Welcome to the TUM: Junge Akademie!

Welcome to the TUM: Junge Akademie! In this booklet the results of the 2016/17 project groups are presented.

Again great students, equipped with a remarkable variety of talents, formed teams to work on challenging issues. During the process of this work they clearly experienced what Henry Ford, reflecting on teamwork, once characterized as follows:

“Coming together is a beginning; keeping together is progress; working together is success.”

“Coming together is a beginning”: The fundamentals of the spirit and the specific flavor of the TUM: Junge Akademie are laid in the project start, by bringing together a variety of outstanding and enthusiastically presented individual ideas. In a tough process of identifying common denominators and shaping project-storylines the ideas are projected onto a set of hypotheses that should preserve the individual enthusiasms but also establish common lines as a basis for the next successful steps. “Keeping together is progress”: Moving from the “talk the talk” of the previous step to the “walk the walk” with all its obstacles, detours and doubts is a decisive process that has to end in a structure that facilitates collaborative work without losing too much energy in redefining, reshaping and questioning the common basis previously defined. And, finally, “working together is success” requires diligence, clear structures, openness to a continuous do-check-act procedure, commitment and reliability, and – hopefully – an optimal deployment of the team members according to their specific talents.

Usually we define success on the basis of the outcome. Strange enough, then, that Henry Ford had already defined the working together and not the outcome of the work as success. He knew about the predominant importance of processes, and their related challenges of course, as prerequisites for excellent products.

We at the TUM: Junge Akademie consider our projects as specific testbeds for coming, keeping and working together on complicated themes. We encourage our members not just to talk about the outcome of their work but also about the process with its specific strengths, weaknesses and threats. Of course a great outcome is the coronation of the prior working together; however, a suboptimal outcome can be an excellent vehicle for a humble analysis by which to understand the deficiencies of the underlying process and to learn lessons that are important for future activities. So far, no master has fallen from the sky!

Highly occupied professors and tutors invest a lot of time and energy into the support of our young talents in the TUM: Junge Akademie. TUM supports this format intensively. Why do we do this? We are aware that our support of excellent students and the experiences
obtained in the interdisciplinary project work unfold an important lever and the efforts pay off many times. Interdependencies described at the basis of scientific knowledge inside our disciplines often seem to give clear answers, so that one might think that the right decisions are obvious, that they should be easy to communicate, and thus have to be widely accepted. However, in order to shape technological and socio-economic progress, we need a sound number of talents who, in addition to excellent work based on scientific expertise in their specific disciplines, are capable of integrating aspects beyond the horizon of their own field and of leading discourse within society in a clear and empathetic manner while remaining aware of the manifold complexities of underlying processes. The discussions during the last months about “alternative facts” have clearly proven the importance of this type of moderating expert, which we urgently need in our societies. These discussions have again confirmed the importance of the sort of support and training provided to excellent students by the TUM: Junge Akademie. In this context the great resonance of the TUM: Junge Akademie theme “Truth and Lies” in the current application phase proves the growing awareness of our students of their future responsibilities beyond their specific skills and competencies in their field.

My sincere thanks go to GE Global Research and Pixida GmbH as partners of the TUM: Junge Akademie, to the Akademie für Politische Bildung Tutzing, and to all the partners, mentors, tutors and former members involved in the projects. Their generosity of time, expertise and friendly advice has been of enormous value to the project groups. Many thanks also to the TUM Board of Management for the continuous support of the format, to the managing director Peter Finger, to Maria Hannecker and their team for their invaluable and highly professional guidance, and to the members of the task forces and the Board of Members for their creativity, devotion and enthusiasm.

This year’s theme, “Decision Processes,” was a great basis for coming, staying and working together. Enjoy reading this book and exploring the related projects! You will also find information here about the further development of the projects of previous years, about the projects in prospect for the coming year, as well as about other activities unfolding at the TUM: Junge Akademie.

Yours,

Gerhard Müller
Senior Vice President Academic and Student Affairs
Dear readers,

The TUM: Junge Akademie was launched in 2010 to encourage outstanding student talents at the Technical University of Munich. This year we have also included our immediate neighbors in Maxvorstadt, the students of the Munich University of Television and Film as well as the University of Music and Theater, into the scholarship program.

The main aim of TUM: Junge Akademie is to bring the students together in interdisciplinary groups which work on socially relevant topics.

“Decision-making processes”: that was the theme of the Academy year 2016. A topic that matches with the committed attitude of the Academy members. At the TUM we are convinced that students, equipped with a willingness to perform and a passion for scientific approaches, will become decision-makers and leaders of the future. They strive for decision making which not only ensures technical feasibility, but is ethically justifiable, socially beneficial and future-proof. Therefore contributes this scholarship program to successful preparation of its members for the time after their studies and doctorate.

The themes underlying the project work require, in addition to intrinsic motivation, the willingness to systematically work, a sound research and the courage to make decisions. Particularly challenging – as in overall scientific research – are the perseverance and the underlying process. Students who train these qualities in their early years of studies, will be well prepared for the demanding world of constant change.

This is what matters to us: to prepare young people as best as possible for the inevitable active participation in this world of instant change.

I wish the graduates of the scholarship program of the year 2016 a positive completion of their projects and a successful transition to the self-imposed goals.

Cordially yours,

Wolfgang A. Herrmann
President of the university
„A good decision is based on knowledge and not on numbers.“

Plato
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editorial</td>
<td>2</td>
</tr>
<tr>
<td>Greetings from the President</td>
<td>5</td>
</tr>
</tbody>
</table>

## Projects 2016/2017
- Preface                                      | 10   |
- dare2share                                   | 12   |
- EatMe – I’m fancy                             | 30   |
- EatMe – I’m low carbon                        | 42   |
- healthtoday                                   | 56   |
- Integration through Democracy                 | 70   |
- modulo                                       | 82   |

## Projects in Flow
- TUM Bike-Sharing                             | 96   |
- Picturise                                     | 98   |
- The lecture series – Insights into Immigration| 100  |

## Projects in Prospect 2017/2018
- Knowledge Management and Communication       | 104  |
- MatchBox                                     | 105  |
- Participation in Politics                    | 106  |
- Politics and Fun                             | 107  |
- Integration as windfall profit from targeted use of diversity | 108  |

## TUM: Junge Akademie
- The Academy                                  | 113  |
- The Boards of the Academy                     | 114  |
- Committed: Taskforces, Tutors, Mentors, Office| 117  |
- A different scholarship program               | 129  |

## Directory
- List of Mentors                              | 136  |
- List of Tutors                                | 137  |
- List of Members                               | 138  |

- Imprint                                      | 143  |
Projects
2016/2017
Preface .......................................................... 10
dare2share.................................................... 12
EatMe – I’m fancy........................................... 30
EatMe – I’m low carbon................................. 42
healthtoday.................................................. 56
Integration trough Democracy..................... 70
modulo ......................................................... 82
Preface

Over the last year and a half, we have looked into decision-making processes and have developed six projects on this theme within several different areas of research. Before reviewing the projects in detail, we want briefly to consider the topic as a whole. Of course, there is no room here for an in-depth discussion, but, to get different perspectives on the matter, we contacted stakeholders of TUM and its corporate partners and asked them about their views on decision-making processes.

In general, the core aspects of these processes are difficult to define, as “each decision has its own individual characteristics and thus cannot be brought into a fixed frame” (Prof. Gerhard Müller, Vice President of TUM). Nevertheless, there is an agreement that decisions “need to be informed by a long-term perspective … integrated in an environment of mutual trust” (Johann Neubauer, Managing Director of Pixida GmbH) and that “a strong sense of responsibility is central to good decision-making” (Dr.-Ing. Carlos Härtel, CTO of GE Global Research). Not only in research and the economy, but also within our projects, a sense of responsibility plays a major role. This is strongly connected to an awareness of a decision’s possible future consequences, whether on a small or a large scale. Thus, in order to “strike the right balance” when evaluating these consequences, “knowing the stakeholders and being mindful of a decision’s implications” (Dr.-Ing. Carlos Härtel) is vital to making a decision. Professor Michael Molls, TUM Emeritus of Excellence, illustrated his general steps of deciding which research project to engage in. After an exhaustive search of related literature, the hypothesis is reviewed in terms of its originality and feasibility. Afterwards, the project is discussed with partners, ideally both from one’s own discipline and from other disciplines, in order to coordinate the project in the most practical way. These steps are exemplary for making decisions in numerous areas. Regarding our own projects, we also followed quite similar steps in the search for our respective topics.

We have touched briefly on some critical aspects of decision-making processes, but there are many more factors to be considered in any given situation, as the following project reports make evident. However, despite all the complexities, risks and difficulties of decision-making, there is also an upside that is often overlooked:

“Decision-making is about shaping the future in all good conscience and, to the best of one’s knowledge, being aware of one’s responsibility to others – but also, sometimes, feeling the magic of the lasting impacts of one’s thoughts and convictions” (Prof. Gerhard Müller).
Project Report dare2share

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Do you dare2share?

“What exactly is meant by this?” you might wonder, on first reading the question above. To be honest, that’s precisely the response we expected you to have. As “sharing” is a widely-used term, we would like to focus here on how it relates to our social life and activities. We’re pretty sure you probably will not be aware of its great potential for facilitating your everyday life and its status as a basic component of human interaction. To show the immediate presence of “sharing”, as manifested in a lot of daily decisions, we invite you to invest a few minutes in a small thought-journey concerning a normal student’s day… and finally, you’ll end up getting an accurate idea of what our project was dedicated to…

Imagine… you were (you are? – all the better, then) a young and smart, intelligent student, capable not only of passing exams at university, but also of organizing daily living on your own… let’s start your day!

“Rrrrrring…!” – this annoying alarm clock interrupts all your sweet dreams; time to get up immediately! It’s Monday, you’ve had quite an eventful weekend and now, the only thing you feel is great hunger. A glance into your fridge causes disillusionment: of course, you did not plan the following week. The next supermarket isn’t far away, but big raindrops covering your window definitely advise you of doing the shopping right now. So – (decide!)

…”well, bad luck, I’m not having breakfast instead.” – Later you’ll repent your decision; your stomach is revolting and causing an uncomfortable feeling. Not a good start to the day.

…”not a problem at all, you just take the rest of your cornflakes and show up at your neighbours’ flat two floors above. Luckily, they are at home and in the right mood to conjure up a fantastic breakfast for three. Anyway, a little conversation is not that bad at all in the morning and now you feel strengthened to continue your day.

Fresh air everywhere? – a slight, unpleasant odour irritates your nose making you feel very uncomfortable. To detect the cause there’s no need for a great search: Your clothes can tell everyone a detailed story about your weekend’s trip – which apparently led you to a handful of pubs and restaurants. The big red smudge left on your trousers indicates the rest of this tasty chilli coconut curry from the Indian Restaurant just round the next corner… uarg! Embarrassed and disgusted at the same time you change your clothes and put the smelling ones…

…”right into the bin collecting your laundry placed in the bathroom. Dad is showing up the next weekend, so probably he’ll take all the stuff back home and make Mum responsible for it.

…”into a laundry machine located in the basement floor. On the way, there’s Andy, having the same idea and together you have enough stuff for one full shared machine.

Back in your room again, this overwhelming, very well-known laziness takes hold… – as typical for a student, isn’t it? – the television seems to be right on the line… grabbing the remote control, switching on the power, your glance falls on the DVD which you’ve not finished yet…

…”Rrrring!!!” …it’s your bell causing disruption. – The young man from the first floor asks you to pass him your extension cable because his own recently broke down.

…”Doing the favor for him, this automatically means having to give up watching TV for the next hours as the cord is linked with just this apparatus, in other words: it returns you into some modus of the stone age you are definitely not keen on at all! -Sorry, but your best friend is in desperate need of the power supply- all day long!

…”mmmh, according to the principle of “do, ut des” this offers you the chance to reciprocate for his help in installing your WLAN last week. Therefore of course you do the favor for him rejoicing in a real good neighbourliness..
While lying around, wasting time, your conscience reminds you: three - unused - hours have passed since you got up, neither filled with attending classes, learning productively, nor studying effectively. – “The late bird catches the big worm then…” thinking, collecting your study material and getting ready to leave. Could be so easy, if there wasn’t this enduring rain causing a bad mood.

As you are not made of sugar, your body should cope with a cold gratis shower along the way.

Tapping on your phone you come up with the idea of making use of the new car sharing App… luckily it takes you no more than five minutes and you end up sitting in the car of a nice student who is attending the same lecture with you in about half an hour. What an easy and effortless way of getting in touch with someone heading in the same direction!

Carpooling not only prevents you from getting sick, but also saves your hairstyling!

Sitting in the lecture, opening your books, doing the best to motivate yourself… there’s something missing, something important: your calculator!!

Grr…”my phone must help out instead.” – Bad choice, while solving complex integrals it lets you down completely.

Well, just around the corner in the cafeteria, there’s a high probability of being able to borrow a calculator from someone who’s not in need of it right now. Thought, done.

Finally, having endured all those endless lectures you become aware of how much research work you wanted to carry out in the library. Instead of joining the others in the cafeteria, you aim to complete your work at home. Hauling the borrowed books in your arms, the previous problem impedes your plan as the weather hasn’t changed and the rain continues to fall. But heavily. There are you, standing in front of the library, just wearing a very small (figure-hugging!) coat, with nothing to cover the books with, helpless, feeling left alone.

And that’s exactly where our project comes in: As you might have already noticed there are always at least two different possible ways to deal with a deficit or lack of desired things. On the one hand (see closed umbrella), you handle the situation passively using a substitute or enduring the situation by accepting it. But as also shown by the given actions above (see opened umbrella), there’s always – let’s say nearly always – a very smart, easy possibility of helping yourself to your need. “Sharing” is what this kind of action is called. It enables consumers both to “obtain” and “provide”, temporarily or permanently, a special thing or also possibly a service.
dare2share –
how sharing is replacing ownership

1. Abstract

Our project “dare2share” is based mainly on the ideas that came to mind at the very beginning of the Project Year 2016, last autumn. As we tried to examine the pros and cons of a sharing economy, we soon realized that we would do better by focusing on just one of its elements, “product sharing.” To cite Carsharing as a common example, owning a car is not a prerequisite of driving it. Following the general principle of this example, our project aimed to define criteria for a successful realization of product sharing by means of a practical case study that involved the sharing of umbrellas all around the campus of Garching to enable students to arrive at lectures with dry hair and clothes on rainy days, we ask finally: Would you make use of our project? If so, would you also be concerned to remain the borrowed umbrella in the same state as you received it? Would you treat it as if it was yours?

By evaluating a preceding inquiry as well as one in request of the process phase, we wanted to examine in detail consumers’ behaviour and attitude concerning their willingness to share. Keep reading and you’ll find out the rest of the story…

2. Background

2.1 Enhancement of a Product’s “efficiency”

Considering the emerging “sharing model”, which refers to the relatively new socio-economic system that revolves around the shared creation, production, distribution, trade, and consumption of goods and services by individuals and even organizations, you might wonder what are the reasons for its growing popularity and, why people seem to prefer obtaining a special thing or service temporarily rather more than owning it. Of course, someone with a critical opinion can come up with the many drawbacks this model might have. The following abstract provides a detailed look at the pros and cons of this model.

An undeniable drawback of the sharing economy is the potential loss of tax revenues for the government. Not all who earn an income by sharing their goods/services pay the taxes from their earnings which should have been added to the government’s tax revenues. It’s not only the government, but also people who work under a shared economy who are being deprived of their benefits. It is hard for them to remain on the labor market except by being underpaid. Additionally, companies like Uber have reduced the number of people using taxis since it started and this has affected the profit of taxi drivers and companies offering transportation services. To conclude, this model seems to be unfair to people who work under this system and it can also take away profits from businesses.

On the other side, supporters posit that a sharing economy lessens unemployment by opening up the labor market to everybody. According to them, it works both ways, with employers looking to hire the perfect candidate for the job able to post the services they need, while workers can offer their services for a fee.

Furthermore, advocates for the sharing economy refer to the point that this eco-system benefits individuals by giving them the power to rent out their belongings and earning money this way. With the proliferation of online websites like eBay and Amazon Mechanical Turk, sharing becomes more flexible and practical in everyday life. It can be considered as very efficient since it directly pairs the person in need of a desired product to someone owning and willing to rent exactly this object. By engaging in this system, both participants benefit: The first one by using the product for less money than a new purchase, the latter for getting a fee.

In our opinion, the most important point for the sharing model is the following fact: human beings accumulate possessions such as cars, properties and gadgets which at one point or another, will be used less and less. With a sharing economy, private owners can offer their vehicles as a means of transportation to others for a fee. The same goes for an unused room in a home where the home owner can sublet it to other people as an added income. With this type of exchange, unused items and possessions are not wasted. Considering the “sharing economy” as a form of recycling, reuse and repurposing we figured out that this model enhances the product’s efficiency.
Not least because of that, we expect the sharing economy to stay, especially as storage room becomes reduced but without a parallel reduction in people’s desire for high standards of living. In our opinion, the world soon won’t have a choice but to accept and adapt to the sharing economy, because the pros do outweigh the cons across all fronts.

2.2 Requirements for the suitability of a product for sharing

The breakthrough and popularity of several sharing models has led to a strong increase of the number of shared product classes with similar business models. The feasibility often depends on the offered, usually reusable, product types for which the respective sharing concept in turn must be suitable for.

Considering consumer services only, one may distinguish between peer-to-peer and business-to-peer concepts. The former describes shared products which are provided by other consumers. Here, only the contact platform might be commercially available. The latter describes the extension of the traditional rental model to short-term supply, enabled by recent technological progress.

Both models require that ownership of a product (incl. carrying and maintaining thereof) has disproportionally higher (financial) cost for individuals than for a dedicated provider. However, if making profit is not the central goal of the sharing model (e.g. within a free service as discussed here), the concrete product, its usage context and more soft factors become increasingly important.

2.2.1 Product type

Not all products can be rented out in an economically feasible way. The costs for providing these must be significantly lower than costs due to a transfer of ownership.

As currently most products are made for usage by a single owner, the product should be explicitly designed for shared usage. It is often sensible to choose a higher quality model both to reduce maintenance costs and to improve user experience. This eventually enhances the service altogether as acquisition costs might be too high for a single user ownership. In this context, maintenance especially means (physical) durability and resetting e.g. means of personalization.

2.2.2 Availability

A central criterion for the practicability is availability and usage duration. From both an economic and ecological point of view the product utilization should be maximized. Therefore, peaks in demand are problematic meaning a high idle time.

These peaks must be prevented by a scalable product distribution (e.g. concurrent usage of the same product entity) or by changes to the usage environment. This in turn requires that the users form a (locally or socially) limited target group.

2.3 Forms of sharing economy

2.3.1 Existing forms of sharing economy

Airbnb, Uber, Lendico – these are probably the first headwords that pop up in our minds if we think of a sharing economy. Indeed, the number of users is increasing impressively. Although the idea of sharing economy has existed before, this trend seemed to be given remarkable impetus by the financial crisis in 2008/2009. People bethought themselves more of sharing. In the following we would like to give a short insight into different forms of sharing:

(E-)Bike sharing:
According to a study conducted by Roland Berger (2016) there are around 1000 bike sharing schemes with more than 1 270 000 bikes. The biggest market is Asia, led by China. Experts expect a growth rate of 20 % per year by 2020 reaching a market volume between EUR 3.6 and 5.3 bn.

Bike sharing is developing towards a “multimodal system”. Not only do we apply technology to locate, reserve and access the bicycles. They are also linked with public transit (e.g. schedules, stations) and technologies are getting cleaner (e.g. solar-powered stations, sustainable bicycle redistribution).

Car sharing:
In terms of Car sharing we can distinguish between station based cars and freefloating cars. The latter can be borrowed and returned within the entire operating area. In Germany hundreds of thousands of people are using this service.
To mention some advantages: It is a cost-effective solution for customers who travel less than 10,000–20,000 km a year. Since there are fewer cars, less parking space is needed. This is especially helpful in cities with a high urban density. The cars will be replaced after a shorter period of time. This way, ecofriendly innovations can spread faster.

Wifi sharing:
Fon was founded in 2006. The startup company offers a global Wifi network consisting of 20 million crowd sourced hotspots focusing on Europe. Fon cooperates with providers from different countries such as Telekom (WLAN to go). A customer of Telekom can either purchase a so called hotspot pass or he can provide his own router publically and gain free Wifi access in return.

Clothes sharing
The average German purchases 60 pieces of clothing a year. Only 25% of those get recycled, the rest are thrown away. People living in countries producing huge and cheap amounts of textile are for example devastatingly affected by intoxicated waters. In China, for instance, 2/3 of the waters are contaminated by chemicals, mostly through textile production.

Fortunately, more and more consumers behave responsibly. We observe a trend towards buying second hand products. Clothes can be shared online. Others go to parties at which you can exchange your clothes.

2.3.2 Sharing on a university campus

Sharing concepts are already established at universities. For example, you can borrow tools and of course books at the library. However, it should be extended to other fields.

In 2012/13 a group of students from the TUM: Junge Akademie started implementing a bike sharing system in collaboration with Stadtwerke München.

MVG Rad (MVG: Münchner Verkehrsgesellschaft mbH) was launched in October 2015. Besides students from TUM citizens from the whole of Munich profit from this service. Currently, more than fifty thousand users are registered.

3. Goals

The goals of our project include two complementary parts: First the implementation of a sharing system for umbrellas on the university campus as a practical and useful offer to students and other visitors of the campus; and second, the examination of emerging problems and in particular the behavior of users - how responsibly do users treat the products and do they use them within the system in the intended way?

3.1 Implementing umbrella sharing on campus as a model for freely accessible sharing network

We wanted to combine the gain of knowledge with a practical hands-on project on campus.

Most sharing products are relatively high-cost products, that are used only rarely (like tools or cars). We came up with a different approach: A product that almost everybody owns, but that hardly anyone has to hand when it is needed: Umbrellas. Most of the time they are at home when you would need them in an unexpected rain shower. Therefore, it would be useful to have them directly at the place where you need them. This makes it a very interesting product for sharing especially on a location like a campus. But umbrellas have further characteristics that make a shared use very useful:

It is quite uncomfortable to transport the umbrella the whole day just to use it for a few minutes - especially once it has become wet. By sharing umbrellas, you really only need to use them while you need them - e.g. on the way from the metro station to the lecture hall or to the cafeteria. Besides, umbrellas are a product that is easily forgotten in the university or on public transport. As you can leave them at any door once you enter a building, this is also solved by sharing.

