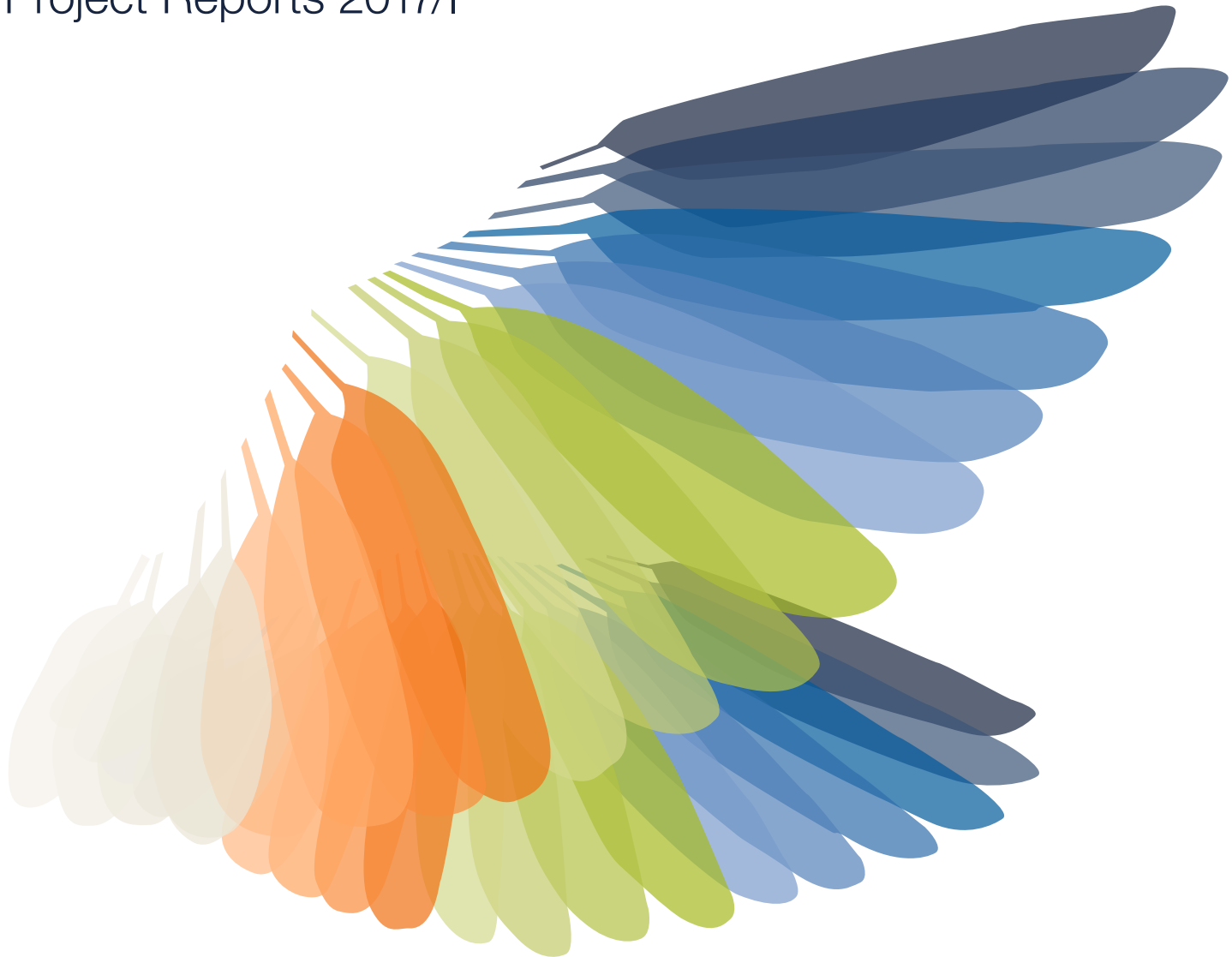


TUM: Junge Akademie

Project Reports 2017/I



TUM: Junge Akademie

Project Reports 2017/I

Partner of



Welcome to the TUM: Junge Akademie



In this booklet the insights and final results of the 2017/I project groups are presented. Starting from the broad call of “Idea – Communication – Reception,” bright students, each of them equipped with individual talents and a specific specialist background, first collaboratively sifted through their personal inspirations and then incorporated these into the ideas they wanted to work on. The consecutively formed teams then launched their projects and set themselves clear goals that could be defined by tangible results. This process was fuelled by scientific analysis, creativity, craziness, open criticism, commitment, and good communication, where nothing was taken for granted and established paradigms and common statements like “as we all know” were all subject to question.

The apparent variety of approaches you find in the booklet reflects the enriching diversity of our students at TUM, resulting from their different origins, contexts, priorities and individual creativity. The

projects presented here address questions of how to assemble a team; how to proactively use various perspectives linked with diversity in order to improve individual perceptions; how to communicate scientific insights to the public; how to improve the awareness of politics in everyday life; and – last but not least – how to promote greater citizen participation in decision-making processes.

Of course, given the complexity of the issues, the related work could not be predetermined by a fixed work-flow, starting with a given task and ending in a final review of how effectively everyone has fulfilled his or her clearly described duties. At the TUM: Junge Akademie the challenge is rather to steer the underlying processes of scientific enquiry, starting from a projection of individual ideas onto a hypothesis and a collaborative plan and then progressing through hard and binding teamwork. It is not just a “talk the talk” of a nice idea on which everybody casually agrees, but a “walk the walk” of tough struggle towards successful project completion.

The teams’ experiences were finally wrapped up in a remarkable symposium on the occasion of TUM’s Open House Day on October 13th. The students chose a new public format reflecting

on their experiences and discussing the question of how to bring individual creativity into joint value creation. These were in my opinion very noble discourses, perfectly suited to the high ideals of a university. Congratulations!

Why do we invest such a lot of time and energy into our TUM: Junge Akademie? We do this as professors and external professionals, mentoring the teams with our expertise; as scientists and alumni, offering our experience to the projects as tutors; as TUM Board of Management in our continuous search for new formats of education and support that will help us all to cope with the future challenges of our society. We do this as we know that our excellent graduates will have the responsibility and power to shape the future in ways we are currently not aware of. They will have to identify and proactively steer disruptive and evolutionary processes, to understand, analyze and balance conflicts of interests, and to act as moderators and communicators.

My sincere thanks to all the 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 Taskforces and the Board of Members for their creativity, devotion and enthusiasm.

Enjoy reading this book and exploring the projects!

Yours,

Gerhard Müller
Senior Vice President Academic and Student Affairs

Dear friends of TUM,



Today – just like 150 years ago, when our university was founded in 1868 – we are convinced that promoting talents is one of our noblest tasks.

The *TUM: Junge Akademie* plays an important part in the TUM's initiatives to promote talent. The program creates an environment in which scholarship holders are able to unfold creativity beyond their own field of expertise and to put special dedication into interdisciplinary approaches to technical, social, economic, and political questions – and there are experienced mentors to provide assistance. The main goal of the *TUM: Junge Akademie* is to bring students together to work on socially relevant topics.

