjectively to slight changes in temperature, which impact our health, well-being, productivity and use of energy to maintain specific body temperatures.

In general, 1-3 degrees Celsius significantly modify the thermal sensation of humans. This means that the built environment is spending large amounts of energy through technical aggregates to maintain a general thermal balance. In part, this creates a built environment that accounts for

almost 50% of the global CO2 emission and paradoxically delivers buildings that often reduce the quality of life for humans, rather than supporting and improving living quality. A significant part of this problem is based on generalising thermal conditions for humans. Consequently, there will be a need for fundamentally new thermal agenda by architectural approaches that meet these problems.

This project focuses on addressing these issues by the development of new thermal responsive building membranes, using primarily thermal variations in the environment to drive changes of the auxiliary membrane structures, structures that not only can play a significant role in new but also in the context of renovation projects.

In connection with the research project 'Thermal Adaptive Architecture' at Aalborg University, materials that can be '3D printed' and robotically assembled for the development of thermally adaptive prototypes are developed. The prototypes are developed experimentally and serve as both research methodology and dissemination object with larger wood-based demonstrations.

Apart from showcasing the process in the KEA Material Design Lab through a series of workshops, lectures and events that, among other, focus on project presentations and temporary expert exchange, the process and individual steps of the project will be exhibited both in-house and at external locations for broader dissemination. The project will be documented for in-house publication and as sample collections, all of which can be directly integrated into future teaching (by Material Design Lab or on loan by programmes). And finally, the project will be presented to a broader audience and published through peer-reviewed articles.

Membrane projects are of interest at KEA's renovation line - KEA Build (5th semester at the Architectural Technology and Construction Management programme) as these are focusing on alternative approaches to energy optimisation in renovation and reconstruction contexts with focus on societal and technological aspects.

On a wider scale, the project looks at performative material compositions for 3D fabrication within the context of a circular economy - all the way from the material input to the eventual output, application and reclaiming. These areas of focus can be expanded to several other educational programmes.

YOUTH FASHION SUMMIT (2018-2019)

By Lecturer Tina Hjort, KEA Design, Project Manager Clarissa Berg, KEA Research, Career and Relations, Lecturer Lotte Nerup, KEA Design, Lecturer Regitze Nehammer, KEA Design, Senior Lecturer Trine Bekkersgaard Stark, KEA Design, Lecturer Helene Niclasen Jeune-Allsopp, KEA Design, Docent Petra Ahde-Deal, KEA Design, Senior Lecturer Berit Konstante Nissen, KEA Design, Senior Lecturer Rasmus Rahbek Simonsen, Senior Lecturer Gullan Strøm Christensen, KEA Digital, Lecturer Mette Marko, KEA Material Design Lab, Lecturer Sophie Edvard Nielsen, Lecturer Penille Dalmose Christensen and Senior Lecturer Jane Burchard, KEA Design

On 13-16 May 2018, the fifth edition of Youth Fashion Summit took place in Copenhagen gathering the next generation of fashion designers, communicators and business executives. The Youth Fashion Summit has been organised all five times by KEA since 2012. As an exclusive sustainability education programme and idea generation

platform for students passionate about a more sustainable fashion industry, the Youth Fashion Summit challenged 100 talented students from around the world to explore how the Sustainable Development Goals (SDGs) number 3 and 5 can represent opportunities for the fashion industry. The mission of the Youth Fashion Summit programme was to give students; the future change makers; a platform, the tools and opportunity to influence the decisions made today, which will mostly effect the future tomorrow. Participating students were encouraged to speak their minds and share their ideas as well as critical perspectives on the current fashion industry and how the industry should be shaped in the future.

Youth Fashion Summit ran during 2018 and 2019 as an extracurricular programme starting with a challenge put forward by The Global Fashion Agenda, Copenhagen School of Design and Technology and the United Nations Global Compact. In the months leading up to the Youth Fashion Summit 2018, 5 webinars provided the students with different approaches, tools and best practice examples. As part of the Youth Fashion Summit, the students attended a three day workshop creating demands and fashion narratives for the fashion industry and a speech which they presented at the world's leading event on sustainability in fashion: Copenhagen Fashion Summit.

In 2019, the same 100 students were invited back to transform their work into corporate action through a case competition given by the Danish company Pandora. The case competition lasted 3 days and the winner was presented at the Copenhagen Fashion Summit 2019 on May 16th.

For more information visit youthfashionsummit.com



The Youth Fashion Summit challenged 100 talented students from around the world to explore how the Sustainable Development Goals – SDGs 3 and 5 – can represent opportunities for the fashion industry.





**KNOWLEDGE ALONE IS NOT ENOUGH.
YOU NEED SKILLS.**

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