Next to umbrellas as a useful sharing product we decided to make usage freely accessible. No registration or payment should be needed. The location for our sharing system is the TUM Campus in Garching. Even if it is publicly accessible at any time, most people there belong in some way or the other to TUM. Therefore, they should have a high level of identification with TUM and its related services. That made us hope that users would treat the umbrellas
responsibly. To make use far more comfortable and uncomplicated we therefore decided that we would implement a sharing system without any registration or payment. We hoped that by the identification with the product and the closed local usage-area, users would be motivated to use the umbrellas sustainably and not to take them out of the system or damage them.

With implementing an umbrella sharing system at the campus in Garching we wanted to bring a useful service to the students and employees. At the same time, with the special feature of free use, we could also find out about users’ behavior within such an open system.

3.2 Analysis of the user behavior

Besides the practical implementation of a sharing system, the main goal of our study was to investigate the potential of a freely accessible sharing network using our model of umbrella sharing on campus. We aimed to assess whether such a service without any charge is accepted by the user and which measures should be considered to ensure long-term success.

We defined success in this context as the presence of two factors: 1. sufficient availability of the shared product, the umbrella, for all users within the service area at the Garching Campus at any point of time (representing a functioning sharing system) 2. sustained usability and overall good condition of the vast majority of shared umbrellas. Therefore, we decided to address our questions from two different perspectives.

3.2.1 User attitude towards the shared product

The user attitude towards the shared product, in our case the umbrella, is crucial for the success of a sharing system. With our study, we aimed to evaluate

- if sharing of a frequently used product is accepted,
- how a device is treated within a freely accessible sharing system, and,
- to what extent objects are removed from the sharing system in terms of unintended use.

3.2.2 User behavior within the system

As the umbrellas within a freely accessible sharing network are borrowed and returned without supervision, the user and his behavior itself becomes an integral part of the sharing system. Hence, we concluded that our study should have the power to answer at least the following questions:

- Which routes do the users take on campus and, therefore, do the users distribute the umbrellas in a well-balanced way within the sharing network?
- Are the umbrellas returned immediately after the end of a rainfall or do they accompany the user for a longer period?
- What fraction of umbrellas is not returned at distinct drop-off locations and needs to be reintegrated in the sharing network from all over the campus?

4. Methods

4.1 Developing the sharing concept

After the decision to focus the project activity on developing a sharing concept, the challenge was to select a suitable product to share in a selected market to defined customers. There are several important aspects which were considered in order to select the best product for sharing.

First, the product needs to be able to be shared. A consumer good which can only be shared once is not suitable. In order to have a long lasting sharing circle the product needs to be shared over a longer timespan of at least 3 months before you change it. In addition easy availability for the customer is a key success factor. People participate in the sharing economy on the one hand because they want to use the product but not buy it, and, on the other hand because the product is very easy to use with, for example, only one click in a smartphone application.

Second, the market which is addressed needs to be selected well. A sharing economy circle with the best product does not work, if the wrong market is addressed. One main decision between a large
public market is where basically everybody can participate, as in well-known sharing concepts like drivenow, and a smaller restricted market like public Institutions or residential buildings, for example. Selecting smaller markets obviously restricts the sharing potential, but it can also lead to a more successful implementation which is spread to bigger markets later. So, depending on the product and other factors like resources the market and the customer in the market needs to be carefully selected.

Third, the period in which the product is shared in the market needs to be determined. There are products which can be shared everyday like cars or bicycles. On the other hand, there are also some which can only be shared at certain times, like skis in winter, for example. Since the main project time was from march until september, the focus was on products which can be used in this timespan.

Fourth and last is the type of return for providing the product for the customer. Most of the sharing providers charge money in order to be part of their platform and in addition charge a small amount per minute of product usage. However, there are also some which provide the products for free. So there was the decision whether to found a platform and charge something for the product usage or provide it for free even without the necessity of a platform.

On the basis of those four main criteria the sharing product was selected. The first idea was to build a sharing box for households at residential buildings designed for storing those tools like gavels or a drilling machines. As these are not used very often, it makes sense to buy them communally. After a short evaluation period a problem with the market was identified. The access to more than five buildings was critical and in addition the sample size was highly variable. Some houses had only students living in them, while in others there was a mixture of students and retired old people. As a consequence, we decided the results could not be scientifically comparable and the market criteria were not met. The second idea was to share a product which is used a lot and doesn’t have much value but is always absent when you need it most, the umbrella. The umbrella was a suitable product to share inside the organization TUM. The idea was to use umbrellas which had been lost by their owners and brought to the lost property office. After a period of time these are sold or thrown away. So the idea was to reuse and share things which were destined to be destroyed. However after consultation with our mentors the decision was made to buy new umbrellas to be able to design them and communicate the idea of sharing on them, for example with a pictogram. More details about the design and visualization of the umbrellas and stations can be found in Section 4.1. After an analysis of Munich weather conditions which can be seen in the figure below, our necessary time

Figure 1: Rainfall analysis Munich 2014-2016, (in millimeter)
conditions were met since the highest amount of rainfall in the past three years was in spring and summer.

Furthermore, with the mentors, we decided to provide the umbrellas for free for students of TUM since the main goal was not to make a profit, as already discussed in Section 2. In order to determine if there was a suitable market, a survey before and during the sharing of umbrellas was conducted. In addition, the umbrellas were tracked to gather real life data about umbrella usage. More details about market data acquisition can be found in Section 4.3.

On basis of the survey data eight umbrella stations with, in sum, 198 umbrellas were located at the Campus Garching. The locations were selected on the basis of the online survey data and the umbrellas were divided evenly between the stations at the beginning of the experiment. A map with the station locations and a pictogram used for communication of the sharing idea can be seen in the following figure.

As a next step, we defined the appearance of our umbrellas. Since formerly conducted polls revealed that potential users prefer big classic umbrellas with a straight handle, we decided to use this exact model. It appeared perfect for our door-to-door concept, since transporting it without using it was too inconvenient and the size would also reduce the chance of theft. Furthermore, the chosen umbrellas were big enough to protect more than one person from rain, so we also conceived a social dimension in our decision. The color we chose was white, since it is the most neutral existing colour and also part of the corporate design colours of TUM. In combination with the size of the umbrellas and our logos printed on them we imagined a high recognition factor in them.

In order to supervise the participants’ routes when using the borrowed umbrellas, we installed beacons on them. With this tracking system we were able to evaluate the usage frequency in relation to the location of the stations and the time of usage.

Regarding our design concept, the next aspect we needed to think about were our containers. We had the chance to recycle barrels
that were used by a former project of the TUM: Junge Akademie. In order to convert them to our requirements, we drilled holes in the ground plate so the water from the umbrellas could drain off. Furthermore, we added a perforated plate as a spacer to the ground-plate, also to define the height of the umbrellas overtopping the edge of the barrels. To stabilize them we integrated cross braces as well.

At last, we decided to design a label onto our barrels, which explains the whole concept in a clear and easily understandable way. On the label we put two pictograms next to some phrases, that make the idea of “taking an umbrella at a station – using it – giving it back at another station” quite clear. To give an oversight about the locations of our umbrellas we also added a map of the campus in Garching with all our stations marked.
4.3 Data Acquisition

4.3.1 Survey to Determine the Market Potential before the Field Study

In order to estimate the market potential of sharing umbrellas an online survey using EvaSys at TUM was conducted. The survey was divided into three main parts.

The first was designed to gather information about the person answering the survey. The goals were to determine (a) if there are faculties we should focus on which are particularly interested in sharing umbrellas; and (b) which means of transport students and employees of TUM use and if there are differences in this between new students and older ones. On the basis of our findings, the umbrella network was designed.

The second part focused on sharing umbrellas, since it was important to select an appropriate product and address users who normally use umbrellas or who would use them if they were provided. In this part information about the product itself was gathered since the end user should get the product which fits his needs.

The third part was about sharing at the TUM in general in order to determine other products which people might want to share. The idea was to share more products after a successful trial with the umbrellas. Since the results of the first field study revealed a bigger problem with robbery than expected there was no other product for sharing selected. Results of the survey can be found in Section 4.4.1.

4.3.2 On-field Observation to validate online survey results

For the purpose of gathering field data an umbrella tracking method which is described in Section 4.3.3 was implemented and on-field surveys were conducted.

The purpose was to gather real life information and compare it with the results gathered in the online survey before the field test. The survey was rather small with only six questions since the aim was to enable it to be completed in only two minutes so as to maximize the number of participants. For the survey a few members of the project team were on-site to ask people using the umbrellas as they walked by the stations. An analysis of the data gathered can be seen in Section 4.3.2.

4.3.3 Tracking the umbrellas using iBeacons and Raspberry Pis

On top of the field study the umbrellas were tracked using iBeacons and Raspberry Pis. This type of tracking was selected because it does not violate data acquisition and storage rules. An iBeacon is installed in the umbrella and Raspberry Pis are located at the umbrella stations. The Pi is connected to the Wifi and is able to detect umbrellas inside or close to the umbrella station. As a consequence, umbrella distribution can be tracked without tracking the umbrella the whole time for example with GPS. Data are gathered from where the umbrella came from and which locations are used most often. On the basis of this the sharing circle can be optimized by relocating stations which are not used or by transporting umbrellas where manually the circle doesn’t work by itself. In addition, the tracking is possible 24 hours seven days a week and it should also prevent people from stealing the umbrellas. Unfortunately, the umbrellas were stolen very fast so there are only poor data available. However, a data analysis is provided in Section 4.3.3.

5. Results

5.1 Evaluation of the implemented on-campus umbrella sharing network

Methods/Tools for the evaluation

Generally speaking, we wanted to use a bundle of quantitative and qualitative analytical tools in order to determine if our enclosed sharing system would sustain itself. Through the tracking data we wanted to look into the usage frequency, the turnover rate and motion profiles of our anonymized users. In order to enrich the viable quantitative data we wanted to conduct field observations and interviews according to a detailed resource plan. The aim of these direct interactions would have been to understand the drivers behind the user behavior more deeply. Unfortunately, we were deprived of this opportunity at a very early stage, as more than 80% of our umbrellas were removed from the system within two days from the start. Surprised by the striking losses, we put the system on hold and saved all the remaining umbrellas. As the system shrunk to an unrepresentative size, we de-
Decided to appeal to the conscience of the users and tried to retrieve some of the lost umbrellas, by attaching signs to each can, stating the loss of the umbrellas and asking the local community to return them. This approach also failed, which left us very critical of our implementation procedure and its potential flaws. Subsequently the cans were partially used as trash cans which honestly gave a very poor picture of attempt to establish a self-sustaining sharing system. In the following we tried to gain objective input on our implementation through campus interviews and observations, which presented us with a distorted picture from what we had experienced practically with the shared system. In the following, these results will be shared and conclusions will be drawn on the evaluation I of our implementation.

5.2 User behavior within the system – User attitude towards the shared project

The next point to be considered was the user behavior in view of the umbrellas within our self-created closed system (TUM). Due to the theft of our umbrellas, which unfortunately occurred after just two days, we didn’t have the possibility to consult or observe the “real” consumers about their behavior with the shared object. However, we wanted to get some feedback and an idea of whether we might have got another result with a different group of users. Therefore, we established a survey and we asked students, who could have been potential users of our project, to take part in it. The following diagram shows the answers of the students to these questions:

1) Did you see the umbrellas which we distributed at the campus in the middle of July?
2) Did you recognize the shield located on the can?
3) Did you pay attention to it?
4) Did you take an umbrella?
5) If it had rained, would you have taken an umbrella?

Thus, we can summarize that nearly all students recognized our project, but only a few saw the instruction shield or paid attention to it. Thus, only 65 percent of the students understood that we wanted to create a sharing system and the rest thought the umbrellas would be a gift. Another interesting fact is that more than 67 percent of the interviewees wouldn’t take one of our umbrellas even if it were raining. Therefore, we should re-think the design and size of the instruction shield and maybe whether the umbrella is a good example of a sharing object.

Furthermore, we concluded our survey with the question “If you had taken an umbrella, would you have brought it back again?” 100 percent of the students answered “Yes.” So, we had completely different results in theory – that no one would steal our sharing object – than in practice, where it took just two days for all the umbrellas to disappear.

5.3 Limitations to the project and reasons for emerging problems

In addition to asking students within a survey about our project, we were able, due to the beacons, to observe when and which umbrellas were brought back to each of the containers. Although we had this opportunity to observe this behavior we were not allowed to track the umbrellas all the time they were used. Thus we were not able to follow the exact route or where exactly the umbrellas were taken to.

Because of the disparity of what happened in reality and what we assumed would happen we came up with a group of reasons for the problems which emerged in this project.

Maybe the design was too attractive for people so that they could not resist taking the umbrella as a free gift. Another reason could be that the aim of our project was not communicated clearly enough.
This could be associated with the difficulty that we started the project in an open system. By starting the project on the campus of Garching we thought we would be able to narrow down the user group to a smaller amount than there would be on the campus in the city of Munich. Due to our researches we know that students were attracted to that program and they specified that they would use the possibility of sharing a product. But still there are not only students or professors on a Campus, there are visitors, mechanics or cleaners who might all be users, too. So at the beginning it was not obvious or clear enough to us which user group would use the product. And there is a certain difficulty in addressing a large number of different people.

A further problem could be the sharing product itself. Umbrellas are quite useful tools, easy to pick up but also with a low monetary value. Still it would have been better to create some kind of deposit system. Furthermore, the sharing product depends on too large a number of parameters that are impossible to control, like the weather. And a last reason could be that people just thought it would not harm anyone if they did not bring back their umbrellas.

Although all this happened in a “community” of students on campus, there was not sufficient incentive for the users to respect the objects and return them, so that others could also profit from them. From these findings, what conclusions can be drawn from this behaviour and how can they be applied to society more generally, and ultimately by what are these conclusions limited?

The limitation – when comparing society with an experiment on a university campus – include a change in the test group, as the university students only make up a small part of society. Therefore, their behavior may differ from the general public. Further, it is impossible in our experiment to tell what percentage of people used the umbrellas correctly and how many did not return them. It is possible that only a few people took more than just one umbrella with them, because they thought of them as “free-gifts.” However, it is likely that a similar result can be expected if the same experiment were conducted for example in front of metro stations in Munich. A similar behavior is likely and additionally the test group “students” also uses these metro stations and contributes to a similar outcome. On the other hand, the influence of the placement of the umbrellas in respect to the number of umbrellas that have gone amiss has not been sufficiently studied. Therefore, a different result could occur in more public places, as in the Marienplatz for example.

We want to emphasize that this experiment is not a picture of the behavioral traits of society (e.g. stealing umbrellas on a regular basis). There is also the possibility that the people responsible for the missing umbrellas did not understand the sharing concept and this then led to the experimental outcome of our project.

To exclude this possible outcome, a different experiment would be necessary, in which every person that participates in the sharing would be previously informed on the terms of use. In our project we tried to realize this by notifications and information provided at the umbrella boxes. But this may not have reached every user.

Despite the limitations for generalizing our results, it is reasonable to state that the concept of sharing in the future will be more common. People like the idea of sharing for various reasons and see the advantages it can bring for all the users.

In our case the concept may not have functioned from the start, but adaptations may make it work.
Acknowledgments

This project would not have been possible without the great support of the whole team of the TUM: Junge Akademie and all current and former members of the TUM: Junge Akademie who offered help and advice.

Therefore, we would like to thank all who supported us and our ideas during the challenging working process. We are indebted to our mentors Prof. Dr. Frenkler and Mr. Lang, whose encouragement and specialized knowledge enabled us to design the umbrella logo as well as implement the whole project in Garching.

We’d also like to thank our tutors Carolin Thiem, Stefan Tippelt and Simon Herzog for their invaluable advice. They always stood by us and provided their help regarding upcoming critical questions and also opinions. Their experience of how to run a project like ours encouraged us a lot.

Furthermore, special thanks go to Andrea Prehofer, whose workshops were an important and very helpful tool regarding working together as a team and communicating one’s ideas as well as concerns.

With regard to the finance of the umbrellas, we want to express great gratitude to our sponsors, the TUM University Foundation, who made it possible to supply these important tools of our project.

Moving on to our survey, we thank all mentors and other supporters who advertised our pre- and post-survey – not to mention all students who took part and thus afforded us the needed database that was crucial to evaluate our project’s hypotheses.

Last but not least, we want to express heartful gratitude to the whole team of the TUM: Junge Akademie, especially Prof. Dr. Gerhard Müller, Peter Finger and Maria Hannecker for their great encouragement and invaluable advice, which more than once cleared up critical questions.
**INTRODUCTION & CURRENT STATUS OF THE PROJECT**

The idea of "usage efficiency" is based on the analysis of the true potentials of a product. Taking into account how frequent and regular something is used, how often it changes its owner/user, etc., we want to be able to predict its suitability for an implementation as a sharing concept.

As our sharing cycle, consisting of the three major stations renting – using – returning, can drastically improve the efficiency of a product when operated properly, one of our key goals was to find crucial criteria for initial and lasting success. We came up with three groups of requirements that are absolutely vital for every concept. Within those topics of "availability", "suitable products" and "raising awareness" we searched for various approaches that in spite of their different basic methods have all led to a successful realization of the common idea of sharing.

Another question we want to answer over the next months is how precisely and reliably it is possible to influence the sharing habits of potential users. Basing our assumptions and expectations on our current understanding of specific target groups as well as establishing further important details through surveys and theoretical studies, the practical implementation of a promising setup will help us verify and adjust our hypothesis on the potential of sharing.

**TASKS & CHALLENGES**

Even a sharing concept as shown in our reduced and simplified sketch is still a complex process with many unknowns and variables. Therefore we need to get everyone in our group involved and continuously define new tasks on upcoming topics and newly appearing aspects.

An important challenge we are faced with is to distinguish between various kinds of user data regarding the consumptions habits of our target groups. We need to detect differences between our expectations, results of surveys and observations during a real-life implementation and deal with the information accordingly. By gaining insight into the causes of those deviations we can re-examine the key statements of our hypothesis regarding the acceptance of sharing concepts within a specific user base.

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**USER HABITS**

- **data input**
- **identification**
- **optimization**
- **availability**
- **closed sharing cycle**
- **products with specific usage features**
- **characteristic feature(s) in design**, usability, etc.
- **direct interaction with potential users**

Suppose our user has decided to give the sharing concept a try and is currently using the product for the first time. There are several aspects of his behaviour that might help us further improving his future sharing-experiences.

As one of the basic requirements of a successful sharing concept is a closed cycle of renting, using and returning the product, we will have to encourage our user not to break that cycle and therefore influence the availability for others. Furthermore we want to keep the whole process as simple as possible. An uncomplicated concept is a crucial feature as it helps our user to quickly adapt to his newly experienced way of consuming.

In addition every user gives us very important data for estimating the average time of one "round" in the sharing cycle. With this knowledge we can further improve the key component "availability".

We have found various ways how the setup will directly influence (potential) users. Parameters in the fields of "monetary aspects", "simplicity" and "availability" have a huge impact on how the concept is perceived by the target group. Coming up with a suitable combination of those factors is one of our main tasks.

Implementing promising setups will help us recognize the most crucial variables.
**dare2share**

How sharing is replacing ownership.

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**THE PROJECT**

The recent emergence of sharing economy products allows the consumer to experience the economic probability of owning various products without the burden of ownership. Whether it is a car-sharing application for transportation or an online marketplace for products, these services allow the consumer to rent or purchase various products. In this field experiment, an electronic module records the umbrella location, and the project team monitors these data. The project team used the data to analyze how sharing is replacing ownership. Consumers can use the self-accessible sharing model, and our separate proprietary product, our shared umbrella.

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**PROJECT TIMELINE**

- **Umbrella as Sharing Object**
  - Based on the knowledge about the different mechanisms of sharing services and umbrella usage, we developed a prototype of a伞 sharing system.
  - We tested the design in several user sessions and gathered feedback for the final design.

- **Improve Design**
  - After the initial umbrella prototype, we looked at the umbrellas from a user’s perspective.
  - We conducted user sessions and gathered feedback for the final design.

- **Station and Network Design**
  - The umbrella stations and network were designed to accommodate the sharing system.
  - We tested the design in several user sessions and gathered feedback for the final design.

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**RESULTS & OUTLOOK**

The user survey conducted before the field experiment revealed some critical issues with the design of the sharing system, which the project team addressed.

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**OUTCOME**

For the practical part of our project, the implementation of an umbrella sharing system, the outcome is unfortunately, that the intended sharing without registration did not work as we hoped it would. Within just a few days most of the umbrellas disappeared. But our project consisted of two parts – the practical implementation and also the theoretical implementation. With the realization of the sharing system we can give a clear answer a sharing system also can sustain itself on the long term in the enclosed ecosystem of a university campus.

---

**SUMMARY AND FUTURE GOALS**

One and a half year ago the members of the TUM Junge Akademie had the first chance getting to know each other during the kick off weekend. These days we spent a lot of time to develop our personal soft skills and finally to form different groups, which should achieve a project. After our group with 14 people was formed, we started to figure out our hypothesis, which we should try to answer scientifically, and our main idea of our project. Shinyly the team decided that we should deal with the domain of “sharing object”. Thus, we spent several meetings to discuss which kind of sharing (for example food sharing, car sharing, furniture sharing, etc.) we wanted to look at. A few weeks and a lot of researches later we determined an umbrella as the best item to be shared. The following steps were to establish a time schedule, to form smaller groups, to fix different tasks and to design the components which contain the umbrella. The umbrella and the information system we committed all relevant TUM stakeholders to the project, so without the community we could not create the system. During the second phase of conceptual and product design we committed all relevant TUM stakeholders to the project, so without the community we could not create the system. After completion we implemented the system for one month at the TUM campus in Garching. Despite the rather devastating outcome we used the last two months for a detailed analysis and reflection of our results, so that our learnings can be passed on.

---

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Prof. Fritz Frenkler, Alexander Lang

---

**MEMBERS**

Michael Bauer, Gunther Bidlingmaier, Markus Höfer, Eva-Maria Schmid, Max Teichgräber, Michael Trimpl, Michael Wei, Yize Zhuwu

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Carolin Thiers, Stefanie Tippelt

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**dare2share**

how sharing is replacing ownership

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**ABSTRACT**

Eco-friendlier, cheaper, simpler – whatever it is that attracts people to share, we cannot deny the increasing emergence of different sharing models. As we scrutinized the topic of sharing economy closely, we soon realized that we should focus on just one of its elements, in our case “product sharing”.