In order to achieve this goal, we need strong partners. This year, our interdisciplinary network of partner universities was joined – in addition to the HFF Munich (Hochschule für Fernsehen und Film) and the University of Music and Performing Arts Munich (Hochschule für Musik und Theater) – by the Munich Academy of Fine Arts (Akademie der Bildenden Künste).

In our anniversary year, students of the *TUM: Junge Akademie* and TUM professors managed to make various scientific topics more accessible to society – and university research, as well as its ap-

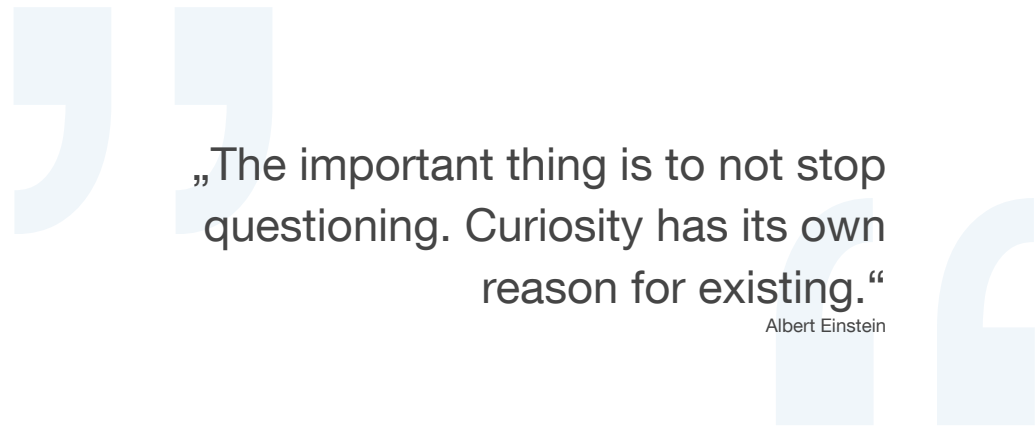
plication in everyday life, is to be seen as a cornerstone of society. This year, the Munich Streetlife Festival gave us two opportunities to enthuse the public about new research findings and science in general.

The "Buddies for Refugees" program of the *TUM: Junge Akademie* was an integral part of the auditor program for refugees at TUM. Over the course of six semesters, 640 TUM students and staff volunteered for the refugees, helping them to become integrated. I would like to thank everyone who served as a role model in this project. If you help quickly, you can help twice; and this is why I would like to express gratitude to our Honorary Senator Ingeborg Pohl, whose generous financial support made this program possible in the first place.

In the future, we will address many further ideas and projects together. I would like to wish all scholarship holders, alumni, friends, and sponsors of our funding program – which is unique in Germany – the necessary commitment, curiosity, and much success!

Wolfgang A. Herrmann

Wolfgang A. Herrmann
President



„The important thing is to not stop questioning. Curiosity has its own reason for existing.“

Albert Einstein

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List of Mentors



Prof. Dr. Lisa **Herzog**
Summer of Diversity
TUM School of Governance

Mentoring is a form of intergenerational solidarity – I've benefitted from various forms of mentoring and would like to pay forward.



Prof. Dr. (em.) Franz **Hofmann**
Summer of Diversity
TUM School for Medicine

TUM:JA is basically a very good idea, but needs some improvement in the recruitment procedure. Select only members that are willing and able to spend extra time on sociological/political ideas.



Prof. Dr. Michael **Krautblatter**
MatchBox
Civil, Geo and Environmental Engineering

TUM:JA is filling a key gap in the transdisciplinary education of next generation students: in cooperation with stakeholders in society, ideas are developed, conceptualised and realised.



Dr. Alexander **Lang**
PiA / muc.me
Chemistry / Mechanical engineering

Working with a group of young highly motivated students from different faculties on a socially relevant topic generates new perspectives, also for my thinking.



Prof. Dr. Sabine **Maasen**
PiA / muc.me
Munich Center for Technology in Society

As a mentor at TUM:JA I cherish the opportunity to interact with students of the technical sciences and help them to engage in responsible engineering.



Prof. Dr. Alwine **Mohnen**
MatchBox
TUM School of Management

I love my role as a mentor for the TUM:JA teams. Meeting with these great young people is enriching, makes me believe of a better future than the press talks about.



Prof. Dr. (em.) Ernst **Mayr**
StreetScience

TUM:JA is excellent, I enjoy very much to be a mentor for it. Helping students to create, shape, implement, and finally evaluate their ideas is a great experience.



Prof. Dr. (em.) Peter **Russer**
StreetScience
Electrical and Computer Engineering

It is a pleasure to mentor in TUM:JA students performing interdisciplinary scientific project work, putting a focus on the project's benefits for the society.



Prof. Dr. Stefan **Wurster**
PiA / muc.me
TUM School of Governance

Promoting modern forms of political participation and education is one of the most important tasks of a political scientist in our day.

List of Tutors



Wolfgang **Enzi**
Summer of Diversity
Physics

Being a tutor allows to share your experiences at the Academy with a group of dedicated and talented students while developing new skills along the way.



Martina **Gschwendtner**
StreetScience
Mathematics

Using the experience I gained from my previous project at TUM:JA, I enjoy inspiring the students to grow with their challenging projects.



Ruppert **Heindl**
PiA / muc.me
TUM School of Education

As a tutor, I support the scholars of TUM:JA to develop their project ideas. Therefor I share my experience with our motivated students.



Johannes **Herms**
Summer of Diversity
Physics

The TUM:JA is a teamwork playground that helps students sort out their priorities.



Dominik **Irber**
PiA / muc.me
Physics

The TUM:JA is the perfect mixture of innovation and interdisciplinary team work, giving young scientists the space to realize their own ideas.



Vivien **Lechner**
MatchBox
Chemistry

TUM:JA offers a unique conjunction of soft skills training and practiced project management, allowing scholars to hone highly coveted skills.



Dr. Matthias **Lehner**
PiA / muc.me
TUM School of Education

As a tutor, I support the scholars of TUM:JA to develop their project ideas. Therefor I share my experience with our motivated students.



Tobias **Stahl**
StreetScience
TUM School of Management

The creativity and lateral thinking we can be a part of at TUM:JA is the perfect showcase for what truly cross-functional student teams are capable of.

List of Scholarship holders 2017/I



Vadim Goryainov
PiA
Informatics

In the 1.5 years that I've been on the project, I have learned a lot of valuable lessons for the future. First and foremost: how to delegate effectively



Ramses Alejandro Grande Fraile
muc.me
Architecture

My time at the TUM:JA has helped me reflect on Technology's role and contribution to Society, something I would like to keep working on in the future.