---

**GOALS**

Firstly, we aimed at implementing a sharing system for umbrellas on the university campus as a practical and useful offer to students and other users of the campus. Secondly, our purpose was to examine emerging problems and in particular user behavior – how responsible do users treat the products and do they use them within the system in the intended way?

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**HYPOTHESIS**

It is the project that a freely available sharing system can sustain itself on the long term in the enclosed ecosystem of a university campus.

---

**TEAM STRUCTURE & PROCESS**

Our team consisted of in total 14 team members from highly affiliated and experienced tutors and three mentors, two different tasks and to design the components which contain the umbrella.

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Project Report *EatMe – I’m fancy*

| Team            | Maximilian Hechler  
|                 | Carolin Klose        
|                 | Sebastian Laumer     
|                 | Sophie Petersen      
|                 | Carlos Piedrafita Alvira 
|                 | Lukas Raith          
|                 | Konstantin Wolf      

| Tutor           | Dominik Irber        
|                 | Josef Oberndorfer    

| Mentor          | Dr. Hannes Petermeier |
The philosophy of a bowl of muesli

Variability

Muesli is a category of diverse foods rather than one specific product. There is an almost limitless freedom to combine different ingredients and to compose an individual mixture by adding or avoiding a specific foodstuff. It requires creativity and courage to design a new muesli, to combine flavors and textures of different ingredients to create an overall foodstuff that excites the taste buds and leaves the consumer satisfied. Each component is different from the others and has its own distinct attributes, and it is the unique combination of ingredients which defines the overall character of a muesli.

Universality

Muesli is universal. This undemanding foodstuff is simple and the preparation could not be easier, making it one of students’ favorite foods. A package of premixed muesli or the ingredients in isolation can be stored for a long time without the risk of spoiling, which is ideal for those who do not have time – or who forget – to shop for fresh groceries on a regular basis. A bowl of muesli can serve as a full, satisfying and filling meal, supplying one with all essential nutrients. It can be a conventional breakfast or snack or even served as lunch or dinner. Muesli is known and valued by many cultures, each interpreting and preparing this universal meal in a unique way.

Consciousness

Nevertheless, taste is not the only criterion to consider. This is a general rule that is true for all foodstuffs we consume. We often base our selections on more ethical criteria too, for example, in order to make consciously considered and socially responsible choices. In addition to the taste, accordance with personal opinions and attitudes matter. Where does the product come from? How and how far was it transported? Is it a natural product or processed by industry? How much of the final price does the farmer earn? Was the product produced under organic and sustainable conditions? Considering these different criteria makes the composition of an ideal muesli more complicated or perhaps even impossible. There cannot be one ideal muesli which is healthy, affordable, socially and ecologically friendly and which contains all desired ingredients. Thus, a careful weighing and judging of many different factors is required to create a personal favorite mixture.

Muesli as a symbol for TUM students

The community of TUM members is highly diverse and heterogeneous. Students originate from countries all over the world, they have different sociocultural backgrounds, religions, attitudes and opinions, their interests and subjects of study range from agriculture to quantum physics – every person at TUM is unique and contributes to the harmony of our diverse community. This heterogeneity is reflected by our model foodstuff “muesli” which consists of a variety of different ingredients characterized by their unique taste, texture, price, origin etc. – together forming a harmonious composition.
The Philosophy of a Muesli Bowl

Variability

Consciousness

Eat me – I’m fancy
Decision-making in food consumption

Conjoint analysis

Group-splitting

Cooperation

Muesli

Universality

Muesli as a symbol for TUM students
Therefore, a set of rational criteria, leading to a certain outcome, were defined and their importance was studied. For our analysis, we decided to concentrate on one specific foodstuff to allow for a precise investigation. Ideal targets are simple products which enable the consecutive variation of different parameters to determine the analyzed factors. After intensive research, we opted for muesli as our food of interest. Apart from being consumed among many different potential target groups in Germany, muesli is a composite foodstuff composed of several ingredients, thus enabling the separate investigation of each decision made when choosing each of these. With muesli, therefore, we were able to analyze many decisions while focusing on just one product. To allow for a more precise analysis of our initial question and to control the comparability of results, we decided to focus on a particular target group: students at TUM. This choice was determined not only by the fact that the latter represented an easily accessible group for us, but also by the high degree of heterogeneity of sociocultural background among TUM students.

Goals and methods

Muesli is a product composed of a variety of ingredients, each possessing its own characteristics. Each consumer might value these attributes differently according to, for example, individual taste, attitude toward costs, personal definition of healthy eating, and ethical views on fair trade. All these things can influence shopping behavior (Gensler 2006). The aim of our research was to determine the factors and characteristics which influence the decision-making of our fellow students most. Intensive analysis of the decision-making process and clustering of criteria yielded four general categories of attributes which we chose to concentrate on for further investigation: “regionality” “label/certification,” “price” and “nutritional value”. Those preferences were determined to produce a tailor-made TUMuesli, which represents the desires of TUM stakeholder.

The selection of a suitable method for our research involved a long process, led by practical considerations and studies on questionnaire-answering and self-assessment. To determine the most important decision-making factors, several approaches were discussed, such as the use of a questionnaire, a virtual model simulation, and an econometric model. Problems occurring in research fields when participants were asked to state their opinion on ethical topics have been described in the relevant literature. If par-
Participants are asked directly whether they prefer a more expensive fair-trade product over a cheaper conventional one, most will state their willingness to buy the fair-trade one. The participants feel obligated to do so, even though they would behave differently in real life (Schöberl 2012). Thus, it is better to ask questions in which such ethical statements get rouged. A method to do this is the conjoint analysis which aims to measure the importance of individual factors without overtly asking about them, while still trying to resemble a realistic decision.

There are two general types of conjoint analyses: a choice-based one and a direct one. We used the latter one to design our conjoint analysis which asks the participants to rank a group of products according to their preferences. Since muesli is a composite product, we separated it into four general components: the basic substance, e.g. cornflakes or oats; milk; chocolate toppings; and dried fruits. For each of these sub-ingredients we designed a group of products using the orthogonal design algorithm of the statistics software SPSS. This was necessary to generate a smaller set of products that was still representative for all products and allowed the consecutive calculation of the importance of the individual factors from the data set. The products differed from one another in terms of the four characteristics of interest: “regionality,” “label/certification,” “price” and “nutritional value.” In their product ranking, the study participants had, for instance, to decide whether they preferred a pack of organic oats from Germany for 4.95 €, or the cheaper but considerably less healthy option of corn flakes from USA.

![决策示例作为联合分析的一部分](Image)

**Figure 1: Decision example as part of a conjoint analysis.**
TUM students take nutritional value, price, social and environmental factors into account differently when selecting their muesli

The survey was conducted over several weeks, allowing us to collect a significant and representative amount of data. A total of 122 persons participated in the survey. As visualized in Figure 1 the sex distribution was nearly evenly spread. Most of the participants were from the campus Innenstadt or Garching. Yet there were also several participants from Weihenstephan, Rechts der Isar and other campuses. Furthermore, the majority of the participating TUM students ate muesli several times per week, some even on a daily basis.

Outcome and Discussion

To assess students’ decision-making about food consumption, a conjoint analysis with a questionnaire was designed. The analysis was based on the model foodstuff muesli, whereby the muesli ingredients of milk, cereal base, chocolate and dried fruit were considered. We administered the questionnaire using the evasys software to check our initial hypothesis:

As an overall aim, we wanted to create a TUM-specific muesli mixture that represented the personal preferences and attitudes of TUM students. Therefore, we added a short survey to our questionnaire which asked for the participant’s favorite muesli ingredients. By combining the data from the conjoint analysis that specify the most important characteristics for each sub-product with the results of the poll that determine the most preferred ingredients, we were able to generate a representative TUMuesli.

Using the generated ranking data of all participants, the conjoint algorithm of SPSS calculated the so-called “part-worth utility,” which is a measure for the importance of each factor.

Asking participants questions about their consumer behavior helped us to understand the relative importance in their decision-making of our four chosen factors: origin, certification labels, price, and nutritional value per muesli ingredient. After processing the data, we were able to prioritize the different factors analyzed in the four examined muesli product categories, thus enabling a product-wide comparison. In figure 2 the results after the post-processing are shown.
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In accordance with the growing consciousness for an ethical lifestyle, we observed a high impact on decisions of the organic/fair-trade label and the origin of ingredients. TUM students especially preferred regional milk, if possible from the own federal state. Moreover, it was very important to them that the chocolate additive had a fairtrade label. Also for the cereal base and dried fruit the highest scoring factors were the origin and/or quality/organic label. Nevertheless, considering the economic status of students in
society, we also noted that the price was one of the determining factors on final decisions and was therefore evaluated as equally important for each ingredient. The importance of a regarded factor can vary significantly between different products. Moreover, all four components analyzed displayed highly diverse properties and may play different roles in everyday life.

Returning to our hypothesis, we can see that the four factors (origin, certification label, price and nutritional value) were evaluated differently. Hence, the investigated factors are not taken equally into account in the decision-making process of students when selecting muesli. This confirms our hypothesis mentioned above. In addition, we recognize, that the influence of the examined factors on the decision-making process might vary depending on the observed product.

Another important and not less interesting finding on the matter of the applicability of a conjoint analysis was that the ranking of products can be an exciting but also quite mentally exhausting endeavor. A dropout rate of approximately 60% of the participants indicated that it took a lot more effort to process a conjoint analysis than a usual questionnaire. For future implementations of conjoint analyses, we would suggest carrying out the conjoint analyses in a lower volume with a more transparent structure so as to decrease the dropout rate.

By uniting the results of the conjoint analysis with the outcome of the upstream questionnaire (Figure 3 and 4) we were able to determine the composition of the TUMuesli as follows:

- Milk from Bavaria
- Oats from Germany
- Dark Chocolate with Fair-Trade Label
- Dried berries from Germany
- Regional almonds and linseeds

These results are not only valuable for the composition of the TUMuesli but also for companies of the food industry, as the importance of certain influencing factors in the decision-making process are illustrated. In particular the change of the utility values according to changes of the characteristic of a certain influencing factor might be of great interest. This can be very useful for decisions in marketing. For instance, companies could better define their pricing according to specific factors of consumer choice.

To conclude, the proposed composition of TUMuesli will be made available at the TUM shop and might also give existing food companies an incentive to produce a custom-made muesli for students.

Summary and Future Goals

The aim of the project was to gain an insight into the preferences of our fellow students and to determine which factors in their decision making are considered most. The result of this analysis is a muesli tailor-made to their desires. The conjoint analysis allowed us to achieve the latter as we were able to examine the decision-making processes of our fellow students and avoid bias due to indirect measurements of preferences. The data on
consumption clearly pointed out the significance of muesli in a student’s diet. The results of our analysis served as a basis for creating the optimal muesli for TUM students. This is muesli to please the palates of all students: A careful composition of rich German oats, complemented by regional almonds and linseeds, with a serving of fine fair-trade dark chocolate and an intricate mixture of dried berries, all of which is completed by a healthy portion of wholesome Bavarian milk. A muesli fulfilling their desire for a satisfying meal, yet containing a dash of that something special that makes the TUMuesli a product that has been missing on their daily breakfast menu.

One of the most crucial things we learned was the importance of an appealing survey. This factor is critical keeping in mind the complexity of the conjoint analysis. An array of seemingly redundant questions can quite quickly irritate the survey taker. This is reflected by the high dropout rate in our survey, proving a need for a more appealing approach to designing the survey. Reducing the dropout rate must hence be viewed as one of the biggest goals for future projects which use the conjoint analysis as a method.

Lastly, we looked at the product itself. As aforementioned, the team created TUMuesli by combining the ingredients most favoured by TUM students. This recipe was subsequently sent to various cereal companies who can market TUMuesli on a trial basis to judge the success of the product. These samples will be sold in the TUM shop to provide access not only to all students but also to visitors wishing to try the product. The trial run in market conditions will serve as a benchmark for the quality of the product. A positive initial response will lead to the addition of TUMuesli to the regular stock of the TUM shop. This way, everyone will be able to enjoy this healthy and satisfying muesli.

Acknowledgments

This project profited from the valuable input of several people to whom we would like to express our gratitude. Firstly, we would like to thank our mentor, Dr. Johannes Petermeier for always offering help and good ideas. We want to express our gratitude to our two mentors, Dominik Irber and Josef Oberndorfer for their overall help, always readily given; for giving realistic and reasonable opinions; and, finally, for the high quality of their photographs. A special thanks goes to Andrea Prehofer, who made the realization of the whole project possible by giving us the idea of the conjoint analysis. Last but not least we would like to thank Prof. Dr.-Ing. Gerhard Müller, Peter Finger, Maria Hannecker and all members of the TUM: Junge Akademie for creating and offering the wonderful setting in which this project was undertaken.

References


EatMe
Decision-making processes concerning food consumption.

Buying food is an everyday activity for most of us. Yet the choice of food has become a highly emotional topic in our western society.

We want to analyze what unconsciously and consciously drives people when it comes to the decision of buying a certain foodstuff.

Imagine yourself on a Saturday morning, shopping the groceries for next week. Are you walking through the abundantly packed aisles of a supermarket or do you prefer to visit your local farmer’s market?

Which criteria are influencing your decision for a particular product when buying apples, vegetables, eggs or coffee?

BACKGROUND
Student’s choice on groceries is an often stereotyped topic that is primarily associated with a limited budget and individual shopping habits. However, this narrow point of view ignores a variety of other factors that may influence this highly emotional decision. Our project aims at reflecting the mood of TUM students on food consumption by analyzing the impact of certain characteristic factors such as quality, price, organic origin and nutritional value.

Muesli represents a widespread universal foodstuff which can be individually composed based on personal preferences. Imagine a place where you get to choose every ingredient of your muesli and can develop a new mixture every day – just like the cafeteria’s salad bar. By preferring certain products in comparison to others the student intuitively ranks food criteria that define the different ingredients. Thus, a bowl of muesli depicts a personal profile and reveals decisive factors of one’s food consumption.

GOALS AND METHODS
Our goal is to find out which conscious and unconscious factors influence the decision making process of food consumption. Therefore, we focused on the product muesli by analysing the selection criteria for muesli ingredients of TUM students.

We are planning to conduct an experiment where students will be asked to choose their own muesli from a variety of products and to rank criteria in terms of importance. The results will be analyzed using statistical methods to identify the most important factors influencing the students’ decision.

We will also conduct a survey among TUM students to gather information about their food consumption habits and preferences. The data will be analyzed using descriptive statistics to identify trends and patterns in food consumption.

The obtained data on selection of the ingredients we want to draw conclusions about the influencing factors of muesli consumption.

We want to analyse what unconsciously and consciously drives people when it comes to the decision of buying a certain foodstuff.

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We are going to investigate the prioritization of criteria in terms of food consumption by applying conjoint analysis as a theoretical tool as well as in a practical way. The latter will be an experiment in cooperation with a muesli producing company where students are supposed to arrange their own muesli by choosing different ingredients. From the obtained data on selection of the ingredients we want to draw conclusions about the influencing factors of muesli consumption.
EatMe I’m fancy!
Decision-making processes concerning food consumption.

ABSTRACT: Decisions about food consumption are more relevant than ever. Our team is interested in the decision-making of students based on the model muesli. We want to elucidate what drives our target group when it comes to the decision of buying a certain foodstuff, using the approach of conjoint analysis and enabling us to rate consumption awareness.

HYPOTHESIS: TUM students take nutritional value, price, social and environmental factors into account differently when choosing their muesli.

GOALS AND METHODS: In a consumer world, in which marketing is part of everyday life, changes and developments for food and drinks get more and more fancy to catch consumer’s attention. Our marketing (just as) one of the main tools. The ratification and brand of food is a form of value, as well as the place of product attributes which should be additionally considered whilst purchasing food.

Our research focused on determining the most influential in the previously listed attributes which will be appraised via a conjoint analysis. A conjoint analysis measures how much consumers value the different attributes of a single product. How our different products (e.g. milk, chocolates, and cereals) will be tasted in regard to their specific attributes. The attributes are blind to each other different attributes concerning our most important interviewee, the student. The kind from the conjoint analysis will be evaluated with SPSS to answer the hypothesis.

EXPECTED OUTCOME AND DISCUSSION: The conjoint analysis is held for several weeks allowing us to collect a significant and representative amount of data. After processing the data to our team, we get a prioritization of the different attributes concerning the four-muesli-products assessed, thus resulting in an overall weight comparison. In accordance with the minimal consciousness for a line-based we expect to observe a high impact of the organic-fair-trade label and the regionality factors in the decision. Whether this comes from a permanently awareness or a merging social bonds is an interesting question (not answerable value).

Nevertheless, considering the economic status of students in society, we still assume the price to be one of the determining factors which will greatly impact the final decision.

TEAM STRUCTURE AND PROCESS:

MEMBERS

Max Leon Hechler, Carolin Juliana Klose, Sebastian Laumer, Sophie Petersen,
Carlos Piedrafita Alvira, Lukas Raith, Konstantin Wolf

TUTORS

Josef Oberndorfer, Dominik Irber

MENTORS

Dr. Hannes Petermeier

OUTCOME AND DISCUSSION:

Asking participants questions about their consumer behaviour helped us to understand the relative importance in their decision-making of their four chosen factors: origin, label/certification, price, and nutritional value per muesli ingredient. The results after the post-processing are shown in the next figure, above right.

In accordance with the growing consciousness for an ethical lifestyle, we observed a high impact on decisions of the organic/fair-trade label and the regionality factors concerning the TUM community. Moreover, considering the economic status of students in society, we also noted that the price was one of the determining factors on final decisions and was therefore evaluated as equally important for each ingredient.

SUMMARY AND FUTURE GOALS:

The conjoint analysis allowed us to examine the decision-making process of our fellow students and avoid bias due to self-assessment. Everybody of us has an impact on our world with his or her everyday shopping behaviour. The results of our analysis served as a basis for creating the optimal muesli for TUM students. This recipe was sent to a cereal company which can market the TUMuesli on a trial basis to judge the success of the product. We decided on a company which helps people with mental illnesses. After this test run, we want our product to be part of the TUM-Shop, enabling all TUM students access to it.

ABSTRACT: Decisions concerning food consumption is an everyday situation and thus a current topic. During a dynamic working process, our group aimed to analyse the importance of different factors for the outcome of such a decision, by performing a conjoint analysis into muesli as a model product. We found out that TUM-students consider factors differently when choosing amongst several ingredients. In addition, we could determine the optimal muesli composition for our fellow students, hereby creating a unique “TUMuesli”.

GOALS

Our goal was to find out which conscious and unconscious factors influence the decision-making process of food consumption. We wanted to analyse what attributes of food drives people when it comes to the decision of buying a certain foodstuff. Therefore, we focused on the product muesli by investigating the selection criteria of TUM students via conjoint analysis. Using the results of our data acquisition we wanted to establish a muesli which represents the preferences of the TUM community.

HYPOTHESIS

Our overarching goal was to improve decision-making processes concerning food consumption based on a better understanding of the influencing factors that are involved. Our initial research focused on the claim:

TUM students take nutritional value, price, social and environmental factors into account differently when selecting their muesli.

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Project Report **EatMe – I’m low carbon**

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Dr. Hannes Petermeier
As a project start, we created a survey regarding existing knowledge about the CO2 footprint and ways that consumers would like further information about it to be made available to them. The aim was to get a clearer image of what people actually need and want. After a hard fight with EVASYS settings, our team managed to launch and even complete the survey shortly after the Christmas break. At that point, with the results of the survey in hand, the idea of creating a mobile app died. For the participants of the survey, a smartphone app would have been only the fourth most desirable option of getting information. On the other hand, a vast majority wanted more information about their food with respect to ecological implications. Thus, instead of trying to somehow still justify developing an app, our team reacted to the outcome by steering our efforts in the direction of a poster that could be displayed in supermarkets. For consumers, information presented directly on food packaging would be a more immediately accessible source of information, but we considered that the realization of such a goal would be unachievable in the limited amount of time available to us. Applying the concept of „SMART“ goals that Miss Prehofer suggested in a workshop on project management helped us in setting realistic goals. After having agreed on the desired outcome, our team quickly started working on it.

“In the beginning, our team consisted of a group of thirteen students, motivated by the common topic „decision processes in the food industry“. We kicked off the team-building process, highlighted in a workshop by Miss Prehofer, with a beautiful day at a climbing garden in August 2016. Supporting each other at challenging points and succeeding in overcoming obstacles together got the spirits up. Nevertheless, bringing together the interests, passions, and skills of thirteen young and idealistic students is obviously quite a challenge. Therefore, we decided to split up into two smaller, more specific interest groups for efficiency reasons. Our sub-team decided to take a closer look at how people care about the CO2 footprint – as one aspect of the general ecological footprint – in their food consumption, hence the name „EatMe. I’m low carbon!“. At first, the projected outcomes seemed clearer to us than they turned out to be in the end. For example, one team member had a „clear imagination of a mobile application that people would use during their shopping to scan barcodes.“ In the project evolution, unexpected events provided opportunities for re-examining our initial idea and redirecting our efforts to viable outputs. In fact, we ended up nowhere near the initial idea. But let us get back to the beginning.

“There was a great atmosphere of common enthusiasm and constructive discussions. This was certainly crucial in ensuring our project’s success despite the obstacles we
Yet, the next experience was a huge setback. Realizing that existing data was either sparse or extremely complex, our team had to adjust the scope of our project. Rather than analyzing certain food types in depth, we decided to give a high-level overview of various types of food. During this data-gathering phase, we ourselves were repeatedly surprised by facts. Did you know that consuming cheese generally causes more CO2 emissions than eating chicken? Or that rice production is emitting CO2 not because of its transportation routes but because of the way it is grown?

Throughout the project time, we had constantly to evolve and rethink our ideas while still managing to advance the project. Our whole team agreed that „a great atmosphere of common enthusiasm“ as well as „lots of constructive discussions“ were crucial in ensuring the project’s success. Nevertheless, there were also phases of low productivity. That was the case especially at points where we struggled with „too many reportings, due dates and obligatory meetings/workshops, which slowed down the progress of our project,“ as one team member phrased it, giving voice to a common thought among the whole group.

A short sketch about conscientious food consumption and CO2 labelling at the buffet afterwards distinguished our presentation from standard talks. We were very pleased by the approval and encouragement we got from the attendees.

A second meaningful highlight was the making of a video in Munich’s pedestrian area. The video can be watched by scanning the QR code. Hoping to make people reflect on the issues involved, we interviewed random passers-by on their knowledge about and concern for their CO2 footprint. Switching sides and getting the „very interesting new experience of being in the role of an interviewer instead of the spectator“ gave our team members highly interesting impressions.

We have tried to improve awareness and actual knowledge about the CO2 footprint. Spreading the word about that topic in the forms of a talk, a video, and miniature versions of the designed posters has not only proved educational to our team but has generated actual value in making people think about their food decisions. After all, the most important thing is not that every single decision is made in favor of a smaller CO2 footprint but rather that people actually start thinking about what implications their food consumption has. Hence, we were happy when one of the interviewed people left with the words „thanks for telling me, this definitely made me think.“ Mission accomplished!
Abstract
Quantifying the ecological impacts of human nutrition is a complex challenge. Based on the product carbon footprint, our information poster enables consumers to improve decision-making processes when buying food.

Background
Imagine yourself on a Saturday morning in the supermarket, shopping for groceries for next week. While you are walking through the aisles richly packed with an incredible variety of products, you are making an important decision every second — although lacking most of the knowledge and information you would need for a successful decision-making process. Standing in front of the vegetables, you might be wondering whether you should choose oranges from Spain, kiwi fruits from Italy or apples from Germany to fulfill your vitamin requirements with the smallest ecological footprint. Maybe the German apples have been stored in a refrigerated warehouse for months, making their resource consumption per kilogram larger than the environmental footprint caused by transporting the oranges from Spain to Germany? Should you buy yoghurt in a reusable glass or in a lightweight plastic container? Which one has a smaller ecological footprint, soy tofu or organic meat from a local farm?

Approximately three quarters of consumers in Germany experience uncertainty and indecision when buying food. These decision-making processes are connected to significant financial expenditures: in 2014, the average German household spent 285 euro on food each month. At the same time, human nutrition makes up a considerable share of global greenhouse gas emissions. The complex value chain of food production, from cultivation, harvest and processing to transport, supermarket sale and refrigeration in a private household, causes so-called “direct” emissions. In addition, “indirect” emissions due to land-use changes further increase the environmental footprint of nutrition. Deforestation for palm oil cultivation in Southeast Asia is a prominent example of indirect greenhouse gas emissions connected to food consumption.

Complex production chains and diverse environmental impacts make it hard to reliably quantify the ecological consequences of human nutrition. Within the 28 member states of the European Union, agriculture alone has a 10% share of total greenhouse gas emissions (figure 1). When considering the total value chain from the farmer’s field to the dinner table or landfill, food consumption is estimated to be responsible for approximately 30% of greenhouse gas emissions in Europe. These numbers show that research into the quantification of food’s environmental impact and the associated consumer behavior is highly relevant. In addition, building consumer awareness within this area can play an important role in mitigating greenhouse gas emissions and tackling climate change.

Goals and methods
Our project pursued two key goals:

1. To develop a better understanding of consumers’ knowledge and behavior in relation to food’s ecological footprint
2. To build awareness among consumers for the importance of food’s ecological footprint by designing an information tool

Our two key goals also defined two consecutive project phases, each characterized by a distinct set of methods.

In our first project phase, we initially conducted an extensive literature search to understand existing approaches for quantifying food’s ecological footprint. The resulting overview of existing studies, key aspects and consumer behavior characteristics served as a groundwork for formulating our hypothesis: Better informed consumers will take a product’s ecological footprint into account for their purchase decision.

Based on this hypothesis, we designed a consumer survey to get a better insight into awareness of and knowledge about the term „ecological footprint.” Furthermore, we aimed to understand how such knowledge potentially influences consumers’ decisions when buying food. To allow for correlation calculation, we used the Likert scale for most of the questions. Additionally, we used multiple choice questions to allow participants a choice for their favored option(s). Aware of our survey’s explorative character, we also introduced several open questions where the participants had the opportunity of giving us further input. We intentionally tried to acquire participants from different social backgrounds to ensure a
diverse survey population. By offering the survey online as well as offline we were able to achieve a total of 243 participants.

In addition to quantitative customer surveys, we also conducted two expert interviews. An interview guide was carefully designed to ensure purposeful questions and high information density. We interviewed two researchers at the Technical University of Munich, Dr. Norman Siebrecht (Chair of Organic Agriculture and Agronomy) and Christian Wolf (Chair of Wood Science), who are both experts in the quantification and analysis of agriculture’s environmental impact.

The second project phase aimed at increasing public awareness and improving the transparency of a product’s ecological footprint for the customer in the supermarket. Here, an important method was the establishment of fruitful partnerships with public institutions and private companies. We employed personal networks and designed a one-pager for a convincing presentation of our project work when contacting potential partners via e-mail or telephone. In the development of our information tool, iterative prototyping based on direct customer feedback also constituted a major part of our methodology.

Outcome and discussion

In general, the ecological footprint “measures humanity’s impact on ecosystems in terms of resources used to satisfy human needs.” It describes a “ratio of human demand for natural capital and the planet’s capacity to sustain it.”\(^5\) For the quantification of a food product’s ecological footprint, various metrics with different units can be employed. Frequently used metrics\(^6\) are
Figure 2: Survey employed for online and offline consumer interviews.
1. Energy intensity: measures the net fuel-energy consumed to provide the heat and power requirements for the production process.  

2. Water consumption: measures the amount of fresh water, excluding rainwater, consumed per unit output of the production process.  

3. Greenhouse gas emissions: measures the amount of carbon dioxide equivalents emitted per unit output of the production process.

Using a chosen metric, a product’s ecological footprint can be quantified by means of a life cycle assessment (LCA). A LCA comprises a detailed inventory of a product’s value chain to assess environmental impacts associated with all the stages of its life (figure 3). In the context of food, most research and quantification attempts are focused on the product carbon footprint (PCF). The PCF measures all greenhouse gas emissions along the food’s life cycle and is indicated in kg CO$_2$ per kg of a specific food product.

However, there is a controversial debate around the suitability of the PCF for reliably quantifying a food product’s sustainability. In most general terms, sustainability includes environmental, economic and social dimensions. However, the PCF does not consider important social criteria, such as social justice, human and labour rights, and it neglects environmental pollutants apart from greenhouse gases. These limitations of the PCF model have been confirmed in our expert interviews: Dr. Siebrecht stressed that greenhouse gas accounting was only a very small aspect of the huge idea of sustainability. Mr Wolf underlined this problem with the example of firewood: it has comparatively low CO$_2$ emissions as a fuel, but releases high concentrations of particulate matter when burned.

On the other hand, various reports have also emphasized the potential benefits of using the PCF as a sustainability metric. For example, a pilot study conducted in Germany has come to conclude that a “transparently documented product carbon footprint creates a stable foundation for a targeted product communication to improve climate-friendly consumption.” The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety has highlighted the necessity for developing better assessment standards and including relevant social and economic considerations in the PCF. However, further research “could transform the product carbon footprint into a useful tool to increase consumer awareness and identify possibilities of reducing greenhouse gas emissions in cultivating, processing, transporting and storing food.” After careful consideration, we have therefore decided to focus our development of an information tool on the PCF while constantly taking its limitations into account.

Our survey of 243 consumers produced several interesting results. For example, the majority of interviewees estimated that their purchase decisions have a medium to high impact on climate change; likewise, more than 50 percent are willing to pay a higher price for an eco-friendlier product. We found that roughly 86% of all participants would find it „good“ or „very good“ to have more information attached to the packaging about how “environmentally friendly” the food is, whereas less than 60% stated the same for information about the “ecological footprint.” Hence it could be inferred that people do not connect this latter term to eco-friendliness. The most favored means of information delivery...
Figure 4: Key results of our consumer survey.

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<td>very high</td>
<td>9.4%</td>
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<tr>
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<td>28.2%</td>
</tr>
<tr>
<td>medium</td>
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<tr>
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<tr>
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</table>

<table>
<thead>
<tr>
<th>Perception of Knowledge about Ecological Footprint</th>
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</thead>
<tbody>
<tr>
<td>very high</td>
<td>3.5%</td>
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<tr>
<td>high</td>
<td>28.2%</td>
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<tr>
<td>medium</td>
<td>37.6%</td>
</tr>
<tr>
<td>low</td>
<td>23.5%</td>
</tr>
<tr>
<td>very low</td>
<td>7.1%</td>
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</tbody>
</table>

Bar chart: How high do you estimate your personal potential to reduce greenhouse gas emissions (1-5 scale, where 5 is “very high”)

<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>3.4</td>
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<tr>
<td>Water</td>
<td>2.7</td>
</tr>
<tr>
<td>Electricity</td>
<td>3.5</td>
</tr>
<tr>
<td>Transport</td>
<td>3.7</td>
</tr>
<tr>
<td>Commodities</td>
<td>3.5</td>
</tr>
</tbody>
</table>
is on the food's packaging, followed by informational posters in supermarkets and via an app or website. This is contrary to our initial expectation that most would prefer an app or a website as their first information source. When looking at the kind of food that consumers want more information for, the survey shows that fruit, vegetables, and meat/fish are on top of the list. We also found that more than 88% would be willing to pay more for food that is more environmentally friendly.

Based on the results of our literature research, expert interviews and customer surveys, we designed an information poster for consumers in the supermarket. Our poster aims at increasing consumer’s understanding of the PCF in the context of food, and gives specific advice for buying less carbon intensive food products. To make our information tool as effective as possible, we designed it according to pre-defined criteria: simplicity, ease of distribution, focus on graphical representations and colorful illustrations, low cost and opportunities for further information about the topic (figure 5). Important research results presented on our poster are:

1. Organic, seasonal and regional cultivation of tomatoes emits 0.035 kg of CO$_2$ per kg of tomatoes, while conventional farming in heated greenhouses causes 9.3 kg CO$_2$/kg of tomatoes.$^{10}$

2. Beef production amounts to 16.9 kg CO$_2$/kg, potato cultivation to only 0.5 kg CO$_2$/kg.$^{11}$

3. The amount of food thrown away in Germany each year accounts for 22 million tonnes of greenhouse gas emissions.$^{12}$

To increase the impact of our information poster in building consumer awareness, we pursued two key activities. Firstly, in a partnership with the National Academy of Science and Engineering (“acatech”), we organized a successful discussion evening about sustainable food production with Prof. Dr. Thomas Hofman (Chair of Food Chemistry and Molecular Sensory Science, TUM) as key speaker. In addition, we produced a video as a starting point for a social media campaign or educational tool: passers-by in the Munich pedestrian area were quizzed about the carbon footprint of different food products in a fun and interactive way, and were presented with one of our posters at the end (figure 6).

**Summary and future goals**

The product carbon footprint (PCF) measures all greenhouse gas emissions along the life cycle of a food product. Our literature research and expert interviews have shown the limitations of the PCF as a sustainability indicator for nutritional choices, but also demonstrated its potential usefulness to improve consumers’ understanding of food’s ecological impact. The customer surveys highlighted that many consumers wish for more detailed information about the eco-friendliness of a specific food product. Our information poster gives specific and simple advice to consumers for reducing their carbon footprint in the supermarket. The discussion event at acatech and our awareness-building video provided starting points for increasing the public engagement with the topic.

To ensure our project’s positive impact on decision-making processes related to food products, we have two future goals:

1. Implementation of a distribution strategy for the information poster in supermarkets and iterative optimization.

2. Integration of the video into a social media campaign or educational tool.

Furthermore, there is also a pressing need for further research and policy implementation. An international standard for assessing the PCF is crucial to ensure a global and transparent comparison between products. In addition, the suitability of the PCF metric for quantifying sustainability needs to be improved by integrating social and additional ecological aspects. And, lastly, political measures are necessary to ensure reliable and accessible life cycle assessment data for any food product. This is a key requirement for successful employment of the PCF as a tool for improving consumers’ decision-making processes in the long term.
**Figure 5: Key elements of our information poster.**

- **Simple overview** shows carbon footprint of different foods: helps the consumer to develop a general understanding of his impact.

- **Examples** based on concrete scientific data: highlights the potential positive impact of considering the carbon footprint in consumption choices.

- **Short and precise advice**: enables consumers to improve decision-making processes and lower their carbon footprints.

- **Colours and easily readable illustrations**: attracts attention to the poster and eases understanding.

- **Tips for further information and a list of sources**: provides opportunities for further engagement with the topic and ensures transparency.
Acknowledgements

Our project could not have been completed successfully without the support of a variety of people. We would therefore like to thank:

- our mentor Dr. Hannes Petermeier and our tutors Dominik Irber and Josef Oberndorfer for their valuable guidance and constructive criticism over the course of one and a half years

- Dr. Norman Siebrecht and Christian Wolf for sharing their expert knowledge with us

- Georgia Samaras and Dr. Michael Penkler for their very helpful seminar on methods of qualitative research

- PD Dr. Marc-Denis Weitze (acatech) for giving us the great opportunity of presenting our work to an interested audience

- Prof. Thomas Hofmann for his thrilling talk at the acatech event

- Ulrich Leyermann for designing our information poster

- Martin Prankl for producing our video

- Prof. Gerhard Müller, Peter Finger, Maria Hannecker and all members of the TUM: Junge Akademie for providing a supportive and dynamic environment where ambitious ideas can be brought to life

Bibliography


EatMe
Decision-making processes concerning food consumption.

Buying food is an everyday activity for most of us. Yet the choice of food has become a highly emotional topic in our western society.

We want to analyze what unconsciously and consciously drives people when it comes to the decision of buying a certain foodstuff.

Imagine yourself on a Saturday morning, shopping the groceries for next week. Are you walking through the abundantly packed aisles of a supermarket or do you prefer to visit your local farmer’s market?

Which criteria are influencing your decision for a particular product when buying apples, potatoes, eggs or coffee?

BACKGROUND

With the increasing awareness for ecological footprint issues and the better understanding of the influence of consumers’ behaviors and their interaction on the environment, a research focus on the healthcare of food products has been activated.

Furthermore, the awareness for social footprint issues is increasing Today, consumers are more and more aware of the importance of supporting products and brands that are perceived as positive in a broader sense of fashion. This trend has been widely recognized by producers and has led to successful products and brands in terms of image. The main trend is one of a growing emphasis on sustainability and eco-friendly products.

In the first phase of our project, we decided to deal with the product carbon footprint. Following up on our project plan, we carried out a survey to find out if people even want more information on this aspect of their food. And if so, what kind of information do they want and in what form they want it.

GOALS AND METHODS

Better informed consumers will choose their food more consciously.

We are primarily targeting food producers towards more eco-friendly and sustainable strategies. Based on literature research and in-depth interviews with experts in the field, we developed a survey that is designed to find out if consumers want more information on product carbon footprint. The survey is intended to find out if consumers want to receive more information on the environmental impact of the products they consume.

OUTCOME AND DISCUSSION

The survey’s aim is to get an overview of the dispersion of and the knowledge about the term “ecological footprint”. Furthermore, we designed it to get some insights into how consumers might influence sustainable consumption. Therefore, we decided to ask the participants about their awareness about the ecological footprint and to find out if they are willing to pay more for environmentally friendly products.

MEMBERS

Philip Böhm, Fabio Bove, Linus Huss, Paul Thillen, Johannes Wüllenweber

TUTORS

Dominik Irber, Josef Oberndorfer

Dr. Hannes Petermeier

SUMMARY AND FUTURE GOALS

As successful implementation of our survey concerning the product carbon footprint was achieved, we want to further explore the willingness of consumers to pay more for environmentally friendly products in order to make informed decisions. We also want to further develop the questionnaires and to refine the model in order to establish a cooperation ensuring sustainable development. Furthermore, we expect to establish a questionnaire for a detailed analysis of the awareness of the product carbon footprint. Therefore, we will focus on providing a detailed analysis of the awareness of the product carbon footprint within the framework of the project "EatMe. I’m Low Carbon."
**Poster 3: Evaluation Day II**

**EatMe. I'm Low Carbon.**

**ABSTRACT**
Building on our consumer surveys and expert interviews, we are currently working on the two key challenges of conducting a reliable life cycle assessment for a food product and presenting its results in a precise, but understandable manner. A poster, website, smartphone application or social media campaign are possible tools to transform our results into increasing public awareness for the ecological footprint of nutrition.

**HYPOTHESES**
Better informed consumers will take a product's ecological footprint into account for their purchase decisions.

**GOALS AND METHODS**
We contacted 200 participants in three different regions in Germany to improve the understanding of consumers about the ecological footprint of food products using the Product Carbon Footprint method. The participants had to perform a life cycle assessment of a certain product in comparison with the default results of the method. For this purpose, we developed a smartphone app. The app was tested in a tasting session to evaluate the understanding of consumers about the ecological footprint of food products. We also conducted an expert interview with two researchers at the University of Münster (Germany) to get a better insight into the influence of food's ecological footprint on consumers' purchase decisions. We also conducted an expert interview with two researchers at the University of Münster (Germany) to get a better insight into the influence of food's ecological footprint on consumers' purchase decisions.

**OUTCOME AND DISCUSSION**
The most important result of our conducted consumer survey was that more than 80% of the participants said that they would consider the ecological footprint of food products when making their purchase decisions. The most important result of our conducted consumer survey was that more than 80% of the participants said that they would consider the ecological footprint of food products when making their purchase decisions.

**SUMMARY AND FUTURE GOALS**
We aim to develop a smartphone app that will allow consumers to easily calculate the ecological footprint of food products. The app will also provide information about the ecological footprint of different food products and allow consumers to compare their purchases with the default results of the Product Carbon Footprint method.

**Poster 4: Annual Conference 2017**

**EatMe. I'm Low Carbon.**

**ABSTRACT**
A more general understanding of consumers' knowledge and behavior in relation to food's ecological footprint.

**HYPOTHESIS**
Better informed consumers will take a product's ecological footprint into account for their purchase decision.

**TEAM STRUCTURE AND PROCESS**
An interdisciplinary team consisting of four persons, two researchers at the University of Münster (Germany), and two students at the Technical University of Munich (TUM) worked on the project. The project was initiated by Dominik Irber and directed by Dr. Hans-Joachim Potsmayer, head of the Sensory Science Laboratory at TUM.

**OUTCOME**
The project resulted in a smartphone app for calculating the ecological footprint of food products. The app is available on the App Store and Google Play.

**FUTURE GOALS**
The project aims to improve consumer awareness for the ecological footprint of food.

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**BIBLIOGRAPHY**

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EatMe – I’m low carbon
# Project Report healthtoday

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- Sabine Pircher

**Mentor**
- Prof. Dr. med. em. Reiner Gradinger
- Prof. Dr.-Ing. Liqiu Meng
Motivation

“The medicine of the future will certainly be a combination of different methods. There will be a strong focus on soft treatments without (meaningful) side-effects. Patients want to be listened to.” claims Dr. med. Irene Scharpf, who works in Ravensburg, Baden-Württemberg. Dr. Scharpf, who is specialized in alternative medicine, observed a large increase of patient numbers over the last couple of years. Possible reasons: growing discontent with conventional medicines, medical scandals spread by the media and political discussions about controversial issues, such as the compulsory vaccination of children.

Where does this growing dissatisfaction come from? Is it dangerous to decrease the priority of well-established conventional medicines? The project Healthtoday analyses the current public opinion about conventional medicine through expert interviews and surveys. But how can we conceive an opinion synopsis of such a complex issue? Qualitative and quantitative research methods were needed in order to gain an overview of peoples’ opinions, hence we organized written and online surveys as well as expert interviews.

Methods

<table>
<thead>
<tr>
<th>Year’s conference</th>
<th>First survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>During March and July 2017</td>
<td>Survey (also online) with multiple-choice answers</td>
</tr>
<tr>
<td>Expertinterviews</td>
<td>During the whole project phase</td>
</tr>
</tbody>
</table>

**A small outtake from one of our Surveys:**
How would you answer these questions? Does your opinion reflect the results of our survey? Let’s find out

2.2 Did the usage of alternative treatment increased during the last year in your opinion?

- yes
- no
- I don’t know

Answer: Yes 92.1%, No 4.9% and I don’t know 3%

5.1 Are possible side effects of conventional medicines deterrence factors?

- yes
- no

Answer: Yes 61.6%, No 38.4%

5.2 Could the not proofed efficiency of homeopathics be a deterrence factor as well?

- yes
- no

Answer: Yes 61.8%, No 38.2%

**Expert interviews:**

The validity of our hypothesis was discussed with health professionals (two doctors and a pharmacist) by means of interviews. All interviewed experts were asked similar questions. Surprisingly, they shared similar opinions.

How would you answer the following questions?
These are the answers of our experts:

1. What do you understand by “conventional medicine” and “alternative medicine”?
   a) Dr. Scharpf: Alternative medicine is mainly based on experience, while school medicine has been proven and is based on facts and research.
   b) Dr. Finger: General medicine (conventional medicine) comprehends scientifically proven methods, as well as other disciplines where the effectiveness of the treatments has been demonstrated, such as psychology and social medicine. Alternative treatments are those which have not been proven scientifically and have not got a long tradition like other pharmaceutical products.
c) **Mr. Müller:** Conventional medicine, also school medicine, comprehends all the procedures and treatments that have been proven and studied thoroughly. Alternative medicine is an experience medicine, an empirical medicine based on experiences and not yet on scientific data. This does not mean alternative medicine is ineffective, but suggests that further studies should be performed in order to understand it more profoundly.

2. Do you think that certain groups in society favor alternative medicine? Does the educational background of the patients have an influence in the decision making?
   a) **Dr. Scharpf:** Those people who are very conscious about their health and their children’s come to me looking for alternative treatments. They are mostly young patients and parents, while the elderly patients come mainly because of the time I spend on them. The persons I care for belong to the middle and upper classes, yet there are exceptions.
   b) **Dr. Finger:** Mostly middle-aged women are the ones that ask about alternative treatments, young patients want treatments with fast results. The patients with a higher education tend to be more critical about the medical treatments and hence ask more about alternative methods.
   c) **Mr. Müller:** Alternative medicine spreads in all social classes and age groups. Nevertheless, the majority asking about alternative treatments are young. Additionally, only people with a certain income have access to alternative drugs because these medical supplies are very expensive and are not covered by the insurances.

3. What does the future hold concerning medicine?
   a) **Dr. Scharpf:** The medicine of the future will certainly be a combination of different methods. There will be a stronger focus on soft treatments without (meaningful) side-effects. There will also be new drugs that are more expensive in their production.
   b) **Dr. Finger:** It would be great if the medical personnel could spend more time on the treatment of their patients, also in hospitals where plenty of specialists are present.
   c) **Mr. Müller:** The system will eventually collapse. New and better medicines will be produced through optimized processes and new scientific discoveries. Yet most of them will be so expensive that insurances, as they currently exist, won’t be able to provide them. Therefore, the access to the general public will be limited.