Danilo Hackner
StreetScience
TUM School of Medicine

It was a wonderful possibility to develop and foster skills in various areas. Thank you for the unique opportunity to take part in a great project.



Philipp Ekkehard Hölzenbein
MatchBox
Architecture

Complex problems require interdisciplinary approaches to be solved. I always stayed within my faculty – through TUM:JA I had the chance to look beyond.



Karim Aly
MatchBox
Sport and Health Sciences

In theTUM:JA I was able to gain a lot of valuable experience regarding teamwork and project work. My highlight was a team meeting in Berlin.



Lukas Egerer
MatchBox
TUM School of Medicine

TUM:JA offered the opportunity to learn valuable lessons about cross-discipline cooperation and project management in a welcoming environment.



Anna Verena Eireiner
PiA
Munich Center for Technology in Society

I really enjoyed my time with TUM:JA. Being part of an interdisciplinary team was a truly memorable and enriching experience.



Carlotta Ferri
PiA
Civil, Geo and Environmental Engineering

TUM:JA was for me a deep learning travel into my own skills. Whoever you are, whatever you are studying, you can create something meaningful.



Henry Lindner
StreetScience
Chemistry

I had an elaborate, but instructive time at the TUM:JA and, together with inspiring fellows, was often able to look beyond the horizons of my field.



Jara Meier
StreetScience
TUM School of Life Sciences

After one and a half years of meetings, discussions, and sometimes strenuous decisions to successfully implement and evaluate StreetScience was impressive.



Felix Niemeier
StreetScience
Architecture

As a TUM:JA scholarship holder I experienced a high degree of interdisciplinary exchange and the pleasure of growing by a challenge.

List of Scholarship holders 2017/I



Anna Pontz
Summer of Diversity
University for Music and
Performing Art Munich

As a musician it was very interesting to meet people who study or work in totally different fields.



Nelly Precht
MatchBox / muc.me
Architecture

Working with the openminded students of TUM:JA is an enrichment and the shift of perspective will widen your horizon thus improving skills and qualifications.



Simon Rehwald
muc.me
Informatics

At university, a project usually ends after one semester. But here, my team was able to create and publicly release a product that might last for a long time.



Nicolas Röhrle
MatchBox
Sport and Health Sciences

At TUM:JA I've learned many important aspects about team work and project management. It gave me the chance to cooperate with different students.



Matthias Passek
muc.me
Civil, Geo and
Environmental Engineering

The academy is an excellent opportunity to gather work experience in a team and to build a network to dedicated students of other disciplines.



Philip Petzoldt
muc.me
Chemistry

The TUM:JA made it possible for me and my team of "muc.me" to realise ideas we could not have carried out in a commercial or private environment.



Kerstin Pfister
PiA
TUM School of Medicine

TUM:JA enables me to interdisciplinary engage in frontiers in science or society, form our visions into a fantastic project and then realize it.



Julia Poliak
MatchBox
University for Television and Film
Munich

The TUM:JA taught me some key lessons about teamwork: what are the main obstacles and what ultimately motivates people to work together?



Jonas Ruchti
muc.me
Electrical and Computer
Engineering

TUM:JA is, in particular, a place for personal advancement. In this regard, it strives not only to do well, but to do Good.



Leah Schembs
PiA
TUM School of Medicine

Working together in an interdisciplinary team with ambitious, intelligent and open-minded students, tutors and mentors enriched me so much – thank you all.



Laura Schütz
PiA
Architecture

All average students are alike; each TUM:JA scholar is talented in his/ her own way. This concentration of exceptional personalities enriched my studies.

List of Scholarship holders 2017/I



Katharina Tropschuh
PiA
TUM School of Medicine

TUM:JA prompted me to think out of the box and helped me to grow personally in a heterogenous and interdisciplinary team of interesting and fascinating people.



Valentina Ustinova
Summer of Diversity
TUM School of Management

TUM:JA is the space for creativity, own initiative, projects, fun with amazing diverse students of different background.



Johannes von Stetten
Summer of Diversity
Electrical and Computer Engineering

It was fun to meet so many interesting and nice people and to work with them! Thanks to everyone for the great time!



Albulena Selmani
Summer of Diversity
Sport and Health Sciences

I am sure that the challenging experience of working with an interdisciplinary team to realize our project, will be a very valuable in my professional future.



Ferdos Sililo-Simon
Summer of Diversity
University for Television and Film Munich

I have learned so much through the project. The summer camp was not only fun for us, but also for the kids, who gave us superb feedback.



Mehmet Ali Taş
Summer of Diversity
TUM School of Management

Realising your ideas with the help of people, who are maybe even more passionate than you. That's what it's all about!



Florian Tichy
PiA
Munich Center for Technology in Society

No transdisciplinarity without conflicts. But going through them was quite a valuable experience for me, as I now know more about what we are made of.



Jana von Trott zu Solz
PiA
TUM School of Medicine

Developing and realising an idea while growing as a team was an exceptional journey full of inspiration and learning, for which I am very thankful.



Konrad Weiss
StreetScience
Informatics

I learned more about our university, other disciplines and myself. Getting to know these bright minds of other disciplines would not have been possible elsewhere.

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Projects of the TUM: Junge Akademie – Experimental approaches to research

The scholarship holders of the TUM: Junge Akademie have realized many unusual and innovative projects since the program started in 2010. Even after the official project phase, many of the project ideas have continued to attract attention and practical interest.

You want to use a bike in Munich? We proudly remember that our team TUMBikesharing of Year 2012 were the pioneers in analyzing the viability and potential of a mobility system based on the principle of a sharing economy, and this came before the Munich Stadtwerke started their planning of a related scheme. Or do you know the reason why the successful TUM Campus Run, now organized once every year by the TUM: Junge Akademie, involves more than 1,500 members of the TUM family? It was the project team runTUMfit which aimed to motivate students and employees of TUM to become aware of their health situation. In the same context, for more than four years, members of the network of TUM have met together weekly in the English Garden to have fun, meet interesting people and improve their fitness. In 2014, a group of scholars started the project VisiTUM, which developed a scheme for students to present information to high school students about their future academic fields. Since then, the Student Service Center (SSZ) of TUM has adapted this concept to develop a volunteering program for students in which they visit partner high schools to advise the younger students on their subject choices as well as on the most appropriate places of study. A project in 2016 focussed on nutrition and on analyzing the various factors in-

fluencing the decision making process when buying food. The result can be seen, bought and tasted at the TUM Shop: the 300 gram pack of TUMuesli.

One of the learning goals of the Academy's project work is to take group members out of their individual comfort zones, and this is facilitated through an interdisciplinary approach. The scholarship holders identify a topic of interest and observe the role it plays in society. In a second step, a research question based on the observations is developed and a hypothesis is formulated. To verify the hypothesis, the students work together in a creative and explorative way to develop a methodology which, after testing, can help the team to plan an innovative project. Supervisors (formerly called mentors) and tutors do their very best to guide, prompt and challenge the teams to help them on their way to a successful outcome. After an intensive self-reflection process and several peer feedback sessions, after twenty month the outcome of the project is discussed and evaluated at the final symposium of each academic year. It is no surprise that the final results of the projects often differ greatly from what was anticipated in the initial project ideas – intellectual agility and flexibility are key qualities to be acquired during the learning process that TUM: Junge Akademie offers its members.