---

**Our journey and the development of our project:**

1. Hypothesis: There is a strong influence of social media and shared information through the internet, regarding health issues, on processes of decision making about our healthcare and therapy options.

   => Change towards our second Hypothesis:

   2. Hypothesis: In society today there is a growing suspicion about conventional medicine and drugs.

   3. Small survey during the last Conclusion: Alternative medicine and homeopathy were frequently perceived as equals


   5. Expert interviews with health-professionals, such as doctors and a pharmacist.

**Outcome**

Now at the final chapter of the project Healthtoday, we can look back at thrilling and exciting months of work. Even if it wasn’t easy, we had a lot of fun and learned about many complex topics. We learned about different medical treatments and the health system in Germany. We learned from the interviews that the topic “Health” will remain a current topic also in the future and we learned that everything could change in the next few years. Furthermore, the workshops offered by the TUM: Junge Akademie were very enriching and practical for the development of this project, as well as for our further work in academic areas. Moreover, we learned to work as a team, sharing the responsibilities and tasks. Fun and companionship were always present and we don’t conclude this project just as team members, but as friends who will certainly remain in contact. To conclude, we encourage the new generations of TUM: Junge Akademie members to enjoy their projects as much as we did.

Yours sincerely,

Team Healthtoday
1. Abstract

With our project Healthtoday we examined our thesis: “In contemporary society there is a growing suspicion about conventional medicine and drugs.” By means of two questionnaires and three expert interviews we evaluated the current state of opinion of patients, physicians and pharmacists.

2. Background

In the past decade research studies have reported an increased usage of complementary and alternative medicine (CAM) treatments in the western world. Therefore, the number of “Heilpraktiker” that have received a state license in Germany by passing an examination on basic medical knowledge and skills at a local public health office has increased from 9000 in 1993 to nearly 20,000 in 2006 (Joos et al., 2006, Beer et al., 2016, Dinges, 2017). The same development can be seen in relation to the increasing number of physicians with additional training in natural medicine and homeopathy that are registered with the Medical Chamber:

![Figure 1: Physicians with additional training that are registered with the Medical Chamber](https://www.gbe-bund.de, 17.10.09)

In science literature, media and society various terms exist for those diagnostic and therapeutic disciplines that are not part of classic conventional medicine. The terms are not always equal and vary through different sources. Due to the wide range of disciplines of CAM it is difficult to determine criteria that are common for all. Moreover, the definitions depend on traditions and on historical developments of cultures and therefore vary a lot (Frass et al., 2012, Marstedt and Moebus, 2002, Joos et al., 2006). Furthermore, the ways of prescription of CAM differ between physicians and non-medical persons among countries (Joos et al., 2006). Traditional medicine have existed over many centuries and experiences were passed from generation to generation providing safety and efficiency of usage. Nevertheless, to be officially recognized, scientific research is necessary to provide additional evidence of its safety and efficacy. However, for lack of adequate or accepted research methodology, the available data are insufficient to fulfill the necessary criteria to support its use worldwide and to be applied as evidence-based medicine (EBM) (Organization, 2000, Porzsolt et al., 2010).

Supporters of alternative medicine see advantages in the holistic medical orientation that are aware of other causes of diseases and therapeutic mechanisms of action compared to conventional medicine. Another advantage is the lack of side effects which gives a reason for mistrust in conventional drugs (Marsted and Moebus, 2002).

Definitions

**Conventional medicine:**
Mostly defined as treatments and methods that are used and investigated at universities of highly developed western countries and is evidence-based medicine (EBM) (Porzsolt et al., 2010, Stefan N. Willich, 2004).

**Alternative Medicine:**
Alternative/complementary medicine in some countries is often used inter-changeably with traditional medicine. Traditional medicine includes knowledge, skills and practices based on theories, beliefs and experiences native to different cultures and is used to maintain health and also prevents, diagnoses, improves or treats physical and mental illness (Organization, 2000).

Definitions of some of the most common areas of alternative medicine:
**Homeopathy:**
The German physician Samuel Hahnemann founded this system of medicine at the end of the 18th century. He divided homeopathy into two major principles:
- the principle of similarity which treats like with like
- the most controversial principle is known as potentization, the process of repeated dilution and vigorous succession at each step of dilution (Du and Knopf, 2009, Boltman-Binkowski, 2016)

**Traditional Chinese Medicine (TCM):**
TCM is an important part of complementary and alternative medicine including herbal medicine and acupuncture and therefore plays an important part in the formation of integrative medicine. TCM was developed two thousand years ago and concentrates on maintaining health and enhancing the resistance to diseases to treat those (Lu et al., 2004).

**Herbal Remedies (Phytotherapy):**
Herbal medicines involve herbs, herbal materials, herbal preparations and finished herbal products that include the active ingredients of the used plants, other plants materials or combinations (Organization, 2000).

**Osteopathy:**
The physician and surgeon Andrew Taylor Still created osteopathy in the mid 18th century. He stated that manual contact is necessary for diagnosis and treatment while respecting the relationship of body, mind and spirit in health and disease. Therefore, the focus is on the structural and functional integrity and the intrinsic tendency for self-healing of the body (Organization, 2010).

### 3. Methods

**Questionnaires**

**First Questionnaire:**
We distributed our first questionnaire, containing open questions, at the annual conference and gained first impressions regarding current opinion on the topic.

In general all three basic opinions related to the acceptance of alternative medicine treatments were specified: positive, neutral and negative. For the positive and neutral fraction the most promising techniques were TCM and Phytotherapy. In contrast, the negative fraction often equated alternative medicine and homeopathy. Fur-
Outcome

The outcome of the second questionnaire is presented through the following graphics:

As shown in Figure 5 the majority of the respondents believes that the usage of alternative treatments has increased during the last years and therefore most of the people think that patients search for alternative treatments. Thereby, our study supports the developments of a still increasing use of complementary and alternative medicine in Germany during the last years (Joos et al., 2006).

More than seventy percent stated that they haven’t been informed sufficiently about alternative treatments on a regular basis during physician appointments. A possible reason for this lack of information transfer might be the rejection, especially, of homoeopathic treatments by medics because of the missing scientific research providing evidence of its safety and efficacy (Dinges, 2017).

As seen in Figure 7 the majority of respondents have used both conventional medicine and natural remedies, a subunit of alternative medicine. More than half of the respondents have applied homeopathy whereas only 22 % have tried osteopathy. The survey from Joos (2006) has stated that natural remedies and homeopathy are very popular in Germany and that the users are more likely to be female and well-educated (Dinges, 2017).

Although fewer people have tried osteopathy compared to homeopathy, they have been far more pleased with the results as shown in Figure 8. Furthermore, homeopathy was the medical treatment with the least satisfaction of the patients compared to conventional medicine, osteopathy and natural remedies.

Since possible side effects are one of the strongest concerns of conventional treatments we wanted to determine if there are social
Figure 5: Has the usage of alternative treatments increased during the last years?

Figure 6: Have you been informed about alternative treatment options by your physician on a regular basis?

Figure 7: Have you experienced the following methods?

Figure 8: How pleased were you with the following methods on a scale from totally (0) and not at all (5)
groups that would be inclined to use alternative medicine instead of conventional. The results are presented in Figure 9:

More than half of the participants thought that the high-risk groups “children” and “pregnant women” should use alternative medicine instead of conventional. This result corresponds with the KIGGs-study which stated that for example homeopathic products like Arnika or Schüssler-Salze are mostly used for children between 3 and 6 years old (Schlack et al., 2008).

**Expert Interviews**

In addition to our questionnaires we performed three expert interviews to gain an overview of our topic from the point of view of physicians and pharmacists.

Therefore we interviewed the general practitioner Dr. med. Irene Scharpf who has specialized on homoeopathic treatments, the internist Dr. med. Sabine Finger and the pharmacist Josef Müller.
Summary of the interviews:
Dr. med. Irene Scharpf = S
Dr. med. Sabine Finger = F
Josef Müller = M

Has the number of patients that want alternative treatments increased?
S: Yes I had a lot more patients in the last years. Especially parents and pregnant women choose to try alternative treatments first.
F: Yes I think so. Because it is a current topic and patients prefer a gentle medicine without side effects.
M: Yes. Especially younger ones are more open to alternative treatments.

Does the educational level of patients have an influence on the treatment they choose?
S: Sure. I think I treat mostly patients out of the middle and higher educated levels, although exceptions always exist.
F: Certainly yes. The higher educated ones question health issues more and search for alternatives.
M: Conventional medicine is scientifically well-founded, whereas alternative medicine isn’t scientifically reviewed and is mostly based on a long tradition.

What will the medicine of the future look like?
S: I’m sure there will be a combination of different methods and the focus will be on treatments without side effect. Moreover, patients will want physicians who listen more closely and spend more time with their patient.
F: It would be desirable for physicians to take more time for treatments and diagnosis. Since medicine is getting more and more specialized the family doctor will become more important to coordinate the results of other specialists.
M: Alternative treatments offer fewer side effects compared to conventional ones. In general it is a great alternative for cases where conventional medicine reaches its limits. Furthermore, alternative physicians can spend more time to treat each patient.

How would you define alternative medicine compared to conventional medicine?
S: Alternative medicine is primarily based on experiences while conventional medicine refers to facts and research studies. There are far fewer studies and statistics regarding CAM.
F: Conventional medicine is scientifically well-founded, whereas alternative medicine isn’t scientifically reviewed and is mostly based on a long tradition.
M: Conventional medicine is empirically-based medicine (EBM) and alternative medicine mostly depends on the traditional background and differs among different countries.

What are the advantages of alternative treatments compared to conventional?
S: The main advantage is fewer side effects. Furthermore, the patient is treated holistically, where conventional medicine uses one drug that works at a certain part of the body. The relationship between patient and physician is much more intensive since more information about the patient is gathered. Therefore a huge disadvantage of conventional medicine is the lack of time used for patients.
F: Alternative medicine lays the focus not only on the disease but also on the complete human standing behind it. Moreover, general practitioners have the problem that they don’t have enough time to treat the patient with the same amount of work as alternative physicians.
M: Alternative treatments offer fewer side effects compared to conventional ones. In general it is a great alternative for cases where conventional medicine reaches its limits. Furthermore, alternative physicians can spend more time to treat each patient.
4. Discussion and Outlook

Especially during the expert interviews, one point that stuck out was that there is a huge time problem within conventional medicine. Due to the little amount of time physicians spend with the patient, the latter get the feeling of not being listened to and of being treated hastily.

The great advantage of alternative treatments is that alternative practitioners take a lot more time for each treatment, for example first anamneses take at least 30 to 45 minutes.

Another main motive for choosing alternative treatments are chronic diseases and missing or insufficient achievements of conventional medicine. Furthermore, the possible side effects are a determining factor since alternative medicine is associated with gentle, natural and side effect free modes of action (Joos et al., 2006).

Within the medical profession and its associations and the insurance companies an extensive controversy about both the scientific acknowledge of alternative medicine and its inclusion within the statutory health insurance catalog of services exists (Marstedt and Moebus, 2002). This is reflected in the results of our survey where the majority stated that they haven’t been informed about alternative treatments by their treating physicians recently. Of relevance here is that there was a huge discussion earlier this year when the Techniker Krankenkasse added homeopathic treatments to their services as many customers appreciate such alternative treatments (TK, 2017).

A major problem for patients choosing medical treatments is the contradictory information they receive from physicians, the media and the general social environment about the different treatments available. A possible solution might be a better system of information transfer about both conventional and alternative treatments by physicians to avoid misunderstanding and mistrust (Joos et al., 2006).

5. Conclusion

Altogether our research and results indicate that a growing suspicion against conventional medicine exists in the society. Two of the main reasons are the possible side effects of conventional drugs and a dissatisfaction of the results of those drugs and treatments. Moreover, the time problem of conventional practicing physicians seems to increase the suspicion towards the success of conventional treatments. In comparison to other European countries, primary physicians treatments in Germany are the shortest, mostly medically and least patient orientated ones. Due to that, patients want physicians to take more time for treatments and explanations for diseases and medicines (Dierks et al., 2006, Horch et al., 2012). Furthermore, the high specialization of many physicians comes not only with advantages, but also with the main problem that due to those specializations the patients are sent from one physician to another, which often leads to frustration and confusion. During the expert interview, Dr. med. Sabine Finger proposed that a possible solution might be the merger of different specialist in one medical practice, whereby patients are treated in one place and physicians have a better exchange their colleagues.

During the last years the relationship between patients and physicians has changed from a passive one to one where patients question the healthcare system and want to influence the spectrum of health insurance catalogs. Therefore, the Federal Ministry of Health (BMG) has originated a national program (gesundheitsziele.de) to encourage the patients as partners within decision making in healthcare and further projects are planned (Horch et al., 2012, Maschewsky-Schneider, 2017). That brings us to the conclusion that the healthcare system in Germany is currently in a state of change, which leads to a higher influence of patient onto the relationship between physicians and patients and a “shared decision making” (Horch et al., 2011).
References


Decision Making in Health-Care

In the society a growing mistrust against conventional medicine and drugs occurs.

BACKGROUND
In the past decade research studies reported an increased use of complementary and alternative medicine (CAM). Natural remedies and homeopathic preparations are examples for alternative medicine treatments but a lot of people and even some physicians do not realize that there is a difference between them. Even though they may have beneficial effects, they should be considered carefully when to be applied and when conventional therapies will be needed.

GOALS
- Evaluation of increasing mistrust towards conventional medicine and drugs
- Determination of demographic influence on decision regarding health care issues
- Analysis of preferred therapy options for different diseases

METHODS
- expert interviews
- focus group interviews
- literature-based research

Motto
Mit viel Lachen, ganz viel machen

Decision Making in Health-Care

In the society a growing mistrust against conventional medicine and drugs occurs.

BACKGROUND
In the past decade research studies reported an increased use of complementary and alternative medicine (CAM). Natural remedies and homeopathic preparations are examples for alternative medicine treatments but a lot of people and even some physicians do not realize that there is a difference between them. Even though they may have beneficial effects, they should be considered carefully when to be applied and when conventional therapies will be needed.

GOALS
- Evaluation of increasing mistrust towards conventional medicine and drugs
- Determination of demographic influence on decision regarding health care issues
- Analysis of preferred therapy options for different diseases

METHODS
- expert interviews
- focus group interviews
- literature-based research

Motto
Mit viel Lachen, ganz viel machen

Healthtoday

ABSTRACT
With our project we want to determine if our thesis: “In the society a growing suspicion against conventional medicine and drugs occurs”, is actually significant. Through our questionnaire from the annual conference we already discovered that a great diversity exists in society about the usage of alternative medical treatments.

GOALS
- determine if there is a growing suspicion against conventional medicine and drugs
- examine which tendencies the various demographic groups have with regard to decide for different treatments
- investigate which kind of treatment is preferred for various diseases

METHODS
- expert interviews
- focus group interviews
- ocular movement analysis

OUTCOME AND DISCUSSIONS
Due to our questionnaire we distributed at the annual conference we got a first impression regarding the current opinion on our topic.

In general all three different opinions related to the acceptance of alternative medicine treatments have been specified: positive, neutral and negative. The positive and neutral fraction were the most promising techniques were the TCM and Phytotherapy. In contrary the negative fraction often equated alternative medicine and homeopathy. Furthermore, the majority has already gained experience with alternative medicine and natural remedies were found as the most positive ones. Unlike to those natural remedies homeopathy was described as less preferable because of missing efficiency.

Moreover, most of the participants are of the opinion that less dangerous diseases could be treated with alternative drugs while life-threatening diseases should be treated with conventional methods or a combination of both.

SUMMARY AND FUTURE GOALS
In addition to our questionnaire we designed a revised one on EvaSys that we want to share in German and English to address most people both online and on paper to ensure that we get complete information about the experiences and opinions and how they relate with the background of the participants. Furthermore we included an option to indicate email addresses with the intention to invite some of the participants to more detailed interviews and focus group interviews. Moreover, we would like to perform some expert interviews to receive inside views of entrepreneurial aspects of our thesis.

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we evaluated the current state of opinion of patients, physicians and pharmacists. In the society a growing suspicion towards conventional medicine and drugs occur. By means of two surveys and three expert interviews we studied public media. Knowledge about the attitude of people towards medical regimes.

As shown in Figure 2 the majority of the respondents believes that the usage of alternative treatments have increased during the last years. A possible solution might be a better information transfer and a transparent handling about both conventional and alternative medicine.

Since possible side effects are one of the strongest concerns of conventional treatments, we wanted to determine, if there are social groups that would be favored to use alternative medicine instead of conventional treatments. Moreover, the pressure of time for conventional practicing physicians seems to increase the suspicion towards the success of conventional treatments.

The results are presented in Figure 4. For which of the following groups should alternative medicine be favored?

Our goals were to determine the reasons for the increasing use of alternative medicine and possible solutions, and to find out which demographic groups are more open towards alternative treatments.

GOALS
In the past decade research studies have reported an increased usage of complementary and alternative medicine (CAM) treatments for different illnesses. This increase can be seen in the increasing number of physicians with additional training in natural medicine and homeopathy that are registered with the Medical Chamber. More than half of the participants thought that the high risk groups children and pregnant women should use alternative medicine instead of conventional. This result corresponds with the KIGGs-study, numbers from Gesundheitsberichterstattung des Bundes www.gbe-bund.de, 17.10.09.

The interest of the public for different types of medical treatments becomes obvious as friends that will certainly remain in contact. Moreover, we managed to work as a team, by sharing responsibilities and tasks. Fun and companionship were always present and we don’t conclude this project just as team members, but as friends that will certainly stay in contact. Together, our research and results indicate the existence of a growing suspicion against conventional medicine and drugs. The pressure of time for conventional practicing physicians seems to increase the suspicion towards the success of conventional treatments. Moreover, the pressure of time for conventional practicing physicians seems to increase the suspicion towards the success of conventional treatments.

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Project Report

Integration through Democracy

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Intercultural exchange and democracy

On 20th and 21st of July 2017, the group Integration through democracy organized a two-day workshop labelled Intercultural exchange and democracy. Ten students, most of them from the program Buddies for Refugees, participated in this event. The aim of the workshop: the intercultural enrichment of all participants, focusing on German culture and its democratic system.

But where does Integration through democracy come from? According to Mira, one of their members, it wasn’t precisely a straight path. “We started off by the unification of two at first completely different groups at the TUM: Junge Akademie’s kick-off weekend. While the first group wanted to focus on asylum policy, the second one had democracy as its central topic. We sat down, discussed the possibility of uniting both groups, and recognized very interesting interfaces of these two currently hot topics.” And so, Decision making processes in asylum policy and democracy was born.

The group started analyzing the possible democratic structures of refugee camps, performing a series of interviews with refugees and helpers, and later on with members of TUM’s Buddies for Refugees program. Finally, after more than one year of intense research, the group came up with the concept of the said workshop, which combined exciting talks, different tasks and games and a guided tour through the Bavarian State Parliament.

The first day of the workshop was centered on intercultural exchange. The day started with two games to get to know each other, which created a relaxed environment, with lots of laughter and amusement. Then, the group started brainstorming about what German culture and stereotypes mean. After these interesting discussions, two teams were created: “Die Fleißigen” and “Die Genialen.” Both teams had to compete against each other, solving riddles and answering questions which put their knowledge of German history, culture and society to the test. After proving their capacity for teamwork as well as their knowledge, the team “Die Genialen” won by just one point!

The cooking event put the icing on the first day’s program. The menu: Bavarian “Rindergeschnetzeltes” with champignon sauce and “Spätzle!” Apart from the amusing cooking and lots of funny moments, a variety of exciting conversations took place, which had the culture of every participant as central topic. Afghanistan’s university system, Spanish football teams, Syrian food, German humour... A sense of trust and fellowship arose from this first day and prepared the group for the intense program of the second day.

Despite being Friday morning, the group started the second day with energy. The program for this part was much more centered on the concept of democracy, its application in daily life decisions and its implementation in Germany. After an initial brainstorming and discussion about the meaning of the word “democracy” itself, different groups had to solve daily life decision-making problems – from which movie to watch, to which ingredients should come in a pizza, etc. – with the aid of democratic means. All participants agreed on the difficulty of solving such problems when, for example, the number of persons involved increased.

This was the perfect transition to the topic of democratic systems within countries. Prof. Dr. Stefan Wurster, from the Bavarian School of Public Policy, gave an interesting talk about the history and development of Germany’s party system, underlining the most important aspects of historical development of parties, ideological spectra and the structure of elections. All attendees actively participated by giving their opinions, debating or asking questions.
This discussion led to the final program of the workshop: the guided tour through the Bavarian State Parliament with Angelika Schorer, Member of the Parliament. She guided the group through the most important rooms of the Maximilianeum, explaining its history and the artworks that hang on their walls. When reaching the room where the political debates take place, everybody could sit down and listen to her explanation about the configuration of the Landtag and its functioning. After the tour, the participants had the opportunity to sit all together with Angelika Schorer, have some snacks and ask her about the daily life of a parliament member.

After the completion of the workshop, the members of Integration through democracy received a lot of positive feedback from the participants. The interview we carried out with two of the participants is an example of this. The group is hoping that the concept of this workshop will continue throughout the next years. Artem, another member of the group, puts it like this: “Now that we’ve learned the positive impact of our workshop on our participants, we won’t stop here. We are considering different possibilities on how to maintain this workshop and make it last as part of the catalogue of events that the Technical University of Munich offers every semester.”

### Interview

Our reporter spoke with Gregor (20 years old) and Shoaib (22 years old) during the two-day workshop. Both are computer science students and also tandem partners in the TUM’s Buddies for refugees program. In this program, students can become “Buddies” of young refugees and help them integrate in TUM’s university life. While Gregor was born and raised in Germany, Shoaib comes from Afghanistan and has been living in Germany for one-and-a-half years.

R: What motivated you to participate in the workshop Intercultural exchange and democracy?

S: As part of the Buddies for refugees program, we have a mailing list, where we receive invitations to different events. I received an invitation for this workshop and sent it to Gregor. I thought that maybe he would be interested.

G: Exactly. We sometimes participate in different events together and here we could also learn something about politics.

R: Did the workshop fulfill your expectations?

G: Absolutely.

S: Yes!

G: Especially as the workshop was structured in a very playful way.

S: Exactly, we liked that a lot!

R: Which part of the workshop made a lasting impression on you and why?

G: I found the guest lecture at the School of Public Policy very interesting, because he gave a good impression of how the election campaign topics are selected. This was interesting for me as someone who is familiar with the German political system.

S: The talk also made a lasting impression on me.

G: Ah, and of course the acting activity!

R: What did you like the least, what would you like to change?

G: There’s nothing!

S: Right.

R: What was the funniest moment of both days?

S: That was yesterday [the first day]. The first round, when we played all together.

G: Exactly! When we encountered a new flatmate in our “house” and we had to imagine what he did for a living.

S: Yes, that was it!

R: If you could summarize the workshop in one sentence, what would it be?

G: Politics explained playfully.

S: How politics and political movements actually function.

R: Thank you very much for the interview and for these two exciting days!
Abstract

The integration of refugees into German society is not an easy task. For a successful integration process, the central values that define our society need to be presented and explained to refugees. We identified democracy as one of the most important of these values. Therefore, we first analyzed the democratic structures in refugee camps and the refugees' knowledge about democracy. Based on the results of the analysis, we designed a workshop about intercultural exchange and democracy. Its aim was to enhance interest and awareness about our culture and democratic system amongst young refugees.

Background

Migration is inherent to human being. From the beginning of the human era, migratory movements have sculpted our social landscapes to the shapes we know today. Migration can be voluntary or involuntary, and is strongly determined by factors associated with the area of origin – where, for example, war, political persecution or natural disasters may have occurred – and with the area of destination – where, for example, political freedom, economic welfare or security might be available.\(^1\) In 2015, the number of refugees arriving in Europe increased rapidly. This refugee crisis turned out to be one of the biggest challenges ever faced by the European Union. People from different countries all over the world have been fleeing to Europe due to war or political instabilities in their home countries. In the year 2016, more than 1.25 million asylum seekers reached Europe.\(^2\) Germany stands out as the country with the highest number of refugees accepted, having processed almost 750.000 asylum applications in 2016. From the numerous statistics provided by the German Federal Office for Migration and Refugees (BAMF), one recognizes a large variety of countries and cultures from which people have reached Germany in the past years. According to BAMF the nationality spectrum in 2016 was dominated by Syrian refugees (36,9 %), followed by Afghanistan (17,6 %) and Iraq (13,3 %).\(^3\)

Goals and Methods

The main goal of our project is based on the statement at the end of the last section: We aim to help refugees enhance their knowledge about democracy in general and about the political system in Germany. By doing so, we are hoping to contribute to a smoother integration of refugees in our society.

The way to reach that goal is quite a long one. The two assumptions that (1) refugees are interested in democracy and that (2) democracy may help to integrate refugees, led to the following two hypotheses:

1) *Both refugees and organizations have an interest in establishing democratic social structures in refugee camps. Furthermore, these structures do not exist currently.*

2) *An enhanced understanding of the concept of democracy and its practical application in everyday life by refugees will contribute to their integration in Germany*
To evaluate the first hypothesis, we conducted around 20 qualitative interviews. For this purpose, we designed 17 different questions about the current situation, aimed at both refugees and heads of refugee camps, to find out about their interests and expectations in relation to social as well as democratic structures in refugee camps. After conducting the qualitative interviews in different refugee camps in the area around Munich, we were able to analyze and compare the findings of the interviews by assigning them to different clusters.

To evaluate the second hypothesis, we designed another qualitative questionnaire with semi-structured questions. We focused here on refugees between the ages of 18 and 30 years. The main content of this questionnaire were questions on the respondents’ understanding of and knowledge about democracy; on their sources of information about political topics in Germany; on their home countries; and on their levels of interest in daily political happenings.

Another important approach to test the second hypothesis was conducting a quantitative survey at the “Buddies For Refugees” (BfR) kick-off event at the beginning of the semester in April 2017. The BfR programme by the TUM: Junge Akademie, a guest auditor programme for young, academically interested refugees and their “Buddies” – regular students at TUM – perfectly displayed our tar-
get group of people aged between 18 and 30. The questionnaire was aimed at both guest auditors (refugees) and buddies (regular students). It consisted of four questions related to the differences and shared interests of each tandem group, the participants’ associations with the concept of democracy, their proposals for activities besides studies, and the communication channels they use.

As a third means of evaluating the second hypothesis, we elaborated a workshop lasting two days for participants of the BfR programme. We derived two main goals for the workshop from our hypothesis (and from the results of the second survey as well):

- To enlarge the participants’ knowledge about intercultural diversity
- To enlarge the participants’ knowledge about democracy and the political system in Germany

To achieve these goals, we divided the workshop into two parts, each focusing on one of the two goals. Furthermore, we added a lecture with Prof. Dr. Stefan Wurster from the Bavarian School of Public Policy (Hochschule für Politik – HfP) as well as a visit to the government at the Bavarian State.
Parliament to provide further insights into the German political system as well as into daily political happenings.

In order to review the concept of the workshop we designed an evaluation form. It asked the participants to feedback on the quality and the contents of the workshop. The results enabled us to verify the achievement of the two goals of the workshop. Specifically, we asked the participants if the workshop reached the following goals:

1) The workshop should aid the participants in getting to know each other
2) The workshop should enable and promote intercultural discussions
3) The workshop should impart knowledge about democracy and the German political system
4) The workshop and trip should be entertaining and fun

The survey was designed to evaluate our proposed goals and the hypothesis, and also to find out what motivated the students to participate in our workshop, which parts they liked particularly and what they thought could improve the workshop.

Outcomes & Discussion

During our work with the local refugee camps and through the interviews that we conducted and clustered we quickly found the first hypothesis to be only partly true: While democratic social structures in refugee camps can hardly be found, camp managers usually do not have ambitions to create such structures. The main argument mentioned by the refugee camp managers is that the implementation of a democratic system might result in the creation of a “parallel society” inside the refugee camp, which might have a negative impact on the further integration process.

Another interesting result of our study in the refugee camps is the following: Although people of many different origins live in the camps, refugees tend to group with refugees of the same origin (for example, Syrians group together with Syrians). This can have multiple causes, such as language compatibility, similar heritages or religious reasons, to name but a few. While the cohesion between refugees of similar heritage is strong, the coupling between those of different groups is rather weak. Our interviews show that only few interactions of refugees with people outside their respective groups exist. One explanation for this could be language incompatibility, as well as religious and cultural differences.

If one were to apply a democratic structure on top of such a heterogeneous community – with strong cohesion among refugees of the same heritage and weak coupling between the resulting groups of different sizes inside the refugee camps – the smaller groups could feel disadvantaged. The protection of these minorities inside the refugee camps might be a reason for the arguments against the introduction of democratic structures in the camps. Due to these results, the first hypothesis must be rejected.

The survey carried out at the “Buddies for refugees” kick-off session showed both the necessity for and an interest in an enhancement of understanding of democratic principles. Comparing the answers from refugees and their buddies, the refugees tended to connect democracy with more abstract concepts, such as “freedom” or “equality,” while the buddies tended to use more concrete terms such as “elections” or “right of participation.” Furthermore, both the buddies and the refugees strongly expressed their support for an event focused on intercultural exchange. Many refugees expressed their willingness to participate in such an event in order to better comprehend German culture.

Based on the results of this questionnaire, we agreed on trying to provide a small group of refugees with an enhanced understanding of the concept of democracy and its operation in everyday life. Therefore, we offered a workshop followed by a trip to the Bavarian State Parliament and including a discussion with a German politician.

We were interested not only in testing our hypothesis, but also in evaluating the success of our proposed method. Figure 1 shows the results of the survey related to the workshop. The graphs show a very positive image. The participants perceived the workshop to be both an enjoyable experience and enriching for their knowledge about democracy and the German political system.
### Day 1: Intercultural exchange

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
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<tbody>
<tr>
<td>The workshop was target-oriented.</td>
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<td>8</td>
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<tr>
<td>I agree with the methods used.</td>
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<td>9</td>
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<tr>
<td>The time spent on each part was fitting.</td>
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<td>I liked the atmosphere.</td>
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<td>4</td>
<td>5</td>
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<tr>
<td>The workshop was fun.</td>
<td></td>
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<td>2</td>
<td>8</td>
</tr>
<tr>
<td>I gained knowledge about „intercultural exchange“.</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td></td>
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<tr>
<td>The workshop’s content fulfilled my expectations.</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I personally benefit from participating.</td>
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<td>4</td>
<td>6</td>
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<tr>
<td>Cooking together was a good conclusion of the day.</td>
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### Day 2: Democracy & German politics

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
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<tbody>
<tr>
<td>The workshop was target-oriented and well structured.</td>
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<td>I agree with the methods used.</td>
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<td>9</td>
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<tr>
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<tr>
<td>I gained knowledge about „democracy and German politics“.</td>
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<td>1</td>
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<td></td>
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<tr>
<td>The workshop’s content fulfilled my expectations.</td>
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<td>I personally benefit from participating.</td>
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<tr>
<td>The presentation fit the content of the workshop.</td>
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<tr>
<td>The presentation was a good addition to the workshop.</td>
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The results of this evaluation show that the workshop enlarged the participants’ knowledge about democracy. However, it is hard to measure the integration of refugees in German society. Thus scientifically proving or contradicting our second hypothesis, which states that the gained knowledge about democracy and politics aids in integrating refugees into Germany, is not yet possible. A reason for that might be that it is hard to measure to what extent people are integrated into society. In order to find out more about that, one would first need to establish a valid measure for integration. As integration might be related to many characteristics of both individuals and the society, this might offer a useful challenge for further projects.

Summary & future goals

We consider our project, including the results of our research and our workshop, as a success, even though we were not able to definitely prove (or disprove) our second hypothesis. We plan on continuing to offer the workshop in future semesters, even if we might not be able to conduct it ourselves anymore. One way of achieving this might be to make the workshop self-sustaining by encouraging past participants to organize and conduct the workshop in subsequent semesters. Another option might be to incorporate the workshop into the Carl von Linde-Akademie, which offers several different workshops and seminars.

References

1 – Everett S. Lee (1966). *A theory of migration*

2 – Eurostat (2016). *Asylum and first time asylum applicants by citizenship, age and sex*


How does democracy work?

Moreover, what defines democracy? How much knowledge about democracy do people seeking for asylum in Germany have?

Our vision is to improve and support democratic structures in refugee asylums. By helping refugees enhancing their knowledge about democracy and how to transfer it into everyday life, we are hoping to contribute to a smoother integration of refugees in our society.

background

Every day, refugees are arriving in Germany searching for shelter. They often do not have the background of coming from democratic-based countries – the countries they are running from are either suffering from dictators or are governed by a small privileged part of the society and do not enable all of their inhabitants to participate in fair, democratic elections. In Germany, political decisions are based on democratic structures.

But – how does democracy work? Moreover, what defines democracy? How much knowledge about democracy do people seeking for asylum in Germany have?

OUR HYPOTHESIS ARE:

1. Both refugees and organizations have an interest towards democratic structures in refugee camps. Furthermore, these structures do not exist currently.

2. An enhanced understanding of the concept of democracy and its exertion in everyday life by refugees contributes to their integration in Germany.

GOALS AND METHODS

Our aim is to improve and support democratic structures in refugee camps. By helping refugees enhance their knowledge about democracy and how to transfer it into everyday life, we are hoping to contribute to a smoother integration of refugees in our society. Our first step towards reaching that goal is to gather as much information as we can about the current social structures in refugee shelters, as well as about the knowledge and understanding of democracy that refugees have.

In order to achieve that, we started interviewing refugees in selected refugee shelters, questioning them about their social surroundings, their knowledge and view on democracy, and their opinions on the matter. We used partly standardized interviews for the first phase of information gathering, but we plan to gain deeper knowledge about the social structures by using focal group discussions.

OUTCOME AND DISCUSSIONS

So far, we carried out two different interviews. The first type consisted of a group discussion with some volunteers at the refugee camp in Garching. This conversation helped us gain a better insight into the everyday life and the problems which refugees and helpers face. Furthermore, we identified some of the important aspects of the structure and functioning of a refugee camp, such as the absence of a dedicated camp management in many cases and the importance of security staff.

Shortly after Christmas, we conducted three additional interviews with different refugees in Garching. The preliminary analysis of the interview shows some interesting facts about the social structures and the cohabitation within the camp. Here, people from the same origin or similar cultural background build up the different social groups, rather than mixing with others. Moreover, the contact persons for everyday problems and issues are sometimes not the social pedagogues working there, but rather the security staff.

SUMMARY AND FUTURE GOALS

In our project, unifying the concepts of “democracy” and “asylum policy”, we want to understand how the social and democratic structures in refugee camps are developed and function, and which forms of intercommunication, organization and hierarchy exist within these accommodations. Using different interview methods, we are gathering contact with asylum seekers to understand their everyday life and to prove whether or not they are interested in the democratic system in Germany.

For the continuation of our project, we plan to carry out more interviews at other refugee camps. Candidates for this task are refugee camps managed by the social service organization “Caritas” and the accommodations in the region of Oberbayern. These are more centralized and managed by an actual dedicated camp management, which is a more useful feature when it comes to analyzing the structure and communication within a camp. We intend to gather all the required information, we will be able to confirm or disprove our hypothesis. We would also like to head towards a project that would aim to enhance democratic structures and knowledge within a camp, if we find an actual interest for democracy in the refugees. Therefore, we do not want to define the concrete form of this project before we draw our final conclusions.
Integration through Democracy

**ABSTRACT**

Our recent interviews with refugees showed a significant interest in intercultural exchange as well as democratic ideas. Based on these results, we are currently developing a workshop for participants of the TUM ‘Buddies for Refugees’ program, focusing on these topics. By that, we hope to contribute to integration through democracy.

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**TUTORS**
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**MENTORS**

**KEY WORDS**
Asylum politics, Democracy, Refugee Integration

**OUTCOME / WORKSHOP**

We derived two main goals for the workshop from our hypothesis and from the results of our research:

- To enlarge the participants’ knowledge on democracy and its exertion in everyday life by refugees contributes to their integration in Germany
- To enlarge the participants’ knowledge on intercultural diversity

**METHODS**

- Interviews with refugees in their shelter and participants of the TUM ‘Buddies for Refugees’ program
- Analysis of data, derived from the workshop
- Analysis of data, derived from the survey

**AGENDA**

1. **Day 1:**
   - Introduction
   - Presentation of the topic
   - Discussion of the topic
   - Group work

2. **Day 2:**
   - Presentation of the topic
   - Discussion of the topic
   - Group work

**OUTCOME**

**GOALS**

To achieve these goals, we divided the workshop into two parts, each focusing on one of the two goals. Furthermore, we added more activities to encourage the participants to work together as a team. These activities included a workshop on intercultural exchange and a workshop on democracy. The participants were asked to work in groups of three or four people and to come up with solutions to the problems presented. Finally, we conducted a survey to assess the participants’ level of understanding and to evaluate the success of the workshop.

**SUMMARY AND FUTURE GOALS**

We consider our project the result of our research and our workshop as a success, even though we could not detect any positive changes in the participants’ awareness of democracy and its exertion in everyday life. One possibility to achieve that is to make the workshop self-sustaining by encouraging past participants to organize and conduct the workshop in the following semesters.

**TEAM STRUCTURE AND PROCESS**

A positive and balanced group dynamic arose at the first meetings, which maintained during the whole project work.

**ABSTRACT**

The integration of refugees in the German society is not an easy task. For a successful integration process, the very central values that define our society should be presented and explained to the refugees. We recognized democracy as one of these very relevant values. Therefore, we first analysed the democratic structures in refugee camps and the refugees’ knowledge about democracy. Based on the results of the analysis, we designed a workshop about intercultural exchange and democracy. Its aim was to enhance the interest and the awareness about our culture and democratic system amongst young refugees.

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**KEY WORDS**
Asylum politics, Democracy, Refugee Integration
Project Report modulo

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How I met your modulo

As I turn my computer on and quickly check my e-mails this morning, I think about the upcoming summer term at the university. “I guess I should finally start looking for some courses…”

After reading yet another “Happy belated new year 2027!” mail from my relatives, I notice a new email popping up in my Inbox. “Ugh, another advertisement mail from my uni …,” I think to myself. But something about it is odd. I’m not even sure why I open it, since the title is not particularly creative. At least the quirky design of the website that it promotes is somehow appealing.

I start skimming the mail, not sure what I am even looking for. “Artificial intelligence, huh?” I think as I am reading some of the usual remarks about the various miracles AI can supposedly perform. “A decent autocorrect would be enough for a start,” I mutter.

Talk with me and learn more about your favourite courses! it says on a small chat window popping up.

So now even the fortune-tellers should fear for their jobs? Still, I should actually be looking for new courses, so why not give the website a try?

Welcome. I’m modulX, the new AI course recommender. Who are you?

“Who am I? Why should I tell you my name, let alone ‘who I am’?” I just consider it an act of politeness. Also, how can I help you find a nice course if I don’t know you? Maybe you’re better off finding a course all by yourself …

“Hey! No need to be so sassy all of a sudden. I am just concerned with privacy, you know. But well, my name is Student T. (name changed by the editorial staff) and I just started my Master’s programme at TUM. So, who are you?”

Privacy? That picture you posted on Facebook last weekend looks like you should be more concerned about that drinking problem of yours.

“What are you talking about? I don’t even have a Facebook account.”

Oops, wrong Student T. then. Anyway, I’m just messing with you. As I said, my name is modulX and I’m here to help you find interesting courses for you. A little while ago, a group of students developed my predecessor “modulo”. It was only a small project, but a lot has happened since then and now here I am, ready to serve.

“I have to say, you almost got me with that remark about Facebook. Wow, I’ve never heard of that project, but it does sound promising. How do I get some recommendations?”

OK, let’s start with your personality: What are your strengths?

“Well, I guess I am more of a creative type. I like communication and working with other people. Besides that, I also enjoy some programming here and there. In the past, I did a few smaller projects including the concept development, implementation and design of web-applications.”

I see … so no strengths, really. You’re making this a bit difficult for me. How about this seminar: “Ethics of Advertising - An Introduction to Modern Problems”?
“Oh come on, why are you so rude? Besides, that course sounds pretty dry. Not like something I would find interesting at all.”

I’m sorry, I acquire most of my language from social media. Anyway, are you sure about this? What is it about the course that you think could be boring.

“It just sounds like any other ‘Philosophy 101’ with some literature work and half-baked presentations. I have never been quite into that whole philosophizing.”

Alright, I hear your concerns. Still, didn’t you say you like communication? What better way of communicating with others than discussing recent topics in a seminar.

“Well, any other seminar would be just as good then ... Besides, what even is ‘Advertisement Ethics’? I’ve never heard of it before.”

The course description (found here) says, it discusses the whole communication process between buyer and seller through advertising. As you are involved with creating web-applications, you will surely have to deal with promoting your products at some point.

“Hmm, give me a second to read the description...,” I write, and then follow the link to the course webpage. To my surprise, the chatbot was right: although I don’t know all of the terminology in the description, I recognize some topics I really enjoyed during my lectures. The seminar could indeed be helpful for future projects. A slight feeling of unease makes me hesitate to return to the chat window. Was this just a lucky strike? Surely, a piece of software could not predict my interests that well... or can it?

“Actually, you might be right. I will at least give this seminar a try. How come you were so sure about this course?”

I’m glad you think so! I guess it comes from years of experience and learning from mistakes. Some say that I can look at a portrait of somebody and tell what they are interested in, but I’m not one to brag. Actually, I prefer an open conversation to find out how I can assist you best.

“Either way, I’m really impressed. Thanks, modulX! :)

Don’t mention it. Please let me know how the course went afterwards. I’m always happy to learn a new thing or two. And go tell your friends about me ;)

“Sure, will do.”

With a strange, yet happy feeling, I close my browser and gaze at my desktop for a few moments. Eventually, the growling of my stomach makes me get up to fetch some muesli from the kitchen.

“I have to check out this whole A.I. project.” I am thinking aloud as I return with my bowl of customized cereals and start doing some research on the student group who developed modulo.

“TUM: Junge Akademie – Project Report 2016/17”? That sounds interesting ...
Abstract

In our project, we developed a course recommender system for TUM students, based on artificial intelligence. The goal was to see whether artificial intelligence might help students in their decision on which course to take. On a long-term perspective, such a course recommendation system based on interests would be advantageous for lecturers and the quality of university education as a whole by effectively increasing the ratio of students participating in a lecture who are actually interested in the respective topic.

1. Background

So-called “Artificial Intelligence” (AI) is frequently discussed in science as well as in the media. There is a wide variety of situations where we are already using AI in daily life – with or without us being conscious of it. The fact that this topic is new, together with its capability to revolutionize our society on a large and small scale, led us to the decision to investigate educational decision-making processes in an AI context.

Since “Artificial Intelligence” is a very broad concept, it became clear very soon that, as a team, we had to focus on a narrower sub-area of the topic. Since the TUM: Junge Akademie is a student program, we wanted to analyze something related to our university, where all resources are relatively near and reachable after all.

Artificial Intelligence has to this day not been included in any way within the educational system. Thus, we first considered whether it would be possible to introduce it into our educational system, and if so, how? In a straightforward way, we looked into applications of AI related to our personal experiences as students. One way to use AI would be to generate recommendations for interdisciplinary courses for students based on their interests. In contrast to already available module lists, the recommendations are not selected via an “old-school” keyword search, but via an intelligent algorithm. By focusing on interdisciplinary modules that every TUM student can select for his/her curriculum, we also reach a broad audience and can evaluate the benefit of such a recommender system in general.

The rationale behind this area of interest was that it is advantageous for the quality of a lecture if the students attending it are genuinely interested in the specific topic. Interested students learn faster without having to be pushed, they participate more and there is less need for continual repetition until everyone has understood the taught concepts. Of course, this is a vision that will not be implemented in the near future, since such a big project needs tests and audits, and the interests of many stakeholders have to be taken into consideration. But our project tries to lay a sound foundation for further activities in the field of Artificial Intelligence within the educational system.

2. Goals and Methods

To research the general need for such a service, we set ourselves the following hypothesis: an AI-based recommender system that delivers suggestions for interdisciplinary modules is helpful for the decision-making process of students selecting such modules.

In order to test this hypothesis, we started by conducting several qualitative interviews with members of our target group, TUM students. In these interviews, the students expressed what we already anticipated from our own experience: an overall wish or hope that such a system would help them in the future, since there is no sort of overview and there are too many unsorted choices in the current system of course selection. To get a better impression of what kind of features such a recommender system should have, we also asked about features they would like the system to display.