You can gain greater insights into this process by reading the complete reports from the project groups of year 2017/I and 2017/II in this publication – and, rest assured, you will find them full of fascinating surprises.



Project Report **Diversity**

Team	Anna Pontz Albulena Selmani Ferdos Sililo-Simon Mehmet Ali Taş Valentina Ustinova Johannes von Stetten	Greetings from the Mentors 26 Journalistic part..... 28 Scientific part 30 Self reflection..... 38 Posters 40
Tutor	Wolfgang Enzi Johannes Herms	
Mentor	Prof. Dr. Lisa Herzog Prof. Dr. (em.) Franz Hofmann	

Diversity

Margaret Mead is said to have coined the phrase, “Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it’s the only thing that ever has.” For the *TUM: Junge Akademie*, the modified version should read: “Never doubt that a small group of thoughtful, committed *students* can change the world...”

The participants we mentored were indeed thoughtful and committed – they were bursting with ideas for how to translate the topic of diversity, whose relevance for our societies cannot be doubted, into a project.

Finally, what actually materialized was a summer program aimed at raising children’s awareness for the topic of diversity, along with a social scientific evaluation of the effect of the program. However, not even the soundest plan is immune to unpleasant surprises, such as a seminar facilitator cancelling his participation at short notice. It was only possible to carry out the summer program because all the team members pulled together and supported one another.

“Diversity” was not only the topic for this task force, though: It is a fundamental principle of the *TUM: Junge Akademie* itself, as its

participants are all from different fields. The willingness to enter into a dialogue between individuals who are pursuing completely different interests in their academic studies, and are thereby preparing themselves for completely different careers and lives, cannot be taken for granted. Sociologist Armin Nassehi is one of the many critical observers of what the tendency of our societies to differentiate into social spheres that are becoming increasingly separated from each other. Recently, he suggested establishing a “parliament of functions and logics, a parliament of intelligences which can bring together various problem-solving competencies and tools.”¹

One question still remains, however, and it is one that remains unanswered for the *TUM: Junge Akademie* as a project as well. This question lies at the core of growing concerns for democracy arising from the emergence of populist forces in many countries: In what ways can diversity be defined so that it includes socio-economic dimensions in addition to the typical parameters of gender and race? How about those who feel, or actually are, left behind according to common definitions? It is a well-known phenomenon that in democracies the voter turnout correlates positively with socio-economic status.² However, if the concerns of disadvantaged groups are not heard by the political system, populist rabble-rous-

ers can easily present themselves as “the true voice of the people” and incite feelings against “the elites.”

University members, no matter whether students or professors, find themselves in a dilemma. On the one hand, many of them share the concern about the cohesion of society and the future of democracy. On the other hand, they are “human capitalists” themselves, and generally equipped with a high amount of “social” and “cultural” capital. For these reasons, those who feel left behind and unheard view them with suspicion.

Certainly, this problem cannot be solved by giving up the values of knowledge and education in order to appeal to people who possess less of them and therefore feel disadvantaged. But maybe we need a new perspective on knowledge and education, one which is based on similar concerns as the ones about the value of diversity that motivated the team of the *TUM: Junge Akademie*. Unfortunately, knowledge and education are often interpreted in terms of individual progress, as means for climbing up the career ladder for the sake of a higher salary. Several decades of a neo-liberal conception of human beings as *homines oeconomici* have had their effects on education as well. But there are also alternative approaches. We can also understand knowledge and education as

means that enable individuals to make a valuable contribution to social welfare. After all, even an AfD-sympathizer who feels left behind and lashes out at “the elites” benefits from medical progress or innovations in energy production.

Conversely, it is also true that those who work in the “higher” professions must appreciate that this is only possible for them because other forms of labor are taken on by other people. If individuals use their knowledge in order to actively support society, the diversity of professions, accompanied by a diversity of social spheres, does not have to result in conflict, but can instead be seen as mutually complementary cooperation. With their project dealing with social diversity, the members of our team have shown that they are willing to accept the social responsibility that comes along with the privilege of an academic education and a program like that of the *TUM: Junge Akademie*.

Lisa Herzog and Franz Hofmann

¹ Armin Nassehi, *Die letzte Stunde der Wahrheit. Warum rechts und links keine Alternativen mehr sind und Gesellschaft ganz anders beschrieben werden muss*. Hamburg: Murmann Publishers, Pos. 4258-4269 (e-book), own translation.

² See e.g. Robert Vehrkamp and Christina Tillmann: „Landtagswahl in NRW: Soziale Spaltung der Wahlbeteiligung hat sich verschärft.“ Bertelsmann Stiftung, viewed 19 May 2017, <https://www.bertelsmann-stiftung.de/de/themen/aktuelle-meldungen/2017/mai/landtagswahl-in-nrw-soziale-spaltung-der-wahlbeteiligung-hat-sich-verschaerft/>.

Summer of Diversity – Chopsticks on Steinway & Sons

“Could I make a phone call?” Max asks straight away on the first day, “I would like to call home and tell them how cool it is here.” Max was one of the seventeen participants of “Summer of Diversity,” a three-day holiday program for children and teenagers between the age of 11 and 14 years. On the first day of the program, August 8th, the first participants arrived just after 8 a.m. at the Musikhochschule München, the event’s venue. The official beginning of the event was scheduled for 9 a.m. – early in the morning, especially when you’re on holiday. However, not so early for many of the kids who had come to the venue a good while before the event was supposed to start. They enjoyed playing cards together or even having a play at one of the two grand pianos from Steinway & Sons, which were positioned in the room. At one point, even both pianos were played on simultaneously by the kids who were keen on trying the Chopsticks. One could clearly feel that the kids were on holiday and there was only one thing that they wanted – fun! That’s enough reason to arrive early.

As the kids reported, it was mainly their parents who had suggested participating in the free holiday program. They had spotted either our colorful posters or an announcement about “Summer of Diversity” in the newspaper. That showed us: Our advertising in the run-up had worked!

The central question that we, the event organizers, had asked ourselves before coming up with the event was: How would it be possible to familiarize kids with diversity, a sensitive topic that overstrains even adults? Would it be relevant and interesting for them after all? And can such topics be imparted in a way that does not make them feel like at school? One thing we knew from the beginning was that we did not want to give lectures. Our aim was to find a way to present the concept in an age-appropriate and entertaining manner. The solution we arrived at was ... experiential education! Therefore, we developed a holiday program that would

combine all of that: Game blocks with knowledge transfer about the concept of diversity, as well as workshops about the topic of interculturality.