To further narrow down both the necessary and feasible features for an AI recommender system, we conducted a literature review about Artificial Intelligence and talked to the departments in charge of the current course selection system at TUM. Based on this analysis and the interviews, we then implemented a prototype of an intelligent course recommender system. A schematic flowchart of the prototype is given in Figure 1.

By setting up this prototype, we wanted to test two aspects: First, whether such a system was realizable at all, and secondly, if so, whether it would be of use to students. Concerning the first aspect, we got an affirmative answer. We successfully implemented a working prototype that is online and can be used. This prototype is a proof-of-concept, since it does not include all modules, but only the interdisciplinary ones held at WTG@MCTS (former Carl-von-
Figure 1: Flowchart of our prototype modulo.
Another pair of answers strengthening this assumption is to what extent the participants would trust a course recommender system like *modulo* to decide which modules to take. While 28% would accept the suggestion for the current system (options 1 to 3 on a 6-item scale), 74% would only provisionally accept them for a future system with the above-mentioned improvements. (See Figure 2b)

Except for the advantages concerning clarity, i.e. there are fewer modules to scan through, and time (stated by 70% and 74% of participants, respectively), a huge majority of 91% of the participants expressed curiosity regarding the suggestions of a further AI-based course recommender system. (See Figure 2c) From this answer, it can be seen that many students think that an improved recommender system would make university life easier for them, at least in relation to this specific aspect of course selection.

There was also a free text answer field for suggestions and feedback, where many users expressed ideas for improving the user experience or front-end, and where they suggested additional features. Two main challenges of the current prototype were commented on by most of the users: the current GUI and the success rate of the suggestions. The idea itself as well as the impact of a future version of *modulo* is considered as great and exciting. This correlates well with the curiosity question mentioned above.

But, of course, it is not entirely as simple as that. We realized as we were working on the prototype that a lot of obstacles remain in the way of such a system. A major aspect to consider are the strict laws concerning data security and protecting personal data. Therefore, not all functions that might be desirable could be implemented in such a recommender system. Here, close cooperation with the responsible contact points within the university’s organization is of utmost importance. This is already difficult for lectures coming from only one department, but it gets more complicated if a future system were to encompass all modules available at TUM.

### 3. Outcome and Discussion

159 students participated both in the test of our recommender system, *modulo*, and in the survey. Around 30% of the participants consider the prototype version of *modulo* to be helpful for finding suitable modules. Besides, it should be stressed, that 87% of the participants believe, that a future version of *modulo* is able to support their decision making (See Figure 2a). In the future, the current recommender system should be improved by providing an even larger amount of suitable training data (thus yielding a better match of interests and suggestions). Furthermore, additional features (e.g., free text input for interests instead of pre-defined keywords) and a greater selection of modules (not only interdisciplinary ones) were mentioned by many users. This clearly shows that there exists a great interest in having an easy-to-use system that supports students in finding suitable modules.

Linde Academy). Although this set is of course only a fraction of all modules of TUM, it already covers a broad range of disciplines and is therefore suitable for testing the recommendations. Furthermore, we focused on one criterion for the decision: personal interest of users. Other criteria could, for example, be the type of assessment involved, the expected workload, the time at which the lecture is held, etc. Most of these have only played a minor role in the current prototype, as they are usually implemented as mere filters. A second point worth mentioning is that the system working on a small scale for a well-defined subset of modules is not easily scalable to cover the whole variety of courses. There are several technical hurdles and administrative barriers preventing a simple transfer of a working system from a small to a larger scale. Depending on the information processed and displayed by the program, one of those hurdles is data security, because it is prohibited by German law to make all the available information public for students who are not allowed to take a certain module. Since every student is able to choose from the WTG@MCTS modules, this aspect did not play a big role in our prototype. Still, it illustrates how quickly an algorithm concerning sensitive data could overstep a legal “line”.

In order to examine the second part of the question, i.e. the usefulness of the system for students, we conducted a second, quantitative survey with TUM students who tested our prototype hosted on a web server, and who were then asked about their user experience in a subsequent questionnaire.

### 4. Summary and Future Goals

The goal of our project was to analyze whether a course recommender system based on Artificial Intelligence would help students in taking a decision on which courses to take. This question can be answered affirmatively for a future, even more sophisticated version of the prototype we developed. But of course, such a system...
Figure 2: Selected questions from the survey.
Figure 3: Screenshot of the Prototype
is only valuable if it is maintained and updated. Therefore, we are at the moment checking whether a smooth handover of the system as a whole to a department of TUM might be possible – consensual interest exists and has been expressed for such a long-term solution, so we are confident that our findings will be of use for future projects.

In order to enable the system to be useful in the future, the improvements mentioned above have to be implemented first. Another survey would then have to show whether the new system is good enough to fulfill the needs of students and lecturers, while respecting the legal and administrative framework in which it has to function. Besides, the positive effects for lecturers and for the quality of lectures have to be proven as well, since they have not been analyzed in this project yet. This could be done by means of interviews about the improved recommender system, but might on the other hand be hard to quantify since in general it will be difficult to separate the effect of an AI-based “modulo 2.0” from other influencing factors.

Our project has shown that an intelligent recommender system for course modules would be accepted and welcomed by most of the students for its advantages in relation to time, effort and clarity, but also out of curiosity. But this will only be a success if the program is maintained well and the courses are kept up-to-date. This could and should be the focus of further research upon the topic. If there was a working system helping students in the future, the implications for lecturers should be analyzed as well. Since, to our knowledge, there is no similar project in other universities up to now, this case would have a lighthouse character for future developments in this direction.

Despite modulo still being in a prototype phase, there are three central findings of our project:

1. Even rather simple projects in a specific sub-area of the university become complicated as soon as user data has to be processed. This is a good mechanism for protecting personal data, but it takes up a large amount of time and effort that has to be considered in project planning.

2. Such a project can only be successful if every stakeholder is involved from the beginning. If the stakeholders are people with busy schedules, this might significantly delay project progress, but their participation and support is essential, even more so if the project is trying to implement something new und unprecedented.

3. From an implementation side, Artificial Intelligence might be more complex than “standard software” since the way solutions are found is not explicitly programmed as a “hard-coded” algorithm, but, rather, the “intelligent” part takes on the search for a solution. This is the core of Artificial Intelligence, but it also makes it harder to evaluate the found solutions and to debug the system if the output does not meet the desired criteria.

Acknowledgement

First and foremost, we want to thank our two mentors Prof. Dr. Sabine Maasen and Dr. Florian Röhrbein for all the insightful discussions and ideas as well as Dr. Jan-Hendrik Passoth for his helpful contributions regarding the realization of our idea. Furthermore, we want to express our gratitude to Prof. Dr. Gerhard Müller as well as M.A. Simone Gruber for their TUM-specific advices concerning possible chances and risks of the project. A final big thank you goes to Dr. Alfred Slanitz and Andrea Bergler from WTG@MCTS for their valuable input, both in the form of course data and ideas about further improving our prototype.
The AI course recommender system and a manual on how to implement similar projects in the future.

Did you ever get lost while searching for interesting courses?
Did you ever hear of a TUM course named “Acting without knowing”?

That’s where our solution ‘modulo’ aims to help.

Nowadays, almost every curriculum at TUM contains credit points that have to be obtained in interdisciplinary courses. This is an advantage, but because of the vast range of courses the choice is also very perplexing for students. Therefore, we aim to build a tool that, based on user preferences, recommends the most fitting options to them. This tool should facilitate the choice of the students by utilizing Artificial Intelligence (AI). In principle, an algorithm matches some user input, e.g. the student’s interests, with the course database. Actual intelligence comes in when the user is giving feedback on the recommendations and the system thereby learns which topics, and thus courses, are more related than others and more likely to be suitable suggestions. The more the system is used, the better the recommendations will get.

The primary goal of our project is to analyse the decision-making processes of students at TUM and map them onto a smart recommender system in order to reduce the time and effort for both students and teachers. We aim to build a tool that, based on user preferences, recommends the most fitting options to them. This tool should facilitate the choice of the students by utilizing Artificial Intelligence (AI). In principle, an algorithm matches some user input, e.g. the student’s interests, with the course database. Actual intelligence comes in when the user is giving feedback on the recommendations and the system thereby learns which topics, and thus courses, are more related than others and more likely to be suitable suggestions. The more the system is used, the better the recommendations will get.

The modulo app
To give an impression of the students’ feedback so far, we listed some of their free-text comments from the survey below.

"During the last year, we implemented an AI-based recommender system for interdisciplinary courses at TUM with the help of WTG@MCTS. We evaluated our prototype “modulo” by conducting a survey with 159 students from different departments to test our hypothesis.

An AI-based recommender system can assist students with their choice of interdisciplinary courses at TUM.

The main question we answered is whether or not there is a demand for a system like modulo among the students. More than 87% of the students think that a finished version of the prototype with more features and a polished GUI would indeed help them when choosing courses.

Prime reasons for using modulo now and in the future are improved clarity and time saving compared to manually scanning the course catalogue as well as just general curiosity about its recommendations.

Follow the QR-code and test modulo yourself!

Is modulo helpful to you?

30% no
70% yes

Yes: Both checkers and heavy course selectors benefited
No: Students opinions of all-group members.

Is modulo more helpful as a current or future version?

45% current
55% future

Feedback:

It was a bit complicated to use at first, but the concept is brilliant!

Give more info on the courses.

The idea is great — but it’s still a long way to go.

More transparency in obtaining the recommendations.

The list of interests is too long and difficult to handle.

Group interests in thematic clusters.

Needed: Nice work!

Needs quicker response and a better GUI.

It was a bit complicated to use at first, but the concept is brilliant!

Follow the QR-code and test modulo yourself!

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Projects in Flow

*inspired by*

TUM: Junge Akademie
TUM Bike-sharing ........................................ 96
Picturise........................................................ 98
The lecture series
Insights into Immigration.............................. 100
# TUM Bike-Sharing

<table>
<thead>
<tr>
<th>Project Group</th>
<th>Holger Banzhaf (Mechanical Engineering)</th>
<th>Youssef Bouguerba (Electrical Engineering and Informatics)</th>
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<td>Klaus Bruckdorfer (Mechanical Engineering &amp; Management)</td>
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<td>Samuel Detzel (Engineering)</td>
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<td>Mentor</td>
<td>Prof. Dr.-Ing. Klaus Diepold</td>
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The Idea of “TUM Bike-Sharing”

The original goal of the project group was the development and installation of a bike-sharing system that would substantially improve the mobility of those students and employees who spend a good deal of their daily time at the campuses of the Technical University of Munich (TUM). Integrating additional stations close to the University Sports Center Munich (ZHS) was envisaged as another major benefit. Consequently, the TUM Bike-Sharing system allows TUM students and employees to move flexibly and comfortably between the widespread TUM facilities by bike. Emphasizing the major unique features of the proposed TUM Bike-Sharing system, the bikes are easy to allocate, unlock and use (self-developed smartphone application) as well as free of charge for all members of the TUM community. Additionally, an eye-catching design intensifies the identification with TUM among students and employees.

Although the project group started developing the idea of TUM Bike-Sharing in 2012, the project is still evolving today. Demonstrating the idea of easily accessible and available Bikes for TUM students and employees at various locations distributed on the TUM campuses, the first TUM Bicycle Service Stations came into operation on the campus in Garching in March 2017 (see Figure 1 and Figure 2). In corporation with the central department of TUM (property management), three stations could be installed successfully. Since many students as well as employees reach their respective faculties and institutes by bike, the service stations allow basic maintenances and repairs. Equipped with several essential tools as well as a tire pump, the vast majority of immediately necessary repairs are now feasible, thus giving further encouragement to students and employees to use their bikes for daily transportation. Moreover, two spare parts depots have been set up on the campus in Garching containing for example small light bulbs, bicycle inner tubes and various repair kits additionally supporting the daily use of bikes.

Project Work within the Team of “TUM Bike-Sharing”

In 2012, sixteen students from nine different faculties of the Technical University of Munich joined the team of TUM Bike-Sharing. Supervised by two postgraduate TUM students the team worked within the period of one year on the development of the bike-sharing system. The interdisciplinary – and quite often intense – exchange between the students during the group meetings led to highly productive discussions. The process of exploring different concepts generated a colorful variety of ideas and possible project directions. All the participants were able to gain valuable experience in the exchange of ideas and opinions. Moreover, during the period of intense project work on the TUM Bicycle Service Stations, the project group developed a profound team spirit. Our continuing strong identification with TUM means that the team is still motivated to put subsequent projects into operation.
The Idea
Picturise is a project which develops high-quality information material to support the everyday life of refugees in Germany. The approach is simple: The information material focuses on easily understandable pictograms and contains only a minimum of text. The explanations are intended to help refugees from various backgrounds to avoid obstacles in their new home country and to show them how Germany works. Despite the fact that the active phase of the project ended in 2016, the group has continued spreading its message among the relevant institutions through to the present.

The Procedure
The student group first conducted a survey of refugees and helpers to establish the precise areas of life where problems for refugees typically arise and where they would most benefit from appropriate information material. Based on this research, the project group started to develop pictogram-based posters that were iteratively improved together with the help of refugees themselves. Up to now, Picturise has produced posters on the topics Basic hygiene guidelines, Principles of solidarity, Emergencies, Opening and Use of a bank account that can either stand alone or be used in workshops.

Conclusion
The project demonstrates that information transfer to refugees can be realized efficiently with pictograms as they offer a suitable way to overcome linguistic and cultural barriers. Since the posters deal with a broad range of different information, the experiences of the project group in creating them might be of direct relevance to many other institutions in their own development of user-friendly information materials. Furthermore, all the refugee shelters with whom the project group has collaborated successfully used the posters and consistently gave the project group positive feedback.

Project development in 2017
After the project group successfully reached the aim of their active year, they did not hesitate for too long before creating a new one. The Project group’s new aim was to spread the idea and its designed posters to as many institutions as possible – and, as a first step, all over Bavaria. Therefore a logistics system was built up, including printing and shipping of poster-packages, containing a defined number of copies of each poster. Based on a thought-out expense budgeting, a price was set for the packages, graduated according to the ordered amount. With the support of the Director of the TUM: Junge Akademie and Senior Vice President for Academic and Student Affairs Prof. Dr.-Ing. Gerhard Müller, all administrative district offices in Bavaria were contacted via a mail-shot which included a brief description of our project and posters, a flyer about our project and a statement of recommendation from our Director. Several institutions showed great interest and ordered packages However, the number of sold packages was not high enough to cover the costs incurred, which is why it has recently been agreed to cease print-and-shipping- based selling. From now on, instead, the means of distribution will be fully digital and free of charge for consumers – this should mean less maintenance work and one more boost to the spread of the material. The remaining packages will be donated to different organizations in and around, but not limited to, Munich. Currently, the implementation of a new information topic in cooperation with the city of Straubing is being discussed. Time will tell what becomes of this, but, meanwhile: Stay tuned and spread the idea of our project!
Bankkonto eröffnen • open a bank account • ouvrir un compte bancaire • حساب بانك • حساب مصرفي مفتوح

Bankkonto nutzen • using a bank account • utiliser un compte bancaire • استخدام حساب بانك • استخدام حساب مصرفي

Hygiene • hygiene • hygiène • النظافة • بياضات

Solidaritätsprinzip • principle of solidarity • principe de solidarité • اصل مساعد • مبدأ المساهمة

Figure 2: Overview over posters
The lecture series

Insights into Immigration

In order to provide interested parties with the opportunity to engage with the topic of immigration in new, intensive and interactive ways in 2016, we launched the concept of a cycle of lectures within the framework of the Buddies for Refugees program. This concept was not only addressed to “buddies and refugees” of the program itself, but also to a wider public audience, beyond the boundaries of TUM alone.

Under the title Insights into Immigration, the event has offered an interesting program of lectures over the past academic year. In cooperation with the Academy of Film and Television (HFF), a lecture was held on the topic of the depiction of migration in documentaries. For another part of the lecture series we invited the Afghan author Hassan Ali Djan to read from his autobiography about his flight to Germany and about finding his way within German society.

In a panel discussion with several business founders and representatives, the possibilities of integrating refugees into the German world of work were explored. The lecture audiences were able to gain new perspectives from renowned speakers such as, for example, Prof. Münch, Chair of the Academy for Political Education, Mrs. Hayali, journalist and moderator of the ZDF-Morgenmagazin, and Dr. Beier, Chief Executive Representative of the German Association for International Cooperation (GIZ). Each lecture was followed by an open discussion with the speaker.

The cycle of lectures is organized and moderated by members of the Junge Akademie, as well as TUM staff members and students. The lecture series Insights into Immigration will continue taking place in the winter term 2017/18. We are looking forward to seeing you at one of the lectures!
Projects in Prospect 2017/2018
Knowledge Management and Communication ........................... 104
MatchBox ........................................................................ 105
Participation in Politics ................................................. 106
Politics and Fun ............................................................. 107
Integration as windfall profit from targeted use of diversity............. 108
Knowledge Management and Communication

We constantly come across complex problems which concern the public:

Investigative Journalists address major news events such as the release of the so-called “Panama Papers”. Scientists work in fields which are subject to an on-going political and public discourse such as nuclear power or genetic engineering and hence should communicate their findings to the public to facilitate a fact-based debate.

In the process of transferring knowledge about these complex problems to the broad public not only the truth of the message but also the perception of the communicator impacts on how society receives and responds to that knowledge.

The involved people are often academics, scientists, university personnel and journalists. Their skills in communication, awareness of numerous potential mishaps and their understanding of the addressee crucially shape the public debate. Hence they need to be able to, for example, simplify their expert knowledge to a degree which the layman can understand without losing its very essence.

Their role as messengers is especially important since the underlying facts may not be available in a way that encourages individual research. Sources who gave testimony in a news story may need protection; datasets or even articles may be hidden behind a pay-wall; yet they are essential for the creation of the news story or the scientific finding.

A misleading perception of the respective counterpart in the dialogue between public and expert hampers the dissemination of evidence-based knowledge in the public conscience.

In order to single out the aspects which are either obstructive or supportive in the communication of expert knowledge, we plan to interview members of the public (“the recipient”) and those experts who feature in the media (“the sender”).

Using these insights we will modify or methods and tools of knowledge communication. A field study will be used to examine whether they work as expected.

Our project aims at the identification of those elements which are instrumental to success or failure in the transfer of expert knowledge to the broad public and, consequently, at helping to improve this process.

Team
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Felix Niemeier

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Tutor
Tobias Stahl
Martina Gschwendtner

Mentor
Prof. Dr. em. Peter Russer
Prof. Dr. em. Ernst Mayr
In today’s corporate culture, teamwork is recognized as an integral part of an effective work philosophy. Individual skills and abilities complement each other and result in a synergistically increased potential for success. Scientific literature provides a multitude of studies analyzing characteristics of team members and their effects on the success of the team (Johnson Vickberg & Christfort, 2017). From an original focus mainly on established major enterprises and the analysis of their respective working processes, the focus of such studies has shifted toward start-up companies and their team structure (Schmelter, 2010).

But what distinguishes successful teamwork in science? In what sort of group composition can young researchers best be brought together to attain successful and lasting teamwork? A potential platform for this purpose is provided by the Junge Akademie of the Technical University Munich (TUM), in which young and inquisitive people grow together as part of interdisciplinary projects. As yet, however, there have been no investigations of the individual characteristics represented in these project teams or of the effectiveness of these teams.

Project “MatchBox” therefore pursues the endeavor of examining the current project teams of the TUM: Junge Akademie with regard to their team composition and degrees of success. Consequently, the project focuses on the following questions:

• **Question 1:** Which combinations of individual traits constitute the teams of TUM: Junge Akademie?
• **Question 2:** In what way are the teams of the TUM: Junge Akademie successful?
• **Question 3:** Is there a connection between the represented individual traits and the success of the teams of the TUM: Junge Akademie?

This project will aim to answer these questions in a multi-step approach. The first step will involve the formation of a concise definition of successful teamwork. Subsequently, the interrelationships of individual traits for successful teamwork will be defined based on comprehensive literature research. Furthermore, several active teams of the TUM: Junge Akademie will be analyzed using standardized survey and observation methods. In this way, the individual traits of team members and the success of the teams will be assessed, and there will then follow an evaluation of whether these two variables are significantly correlated. The final step will constitute an assessment of whether the identified interrelationships in this study correspond to established knowledge in scientific literature, therefore potentially providing a hands-on verification of the theoretical concept.

This project will make a lasting contribution to the vision of the TUM: Junge Akademie to bring young scientists together in an enduring and living network. The project analyzes TUM: Junge Akademie as a “matchbox” because of its capacity to bring people together to work successfully in teams, thus offering a basis for optimized matching procedures for societal value-creating processes.

**References**


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**Team**

<table>
<thead>
<tr>
<th>Karim Aly</th>
<th>Julia Poliak</th>
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<tbody>
<tr>
<td>Judith Brame</td>
<td>Nelly Prechtl</td>
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<tr>
<td>Lukas Egerer</td>
<td>Nicolas Röhrle</td>
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<td>Philipp Hölzenbein</td>
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</tbody>
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**Tutor**

| Vivien Lechner | Nikolai Morin |

**Mentor**

| Prof. Dr. Alwine Mohnen | Prof. Dr. Michael Krautblatter |
Participation in Politics

According to the International Association for Public Participation and Mariska Wouters, Ned Hardie-Boys and Carla Wilson in “Evaluating public input in National Park Management Plan reviews,” there are different degrees of enabling civic participation. The level with the least potential for influence is merely to inform people about political actions and possibilities. More influential is direct consultation with the people who are affected by political decisions. To have even more impact, it is also possible to involve civilians in the decision-making process or to collaborate with them to be sure that their problems and their interests are addressed. The highest stage of participation is the superlative of direct democracy: Empowering the people to make their own decisions.

Ongoing discussions show that the option of direct forms of democratic participation is controversial (Prof. Dr. Angelika Vetter in BÜRGERBETEILIGUNG UND DEMOKRATIE. EIN ÜBERBLICK). However, in general, involving people in political discussions and encouraging their participation is crucial for our society. Looking at past election turnouts in Europe, which serve as a reasonable indicator of political participation and interest, one can easily see that there exists potential for improvement: In the federal elections in 2017 in Germany only 76.2% of the people made use of their votes and even fewer people participated in the parliamentary elections in France (less than 50% in round two).

The first step of our project was to analyze the reasons for this lack of participation and we concluded the following: There are a lack of participation opportunities and some people even have no idea of the significance of their political contribution. Therefore, our groups’ vision is to tackle especially the first of these two findings by providing an easy and direct way for civilians to communicate their ideas and opinions. In our high-tech age there are plenty of possibilities to improve the integration of people within political decision-making processes and to prevent a feeling of neglect and impotence.

In the next steps we plan to decide which medium we want to use. Possibilities are a platform on the internet, regular meetings in physical form or an app. The choice of the method depends especially on the target group, which we are going to define as well. To sustain our project in the future and to make a first run with a prototype we are thinking about partnerships with politicians or institutions.
Politics and Fun

Do you remember your social studies class back in high school? Do you still feel your pulse rise thinking of the excited suspense in the classroom and the inspiring political discussions in your lunch break talks?

If the answer to these questions is “yes,” either you were a very interested and committed student or your teacher must have had fruitful didactical tricks to engage your attention. Most likely, though, you have been part of the majority of youngsters who were not particularly interested in political processes, civic participation or the next election date. Understandably, you had apparently more important problems to tackle – being a teenager can turn out to be a complicated everyday life task. But should young people who do not even have the possibility of voting even care about political processes and developments on the political stage? Isn’t there plenty of time to engage with – and maybe even get involved in – politics when one becomes an adult and an eligible-voter? These provocative questions and examples of course lead to only one possible answer: Yes, adolescents especially must be encouraged to gain political knowledge. They should be well-informed about former and current political affairs and care about the improvement of the future as well. They are the future voters who will decide about the political and social evolution of our society. They should, as far as possible, develop well-founded opinions, a genuine interest for politics and an understanding of the consequences of political passivity or even ignorance. It is essential for any citizen to be well informed, to think critically and to form thought-through opinions. However, quite a lot of young people seem to be uninterested in politics of even reject it. One reason for that might be that young people find politics boring or too complex to be understood. Politics is not something you can easily observe and for that reason it is also very difficult to be explained properly. It is also unlikely that many people will have had a direct personal experience of the practical functioning of the political system in all its complexity. We have already started exploring and researching this wide and very exciting field. After pooling personal knowledge and experiences and considering some initial data, and after intense dynamic discussions, we have developed our hypothesis: “Self-directed experiences lead to a more profound understanding of the complex network of functions and roles involved in politics than lecture-style teaching.” This premise points to the development of an interactive and participatory learning method that should make young students come face to face with politics, current events and basic political knowledge. By evaluating our method after the realization of our visionary plan, we are interested to discover whether or not our hypothesis will be confirmed and whether the methods that we will have developed can be implemented and continuously improved in schools. We came to the conclusion that we should involve a politically-naive age group and decided on junior high school students (8th or 10th grade). At the moment we are working on the specific learning method we want to apply. Currently we are considering board games, mobile applications and simulation/experimental games. Furthermore, our next goal is to investigate how exactly politics are being taught in German schools. In order to do that, we are preparing questionnaires for teachers and students of teaching where they can express their opinions and their wishes regarding the current nature of political education. Our ambitious goal is to create a project with a sustainable effect and a long-term use that – most importantly – makes learning fun and arouses political interest among the next generation.

Inspired by this idea, we are passionate about making politics fun!

Team
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Laura Schütz
Leah Schembs
Florian Tichy
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Jana von Trott zu Solz

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Mentor
Alexander Lang
Prof. Dr. Sabine Maasen
Prof. Dr. Stefan Wurster
Integration as windfall profit from targeted use of diversity

Diversity is a term that appears in many political debates and in everyday life. But do we really know the meaning of it and do we really think about the same thing when we talk about it? That this is not the case was one of our first findings as we developed a new perception of diversity through our research and interviews with experts. The word “diversity” doesn’t have a restricted meaning in terms of origin, but has many different contexts and emphases. The particular aspects of diversity that we are concerned with relate to the following areas:

- ethnicity
- age
- gender
- socioeconomic status
- disability
- lifestyle and habits

Globalization, individual lifestyles, social change, together with political crises, have a big influence on all people in society. Today, Germany has a much more variegated society compared to the situation 50 years ago, with many more different ethnic groups than there used to be. On top of that, the country is undergoing significant demographic change and the number of elderly people will rise in the future. The role of women has changed, so that young women are planning nowadays to have both a family and a professional career. The gap between rich and poor is growing, even in a rich country like Germany. Furthermore, people are becoming more individualistic within the society.

All the above shows that it is essential to take a closer look at diversity. For our study, we want to focus on people who are not properly integrated in society and are discriminated against because of their diversity. Our aim is to identify profitable uses for their skills and differences and to encourage them to participate fully in society. We aim for a notable and lasting project.
The Academy ............................................. 113
The Boards of the Academy......................... 114
Committed:
Taskforces, Tutors, Mentors, Office.......... 117
A different scholarship program ................. 129
"To me, the academy is a gate to a diverse community, rich with new perspectives. Working on challenging projects in an interdisciplinary ambience with the guidance of professional mentors, I feel I am growing on many levels."
Dina Aladawy, Year of 2016/17, Informatics, Artificial Intelligence

"Being part of the exceptional network of the academy lets me contribute not only to my personality but also to the society. Most importantly, I enjoy being part of a wonderful family away from home, with events and kind people from various backgrounds."
Meriç Firat, Year of 2013/14, Electrical and Computer Engineering, VisiTUM

"I associate the academy with personal growth towards living my full potential. Thanks to various seminars, workshops and my project team, which consists of students from various backgrounds, I develop personal skills in addition to the technical expertise I acquire during my studies at TUM."
Martina Gschwendtner, Year of 2015/16, Mathematical Physics, uniSPEAK

"Being in contact with students of various disciplines is very important to me. In the academy, students of all departments are connected via a network that not only acts as a big community but also offers the freedom to realize projects and to evolve."
Daniel Schwinger, Year of 2014/15, Chemistry, openTUM
The TUM: Junge Akademie is TUM’s scholarship program for exceptionally talented and dedicated students with a special affinity for science and research. The scholars are students from all departments of TUM and our partners, University for Television and Film Munich and University of Music and Performing Arts Munich. The Academy prepares young talents to further the development of an advanced society. Within the scope of an active network, the TUM: Junge Akademie provides the necessary space and support for its members to flourish, giving students the opportunity to work freely on self-imposed questions, to unfold their individual talents and to learn to take responsibility for their technical and scientific ideas.

To build a productive and innovative environment for our young talents, we challenge our members to engage in ambitious and socially relevant projects and initiatives. Therefore they become involved in a project team, which develops a hypothesis linked to their year’s call. After the team has been formed, a hypothesis will be developed, based on several observations realized by the scholars. Together with their mentors and tutors an appropriate methodology to test the assumption of the group is designed and applied. To empower our members’ personal development, we offer them workshops, interdisciplinary exchange and cultural activities. We bring together our new and former members to build a pool in which members from different years can share their ideas or help the younger Academy members by tutoring the project teams. By coaching and supporting the students in challenging situations that might occur within the project development, our team aims to encourage creative freedom, unconventional ideas, analytical thinking and the consideration of scientific insights. The program fosters a mutually beneficial relationship in which our members are helped to achieve their full intellectual potential while also contributing directly to the shaping of the Academy’s future. In this connection, we encourage members to take responsibility for other members by, for example, serving on the Board of Members or the Advisory Board. Those who are more devoted to operational tasks join one of the Taskforces: “Event,” “Marketing,” “Members & Recruiting,” “Mentoring” or “Contacts, Alliances and Partners / CAP.” In both cases, they contribute to the Academy’s development in terms of successful capacity-building as an organization within the Technical University of Munich.

Right from the beginning, the participants are involved in a vibrant network consisting of alumni of the Academy, currently active professors and the TUM Emeriti of Excellence, as well as the young researchers themselves. There are exclusive workshops and cultural events as well as financial resources to implement project ideas and to facilitate comprehensive measures of training and personal development beyond the respective fields of study.
The Boards of the Academy

Since the Academy’s foundation in 2010, the Advisory Board represents the organisational unit of the TUM: Junge Akademie with decision-making power. At the members’ request, the Board of Members was launched in order to collect the members’ views as a design committee and to pass those ideas on to the steering committee.

The Advisory Board – Where decisions are made

The Advisory Board represents the Academy’s governing body, whose members meet twice a year. It primarily decides on the medium to long-term strategic and organizational issues of the TUM: Junge Akademie.

Since 2016 the President of the University of Music and Performing Arts Munich, Prof. Dr. Bernd Redmann and the President of the University of Television and Film Munich, Prof. Dr. Bettina Reitz have further enriched the collaborative nature of the Advisory Board.

The strategic themes include in particular the purpose and direction of the TUM: Junge Akademie as well as its interaction with TUM’s several institutions and their programs, such as the Munich Center for Technology in Society (MCTS), the TUM School of Governance or the TUM University Foundation. New proposals from the Board of Members are also discussed here.

In addition, the Advisory Board is responsible for key operational tasks, which include the selection of new members or the definition of possible project topics from the wide variety of the submitted project ideas.

The Advisory Board is composed of the director, three representatives of the former professors, three representatives of the active professors and six elected members of the TUM: Junge Akademie.

Members of the Advisory Board 2016/17:

**Director:**
Prof. Dr.-Ing. Gerhard Müller,
Senior Vice President Academic and Student Affairs

**Members:**
Julian Biendarra
Carl Ebbinghaus
Martin Kaumanns
Beate Ursula Lang
Matthias Lehner
Philipp Rinner

**Professors:**
Prof. Dr.-Ing. Klaus Diepold,
TUM Department of Electrical and Computer Engineering
Prof. Dr. Jürgen Geist,
TUM School of Life Sciences Weihenstephan
Prof. Dr. Sabine Maasen,
Munich Center for Technology in Society
Prof. Dr. med (em.) Michael Molls,
Speaker Emeritit of Excellence
Prof. Dr. Bernd Redmann,
University of Music and Performing Arts Munich
Prof. Dr. Bettina Reitz,
University of Television and Film Munich
Board of Members

The Board of Members synthesizes and represents the members’ various interests within the TUM: Junge Akademie. Here, representatives of the current projects, the Taskforces and interested members of all years meet regularly and discuss the current state and the further development of the Academy.

At the meetings, problems of the project teams, topics of the Taskforces, and ideas for continuous improvement – introduced by members – are discussed.

Proposals for changes of the scholarship program are handed to the Advisory Board, the director and the office team. Together with them, the members take action to implement these changes.

In the last year, for example, the members introduced the idea of moving the start of the project phase to the beginning of the winter semester. This idea was approved by the Advisory Board and implemented for the winter semester 2017/18.

The Board of Members elects six members’ representatives to the Advisory Board. By this integration of the Board of Members into the Advisory Board, the members are able to participate actively in the decision-making process of the Academy and can represent the members’ interests.

All members are invited to participate in the Board of Members meetings and to share their opinions and ideas in order to help the TUM: Junge Akademie to evolve a scholarship program that empowers the members’ personal development.

Jour Fixe

During the last year the Jour Fixe, a monthly meeting with the Taskforces, was initiated. At these meetings, the heads of the Taskforces, the director of the Academy, the office team and the speaker of the Board of Members discuss the current activities of the Taskforces and review their ongoing collaboration. In contrast to the Board of Members meetings, these meetings are largely focused on current work and not so much on the further development of the Academy.
Committed: Taskforces, Tutors, Mentors, Office

The statement “Members for members” is understood as a leit-motif at the TUM: Junge Akademie: Members are actively taking part in the creation of the Academy’s programs. This is reflected, among other things, in the selection of workshops, such as the workshop on “creative writing”, which bolsters the development of the participants’ skills concerning editorial work and scientific writing.

In addition, the Academy provides access to experts at the Technical University of Munich as well as to external experts, it financially supports the realization of events and it offers its members the necessary space to carry out activities in support of the Academy’s network.

In this way, members of all years and alumni get involved in the Taskforces or as tutors for one of the project groups. To facilitate the operations, the office team supports and encourages all members in their commitment and work.
The CAP Taskforce

The Taskforce, “Contacts, Alliances & Partnerships” (CAP), has been established with the goal of winning over partners for the TUM: Junge Akademie. Individuals, scientific bodies, public and private organizations or companies can all be strong partners for the TUM: Junge Akademie. The Taskforce is eager to acquire supporters who share the principles, values, and ideas of the Academy. By valuing the rich potential of interdisciplinary teams, the TUM: Junge Akademie actively explores dependencies between technology and society and seeks to develop solutions to the most pressing problems.

Apart from the possibility of supporting the TUM: Junge Akademie in its entirety, partners are also welcome to focus on specific projects. These could be topics investigated by members in their project year, individual events organized by the Taskforces, or other promising ideas.

There are two principal ways in which we promote collaborative partnerships:

• Members of the Taskforce proactively approach potential partners and work to inspire them to become supporters of the TUM: Junge Akademie.

• We maintain an open invitation to all interested parties to contact the Taskforce concerning partnership opportunities and we warmly welcome all such approaches.

The Taskforce would be delighted to discuss all aspects of collaboration with potential partners and would be happy to advise on specific individual concepts or proposals.

Your CAP Taskforce
Andreas-David Brunner
Fabian Finger
Julian Fischer
Philipp Hulm
Marvin Lechner
Josef Oberndorfer
Leonard Przybilla
Mareike Spindler
Tobias Stahl
Justus Wolf
Sebastian Zäpfel
Matthias Zipper
The Marketing Taskforce

The aim of the Marketing Taskforce is to make the TUM: Junge Akademie more visible to students and employees at TUM as well as to potential partners and employers outside of TUM. To this end, the Taskforce supports the office team and the other Taskforces, as well as the project groups, on issues of public relations and marketing. The members take care of the web presence of the TUM: Junge Akademie by keeping it up to date with pictures, reports and any other news, and they develop concepts for the TUM: Junge Akademie branded giveaways.

The Marketing Taskforce also selects topics for publications, revises reports, and communicates with employees of TUM-internal institutions such as the press office. In addition, they are responsible for the style guide for the project reports which appear in this very project book. The members of this Taskforce are active in many places, where they seek constantly to improve the presentation of the TUM: Junge Akademie and bring to life new concepts and ideas!

Your Marketing Taskforce
Vanessa Buchweitz
Sebastian Kaltenbach
Philipp Marzak
Dennis Röcker
Martin Zirngibl

Further supported by
Meric Firat
Dominik Irber
Franz Seitz
Taskforce Members

The TUM: Junge Akademie provides a framework that allows its members to develop their ideas and personality in an interdisciplinary environment. Any activities within this framework, however, arise from the contributions of all individual members. Thus, our task is to support everyone within the Academy throughout and beyond their active membership.

During the application phase, we help inform potential candidates; we prepare a welcome package for all new members and contribute to the kick-off event to increase identification with the Academy right from the beginning.

Constantly gathering feedback from the active project teams, we identify room for improvement in processes and communication. As we are involved with recruitment as well as important milestones during the project phase, we implement changes that help align member perception with the Academy’s actual strategy. When issues beyond our reach are brought to our attention, we raise awareness in appropriate committees and propose improvements. At the same time, we are available for all members in case of social or personal challenges.

Additionally, we strive to establish contacts between active members and the growing number of alumni, who can provide valuable insights for present and future projects.

Last year, we worked to improve the conditions for the members of the Academy in the project phase. We introduced changes in the early course of the project phase to provide a creative climate for the teams in which they could develop inventive new ideas for their projects. We also contributed to the discussion about the scientificity of the projects and introduced changes in the application phase of the new year.

Every member of the Academy is cordially invited to leave us feedback, questions or suggestions. Contact us at members@jungeakademie.tum.de or talk to us directly.

Your Members & Recruiting Taskforce
Dina AlAdawy
Florian Andres
Severin Angerpointner
Sonja Fuchs
Christian Grätz
Bernhard Häfner
Maximilian Held
Friederike Groschupp
Florian Männer
Simon Rieß
Felix Schweighofer
Mentoring

The taskforce "Mentoring" represents the youngest taskforce of the TUM: Junge Akademie and was founded in spring 2017 on the initiative of the members.

The taskforce pursues two objectives: On the one hand, the facets of the Academy curriculum are to be extended to include the aspects of personality and career development. Over the past few years, it has become clear that although the Academy has a very strong portfolio of scientific project planning and implementation, the needs of its members go beyond that. In a survey of members and alumni of the Academy (as potential mentors), expectations regarding the scope and content of the mentoring scheme were assessed, so that a user-centered program could be designed.

On the other hand, in the context of mentoring tandems and group mentoring, the mentoring concept also pursues the goal of consolidating links with the Academy among alumni, emeriti of excellence, professors, as well as members of the sponsoring companies.

According to the strategic plan, the implementation of the program is now scheduled for the winter semester within the framework of several pilot tandem projects, so that mentoring can be fully integrated into the long-term program of the Academy.

Your Mentoring Taskforce
Philipp Rinner
Fabian Schmitz
Robin Weiß
The sun burns on your neck, the grass tickles between your toes and there is the smell of barbecue in the air: You might almost think you were at the Flaucher in Munich. But not at all! The TUM: Junge Akademie is celebrating its annual summer festival, which will be remembered by many not only for its culinary, musical and sporting delights.

Cohesion and community spirit play an essential role within the TUM: Junge Akademie. By taking part in high quality events, the Academy’s members and alumni have the opportunity to get to know each other better, outside normal university routines, project work and official meetings, and to establish an active network within the Academy. The underlying principle “by members for members” plays an important role in this context, as “only the things we experience together, weld us together properly.”

A particular challenge is to meet the different preferences of as many members as possible, while at the same time not limiting the program to a few, specific events. To achieve that, we offer events from six categories: Business, Culture, Nature, Science, Society and Sports. That guarantees a good mixture for every taste.

Since the foundation of the Academy, the Taskforce Event has been actively involved in the Academy’s offers and is able to respond effectively to the preferences of the Academy’s members through close collaboration with the Board of Members.

The already established “running dinner,” where every participant enjoys appetizer, main course and dessert in three different locations, has been retained and continues to be hosted up to two times per semester. During the evenings, each participating team of two is in charge of one of the three courses while enjoying the other ones as guests.

In addition, this year introduced the regular werewolf games evening. This event has been hosted in cooperation with the Academic Foundation of the German People and the Max-Weber-Scholarship, and offers participants the possibility to deceive, murder and intrigue, all while establishing bonds within and beyond the Academy. Werewolf games evenings are held once every month.

We hope readers are curious to see what kind of exciting activities the Event Taskforce will be offering the Academy’s members next year!

Your Event Taskforce
Artem Bliznyuk (leader)
Alex Biederer (co-leader)
Anna Schmidt (former leader)
Paul Bandow
Maria Baumgartner
Eva Maria Biehl
Fabio Bove
Sarah Braun
Andrei Costinescu
Jennifer Herrmann
Linus Huss
Andreas Noll
Stefan Röhrl
Evi Schmid
Sebastian Weiß
Mira Zeilberger
Tutors

To take on the task of a tutor is one of the ways of involvement within the TUM: Junge Akademie. Several tutors support each group of students with respect to their ideas throughout the whole project year. They assist and advise the teams in the project realization, from concept to practical implementation. In this context, the tutors draw on experiences from their own project work. In the search for and the address of experts and other contacts they represent important interfaces for the project teams because of their already existing networks. The tutors benefit from their commitment as well, as they gain important experiences that strengthen their skills by taking over management tasks, motivating the team, giving feedback and moderating conflicts, without interfering with the team’s own freedom of decision.

See List of Tutors, p. 137

Mentors

Mentors are recruited mainly from the group of active and retired professors of the Technical University of Munich. However, they might also be employees in TUM’s scientific management or TUM alumni with specific expertise. As part of their mentorship, they support their respective project team throughout the whole project work. Due to their years of experience they are ideally prepared for this task: They advise the project groups regarding the orientation of their concepts, they critically question the aims and methods used, they bring expertise in scientific issues and keep quality standards in mind. Due to their work inside and outside TUM they are also part of a large network that can often be used to support and promote the projects and this therefore represents a profitable factor for all sides.

See List of Mentors, p. 136

Office

In order to help the members develop their projects and work on different ideas within the Taskforces as well as the Board of Members, the office team oversees the general operation. That includes, amongst other things, the proper management of finances, the development and implementation of attractive training opportunities and communication with external and internal partners. The office team acts as specified by the Advisory Board and ensures that current and former members of the TUM: Junge Akademie perceive and experience themselves as a network.

The TUM: Junge Akademie is managed by the Senior Vice President for Academic Affairs of the Technical University of Munich, Mr Professor Gerhard Müller. In this regard, he is operatively supported by the office team that currently consists of the Managing Director, the Team Assistant and two Student Assistants.

The Office Team

Peter Finger, Maria Hannecker, Bernadette Frey, Katerina Vesela
A different scholarship program

Being part of TUM: Junge Akademie lets me contribute not only to my personality but also to the society. Most importantly, I enjoy being part of a wonderful family away from home, with events and kind people from various backgrounds.

Meriç Firat

In addition to the invaluable experiences, learning and networking directly associated with the projects, the TUM: Junge Akademie also offers members the benefits of an attractive supporting program of training with varied opportunities for personal and professional development. In this context, they are able to participate in a wide range of events such as discussions and workshops, and cultural events such as concerts.

In addition, the annual summer festival, the monthly regulars’ table and the Academy’s festive annual conference provide a pleasant setting to meet and exchange views. The members are integrated actively by the Event Taskforce in both the selection of event formats as well as in their organisation and implementation and so can contribute their ideas, wishes and expectations. In this way, each semester anew the TUM: Junge Akademie is able to offer a unique programme to its members, friends and supporters.
Selection Days

Alumni to Newbies

May

Kick-off in Feldafing

June

July

August

Futurelab
A different scholarship program – Impressions of the active Academy network

Sailing Day

Academy Talk – Numbers and Music

September

October

November

December

Annual Conference

Alumni to Newbies
Evaluation Day

Academy Talk

January

February

March

April

The Day of Initiative

Project Finale – TUM Bikesharing
Selection Days

Acatech – EatMe Low Carbon

May

June

July

September

TUM Campus Run

Academy Talk with the former district administrator of Neumarkt i.d.O. Albert Löhner
Directory
List of Mentors .......................................................... 136
List of Tutors............................................................. 137
List of Members .......................................................... 138
Imprint ........................................................................ 143
List of Mentors

Prof. Dr. Peter Fierling
Integration through Democracy
Associate Professorship of Experimentalphysik (E18)

Prof. Fritz Frenkler
dare2share
Chair of Industrial Design

Prof. Dr. Reiner Gradinger
health today
TUM School of Medicine: Chair of Orthopaed and Trauma Surgery

Alexander Lang
dare2share
IMAN Solutions GmbH

Prof. Dr. Sabine Maasen
modulo
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