The first day started with ice-breaker activities and group games which were considered important as most of the kids didn’t know each other. Furthermore, the games enabled a group-identity to take shape among the seventeen individuals. We were convinced that the participants were only able to learn something and have fun if they felt comfortable and part of the group. Due to the number of participants, the group had to be separated into two smaller groups. On the first day, the workshop Improvisation Theater and the first block of the Diversity Training took place.

In the Improvisation Theater module, the kids learned to put themselves in different situations and roles. Our participants were very impressed when they found out that actors, in their training, would have to do improvisation theater every day for two hours. One of the groups had a lot of fun when they were instructed to break a taboo and use swearwords. Max was in the other group, which had the task of trying to open up the actors by arousing various emotions. Max didn’t find this easy. But, also in this group, there was a lot of laughter, as the kids used all kinds of means possible to bring the others out of their shells. It was incredibly entertaining to see with what self-confidence and creativity the kids performed the tasks.

The Diversity Training was intended to make the participants familiar with the concept of diversity in general. It was important for us that the kids acquired their knowledge autonomously and were able to express their own thoughts. We did not intend to supply a definition and tell the kids what to think about the topic. During the first Diversity Training, the participants had to think about how they would describe themselves, which attributes distinguished them

from others, what hobbies they had and what they were particularly good at. The comparison of these characteristics among the individuals led them to the insight that everyone is different, and that this is normal and good. In the following days, further diversity blocks took place, which enabled the kids to find out more about the concept in a playful way. Furthermore, percussion workshops, Capoeira and communal cooking were part of the program.

At the percussion workshop, the participants got acquainted with drums and different drumming techniques. The workshop instructor showed the kids a Cajon and asked which German word had a similar sound to its name and what its appearance reminded them of. One of the kids suggested a carton and was right on target. It was explained to the kids that Cajones were originally made from transport boxes and used by African slaves after their traditional drums had been taken away. The children also played on African Djembes and Latin-American Congas and Bongos.

The cooking workshop took place in the cooking school “Koch dich glücklich.” But in what way is cooking related to diversity? In no way! However, it is related to interculturality. The participants were asked to try out something new and to work together as a team while preparing a meal. The result for the starter was Vietnamese Spring Rolls, which they had made from rice leaves and rice noodles. Before consumption, the rolls were dipped in a hot sauce. The main course was self-made Ravioli with a self-made stuffing. As a dessert, they served American Chocolate Raspberry Crumble with vanilla ice cream.

In addition, the kids tried out the Brazilian Capoeira. The two Brazilian course instructors showed them how dance and martial arts can be combined. Promptly, one of the participants observed: “So you don’t really hit each other?” Indeed, with Capoeira the intention is not to hurt your teammate. Neither should there be any

body contact at all. The opponent’s attacks are not blocked, they are rather reacted to with a counter-attack. The result is a sort of conversation that requires a huge amount of agility, alertness and interaction. It was obvious that the kids were having fun trying out the several basic steps and finally playing themselves. Each round, two at a time played in the Roda, the circle formed by all players, while the others were singing and clapping, accompanied by the Berimbau.

While examining the participant list, we caught ourselves thinking: This group is not diverse enough for investigating a question that deals with diversity.” But that is exactly the wrong way of thinking about it, as we had reduced the term “diversity” to the participants’ origins only. It may be true that all our participants had at least one parent that was German. However, this characteristic on its own does not necessarily indicate a homogeneous group. We were able to observe a variety of different characters and attributes in this group consisting of seventeen children and teenagers. During the workshops, we also realized that the kids all had different strengths. One of the participants who had had difficulties at the Improvisation Theater was unstoppable at the Capoeira. It was impossible to claim that there was a workshop that all kids found equally easy or difficult. Some of the children stood out by enormous creativity, others were extraordinarily athletic, musical, or self-confident. The differences became particularly obvious when the kids were talking about their career wishes. For example, one of the participants would like to study physics and join NASA, while another one would like to be an actor in California.

At the end of the three days, Max said: “I am very sad that not more kids have participated, because they would have loved it, too.” We also enjoyed the three days ourselves – and above all, the kids showed us just how diverse a group can be, even though it might not be obvious at first sight. ■

Leaving the Pigeonhole

How to communicate diversity skills

In a Nutshell:

- A summer program for teenagers with focus on diversity was organized
- The program was successfully conducted at the HMTM in Munich
- Questionnaires and interviews showed an increase in awareness for diversity in the participants
- In conclusion, existing summer programs could benefit from workshops focused on diversity

Abstract

The term “diversity” has been generally used within biological research and means in this field a great variety of species. The term is also used to refer to variousness in society. Our project aims to gather detailed information on the topic of promoting diversity competency in teenagers. Qualitative research during a three-day summer program was designed to provide such information.

1. Background

The development of societies shows a general tendency towards more complex and heterogeneous social milieus. These heterogeneous units have a multitude of particular characteristics across a large number of individual members. The term “diversity” denotes this great social variety and describes similarities and divergences within and between them. Very often the term “diversity” refers only to cultural differences but it has a wide range of meanings. The term encompasses various dimensions of society: sex, age, sexual orientation, ethnic-religious-cultural affinity, religious affiliation and also socio-economic environment, leisure behavior and habits.

Dissimilarities between different groups in society aren’t always looked on favorably – the challenge of recent assimilation concepts in politics to those of social inclusion are a clear indication. But according to a research report of the Max-Planck-Gesellschaft¹, the term diversity is increasingly used in a positive way. The reasons cited were as follows: “*allgemeine Individualisierungstendenzen, die Zunahme migrationsbedingter Vielfalt und die gestiegene Bedeutung von Antidiskriminierungsdiskursen.*”², which can be translated as “general tendencies towards individualization, the increase of migration-related diversity and the increased importance of anti-discrimination discourses”.

¹ Cp. Nieswand, Boris: Diversität und Gesellschaft. Forschungsbericht 2010 – Max-Planck-Institut zur Erforschung multireligiöser und multiethnischer Gesellschaften. <https://www.mpg.de/359276/forschungsSchwerpunkt>. (18.08.2018).

² Nieswand, Boris.

Society has a duty to prepare its members for diversity³ and to begin an early “training” for dealing appropriately with people from different communities. The aim is to prevent intolerance and discrimination and therefore to counteract social inequalities. For a long time the ability to encounter other people prejudice-free and in a spirit of mutual respect was called intercultural competence.

Wolfgang Welsch, philosopher and researcher in the field of aesthetics and the discussion of postmodernism, criticizes the term “interculturality” because it implies a negative connotation of other cultures.⁴ In his view, the term “transculturality” symbolizes in a better way positive and respectful interactions between the members of society. Furthermore, according to Welsch, modern society is characterized as a place where identity formation proceeds in a heterogeneous environment of many cultures. Welsch describes this process as a patchwork which results in people becoming “cultural hybrids.”⁵

Our summer program aimed to investigate if it is possible for pupils to acquire “diversity skills” in workshops dealing with the topic of diversity. These diversity skills do not have measurable characteristics, but rather can be seen as general social skills such as taking all people seriously as individuals, with their own individual concerns and needs, instead of regarding them just as members of a certain social group.

This ability should be accompanied by a sensitization to stereotypical categorizations and discrimination. The overall objective of acquiring diversity skills is to develop and establish a differentiated perception and awareness combined with a self-critical attitude. The term “Diversitätskompetenz” is in addition understood to mean abilities such as empathy and the ability to tolerate insecurities and diversities in society.⁶ In summary, it can be said that the aim of our program is to foster an appreciative approach towards diversity where differences are evaluated in a non-normative way.

Pupils most commonly experience a teacher-centred education or classroom teaching style. This way cannot be seen as very effective to convey the knowledge and skills requiring independent action of individuals. To teach diversity skills we designed a summer program according to the proven pedagogical principles of experiential education. And therefore the project focuses on experiential learning. The term “experience” in this context was coined by American philosopher, psychologist, and educational reformer John Dewey. In his view experiences should be seen as experiments with the world due to its recognition.⁷ Hence experiences are vital for learning.

2. Goals and Methods

The study aims to explore whether an experimental pedagogical summer program for children aged 11-13 can develop and strengthen their awareness and acceptance of diversity.

³ Cp. Aigner, Petra: Integration, Interkultur oder Diversität? Anmerkungen zu Fragen von Theorie und Praxis ethnisch – kultureller Vielfalt in Österreich.: “Hier muss auch darauf verwiesen werden, dass Migration und der Umgang mit/bzw. die Bewältigung von daraus resultierender Diversität eine historische Konstante der Menschheitsgeschichte, ja fast der „Normalzustand“ sind (vgl. Kleinschmidt 2011), und dass alle heute weltgesellschaftlich bedeutsamen Regionen und Gesellschaften (Europa, Nord- & Lateinamerika, Afrika, indischer Subkontinent, China, Südostasien etc.) zutiefst von ganz archaischen bis ganz modernen Migrationsphänomenen geprägt sind, die bei aktuellen Fragen nicht außer Acht gelassen werden können.” http://www.isw-linz.at/themen/dbdocs/LF_Aigner_2_13.pdf. (15.08.2018).

⁴ Cp. Welsch, Wolfgang: Welsch, Wolfgang: Spaces of Culture: City, Nation, World, ed. by Mike Featherstone and Scott Lash, London: Sage 1999, 194-213: “Are then, perhaps, the concepts of interculturality and multiculturalism more able to provide an appropriate concept of today’s cultures? They apparently try to overcome some flaws of the traditional concept by advocating a mutual understanding of different cultures. Yet they are, as I will argue, almost as inappropriate as the traditional concept itself, because they still conceptually presuppose it.”

⁵ Welsch (1999).

⁶ To understand our conception of the term “Kompetenz” see Franz Weinert’s definition of the term: “die bei Individuen verfügbaren oder durch sie erlernbaren kognitiven Fähigkeiten und Fertigkeiten, um bestimmte Probleme zu lösen, sowie die damit verbundenen motivationalen, volitionalen [die willentliche Steuerung von Handlungen und Handlungsabsichten] und sozialen Bereitschaften und Fähigkeiten, um die Problemlösungen in variablen Situationen erfolgreich und verantwortungsvoll nutzen zu können.” In: Weinert, Franz E. (Hrsg): Leistungsmessungen in Schulen, Weinheim und Basel, 2001, S. 27f.

⁷ Cp. Dewey, John: Demokratie und Erziehung. Eine Einleitung in die philosophische Pädagogik. Hrsg. von Jürgen Oelkers. Weinheim und Basel: Beltz 2000, S.187.

For the recruitment of participants, posters were hung in several public schools and various locations across the TUM campus. Flyers were handed out at public libraries in Munich, especially in the sections with children's books. In addition, there was an article in the *Süddeutsche Zeitung* about the summer camp. Social media channels were used to announce the event on the Facebook pages of the TUM: Junge Akademie and TU München. The program was also announced to professors of TUM via email. A website was established to simplify the process of application. In the end 17 participants registered. Most of them were recruited via the newspaper article in the *Süddeutsche Zeitung*. We had decided to accept a maximum of 35 participants. In retrospect, we think that would have been too many participants for this program. The group size of 17 participants, divided into two groups of 8 and 9 children, was appropriate. The only inclusion criteria for participants was an age between 11 and 13 years. One exception was made for a 14 year old participant.

The conducted intervention was a three-day program named “Summer of Diversity” that took place at the University of Music and Performing Arts Munich. The participants took part in several workshops that were led by professional course leaders. The organization team participated as supervisors. The activities included workshops in improvisation theatre, Capoeira, percussion and

cooking. These represent the experimental pedagogical component of the summer program. Furthermore, there was a workshop about diversity and also different group games. A detailed time-table of the program is shown in figure 1.

A one-group pre-test/post-test design was used. The 17 participants completed a three-page questionnaire at the beginning of the first day of the program. At the end of the last day of the program, a second eight-page questionnaire was completed by all 16 participants that were present on that day. In order to have a better overview and an appropriate statistical analysis of the results, the questionnaire was created on EvaSys. Furthermore, the 13 participants who gave their consent were interviewed on the last day. Moreover, the organization team made observations during all the activities of the three-day program.

The first questionnaire contained questions about basic information such as age, sex, school form, native language and the place of birth of the participants and their parents. In addition, other questions aimed to capture the children's knowledge and perception of diversity, discrimination and minorities. Besides that, there were questions about the participants' expectations of the program and the reason for their participation.

The second questionnaire included the questions about basic information that had already been used the first time. A further 22 questions focused on knowledge about diversity and its various aspects and associations. In addition, there were questions to evaluate their competencies and their willingness to work in teams. Another important aspect of the questionnaire was the appraisal of the program. This contained questions about the workshops, the course leaders and the organization team in their role of supervisors. The participants were invited to give recommendations for possible improvements. One page of the second questionnaire can be seen in figure 2.

In the interviews there were questions about how the children liked the program and the other participants. They were also asked if they had had any funny or special experiences during the program. Finally, they were asked if they had known the meaning of diversity before participating in the program and then what they now know about diversity after taking part in the program.

3. Outcome and Discussion

In the following, the results of the questionnaire evaluation and the observations made by the organization team are provided.

On the first and second day all 17 participants who had signed up took part in the program. On the last day there was one case of illness. This level of attendance indicates that the children favored the program. Furthermore the children gave positive feedback about the workshops. They said they had had fun participating and trying new things. This corresponds with our own observations.

Evaluation of the first questionnaire, which was conducted before the program, allows us to derive some facts about the participants and make various assumptions.

EvaSys		Summer of Diversity Fragebogen - Befragung nach dem Programm		Electric Paper	
3. Ferienprogramm (Fortsetzung)					
3.9 Wie fandest du die Länge des Ferienprogramms?	<input type="checkbox"/> zu kurz	<input type="checkbox"/> genau richtig	<input type="checkbox"/> zu lang		
3.10 Hat das Programm deine Erwartungen erfüllt?	<input type="checkbox"/> besser als erwartet	<input type="checkbox"/> wie erwartet	<input type="checkbox"/> schlechter als erwartet		
3.11 Wie war die Stimmung für dich?	<input type="checkbox"/> sehr gut <input type="checkbox"/> gar nicht gut	<input type="checkbox"/> gut	<input type="checkbox"/> nicht so gut		
3.12 Wie fandest du den Workshop Improtheater?	<input type="checkbox"/> sehr gut <input type="checkbox"/> gar nicht gut	<input type="checkbox"/> gut	<input type="checkbox"/> nicht so gut		
3.13 Dein Kommentar zum Workshop Improtheater:					
3.14 Wie fandest du den Workshop Capoeira?	<input type="checkbox"/> sehr gut <input type="checkbox"/> gar nicht gut	<input type="checkbox"/> gut	<input type="checkbox"/> nicht so gut		
3.15 Dein Kommentar zum Workshop Capoeira:					
3.16 Wie fandest du den Workshop Kochen?	<input type="checkbox"/> sehr gut <input type="checkbox"/> gar nicht gut	<input type="checkbox"/> gut	<input type="checkbox"/> nicht so gut		
3.17 Dein Kommentar zum Workshop Kochen:					

Figure 2: Page 7 of the second questionnaire

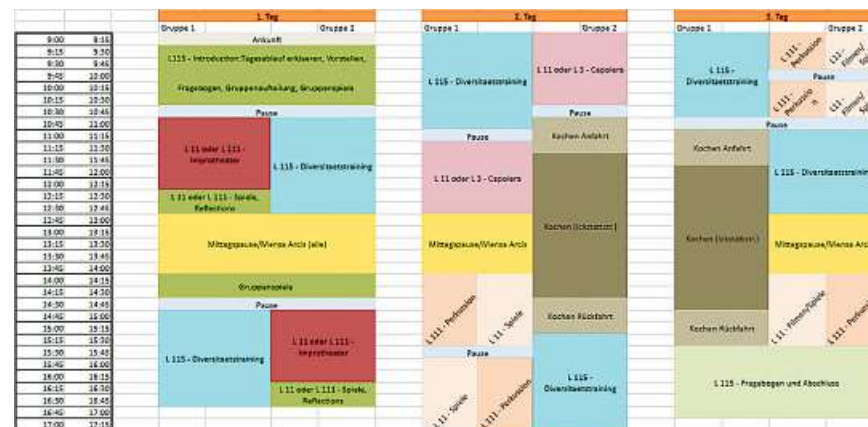


Figure 1: Timetable of the program

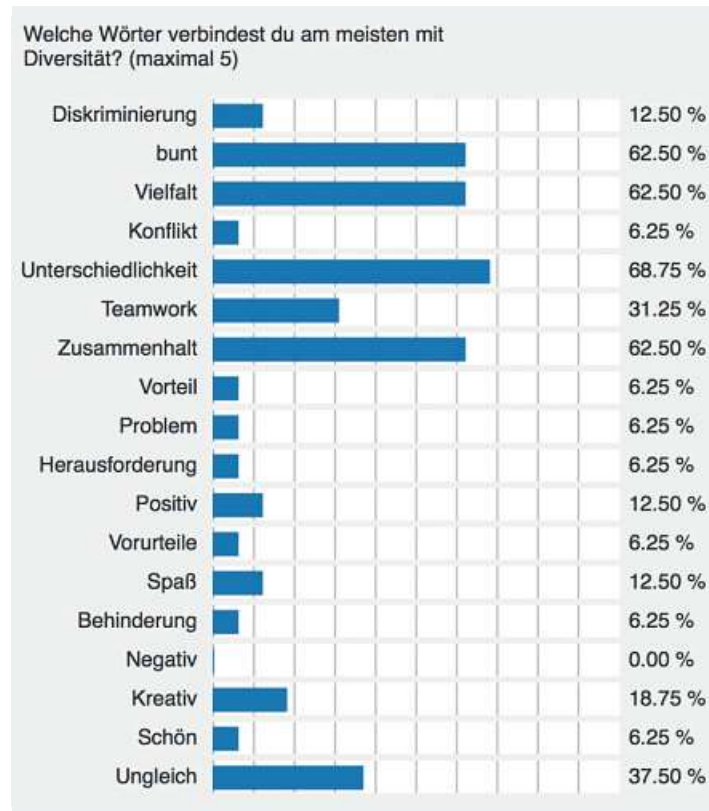


Figure 3: "Which words do you associate with diversity?"

There were 65% female and 35% male participants. All participants were between 11-13 years old, with the exception of 2 children (10 and 14 years old). Gymnasium students formed the majority in our program. According to the questionnaire, only 15% of the participants were familiar with the term "diversity" before our program. The main interests of participants included sport, music, time spent with friends and family. It was found that most of the participants share their interests with their family and friends. Although most of the participants regard themselves as German

(near 90%), around 50% of them also feel that they belong to another nation. The underlying reason could be the ethnic origin of their parents, for example American, Brazilian, Italian ... In spite of the fact that 60% of the participants face questions on their ethnic background in their daily lives, almost the same percentage of children ask this question to others. This signals that they do not feel discriminated against or excluded by their peers when asked about their ethnic background. However, most of them have already faced some sort of discrimination, which can also be based on other reasons than nationality.

After the evaluation of the second questionnaire, which was carried out at the end of the program, we found that the awareness of participants with regard to diversity and how diversity manifests itself in daily life had surged. The detailed results can be seen in figure 3. In summary, children link diversity with teamwork, variety, creativity, and inequality.

In order to get more unbiased and sensitive information related to the children's understanding of diversity in the questionnaire, we presented children with different scenarios that touch the subject of diversity and discrimination based on race, color and disability. The results are provided in figure 4. It was found that although diversity is perceived as advantageous and society can gain a lot from it, the participants also acknowledged the fact that it also causes some misunderstanding and conflicts in group communication. Openness to other nationalities is less evident in relation to non-European countries, when compared to European ones. One outstanding discovery is that none of the participants see skin color as an interference parameter.

Moreover, we noted that the children quickly started interacting with the others and took part in the group games. In the interviews most children reported that they thought the other participants were nice and that they had made new friends. All of them replied that they could get along well with the others. Our questionnaire also supports this opinion. The participants stated that they had friends from all over the world, including countries such as Ecuador, China, Rumania, Luxemburg, Brasil, Turkey, Peru, and Poland. In one of the workshops, in which the meaning of diversity was

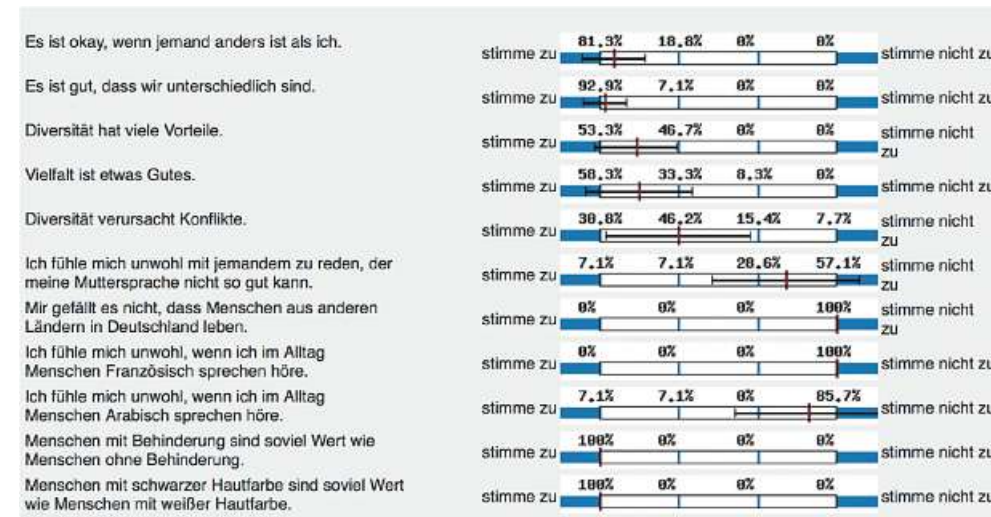


Figure 4: Responses to the second questionnaire

introduced to the children, they had the chance to discuss whether they think diversity has advantages or not. We realized the oldest participant (14 years old) of the group had a more critical opinion on working in a diverse team. He mainly associated diversity in a group with the potential for conflicts and difficulties, while the two youngest (11 years old) said they generally preferred working in a group and did not like working alone. After being asked in the individual interviews conducted during the workshop breaks if they knew the word "Diversität," almost all children said they did not know the word or its meaning before taking part in the program. All of them were able to explain the meaning of diversity in the interviews.

4. Summary and Future Goals

The summer program "Summer of Diversity" provided plenty of valuable insights for a better understanding of how to increase the awareness of diversity in our society. We believe that the questionnaires and interviews we conducted provide useful information for examining our hypothesis. From our personal observations, as well as from the collected data, we conclude that the teenagers

had had a lot of fun and felt good about the experience. This is important to us as we believe that a positive atmosphere is an important basis for any learning process. Additionally, looking at our hypothesis, we are convinced that the summer program "Summer of Diversity" increased the awareness of diversity of the participating teenagers.

We are aware that 17 participants are not sufficient to draw robust quantitative conclusions from questionnaires and that for meaningful results the programs needs to be scaled up. Meanwhile we learned that for a small team of scientists it is not easy to handle 17 teenagers full-time. Therefore, in order to scale up our summer program, solutions must be found as to how to conduct it with larger numbers of participants.

Also, more extensive collaboration with a social scientist could have improved the scientific examination of our program. With additional guidance we might have been able to create questionnaires and interview guidelines which enabled us to draw more precise conclusions regarding our hypothesis.

Looking at these shortcomings, but also the success of the program, we believe that it would certainly be worthwhile to conduct similar summer programs in the future, where some of the problems encountered in the first run could be remedied.

As the organization of a summer program takes some effort, it might also be worth considering the option of teaming up with existing summer programs. On the one hand, examining the impact of other summer programs on the awareness of diversity could provide further insight into how the concept of diversity can be communicated more effectively. On the other hand, additional diversity workshops could be offered at existing summer programs. We would be happy to share our results as well as our personal impressions with others. We are convinced that it would be valuable for other summer programs to integrate concepts similar to "Summer of Diversity."

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Self-reflection Diversity

“Integration als Windfallprodukt durch gezielte Nutzung von Diversität” – “Windfallproduct Integration as a result of targeted use of diversity.”

Both in German and English the working title of our project seemed to be rather clumsy for an interesting thought leading, hopefully, to an exciting project. The basic elements – diversity and integration – are complex issues with a multidimensional nature and they have given rise to a multitude of explanations, definitions and action plans.



As a basis for creating innovative ideas and planning our communications, there were regular meetings within the team. Our first meetings were taken up with approaches to understanding the basic ideas and different concepts of the terms “integration” and “diversity.” At first we called ourselves “team integration” but soon switched to the name “team diversity.” This title not only described our project but also the composition of the team, since the student

members are drawn from three different universities – the TUM: Junge Akademie has small-scale cooperative arrangements with other universities – and from various areas and courses of studies such as film production, health science, electrical engineering and information technology, business studies and musical education. Additionally, the members have different cultural backgrounds. All these factors could be cause enough to complicate teamwork but we realized at an early stage that our common goal was to organize a participative project instead of a pure research project. Nonetheless, by distributing roles and tasks at various decision-making levels, and by establishing rules of communication, we avoided conflicts in the team. Members’ overloaded schedules sometimes resulted in exhausting team meetings, and so-called power projects that seemed often less than profitable contributed to this workload. Time management and estimating availability now and then caused minor problems.

As stated previously, we needed some time to familiarize ourselves step by step with the topic and to acquire the relevant specialist knowledge and methodology as well as an understanding of interdisciplinary interrelations.

As it later transpired, one of the main problems was getting started on the actual project work. Right from the first meeting, we generated ideas, but it needed quite some time till these ideas were firmed up sufficiently to allow us to envisage constructive solutions and to make actual plans for our project. One of the reasons why decision-making was quite difficult was our determination to include every team member in the process – which, as already mentioned, was complicated by problems of availability.

We were helped greatly, however, by managing our project through the setting of concrete milestones and interim steps. ■



Diversity

ABSTRACT According to recent studies diversity makes teams more successful. But do teams always benefit from diversity? We understand diversity as a science – We should definitely know more about it. If diversity would be an ingredient, how much would be to much?

GOALS

- How to find the best combination of diverse personalities for a successful team
- Is there a cooking recipe to form a successful team?
- Are there different cooking recipes for successful teams in different challenges?
- To prove hypotheses in practice by looking at startups, companies, other organizations
- Help a group or team in business or society to achieve more by employing a better degree of diversity

A COOKING RECIPE
HOW DIVERSE SHOULD BE A TEAM?

0% → 100%

lack of opinions, ideas → no innovations
Optimal diverse combination?
Efficiency, Creativity, Innovations

HYPOTHESIS
There is an optimal mixture of diverse individuals for a successful team.

TEAM STRUCTURE & PROCESS

- Interdisciplinary group of international students: 2 group speakers and a moderator
- regular meetings with agenda planning

OUTCOME
Our research showed us various aspects of diversity. The particular aspects of diversity that we are concerned with relate to the following areas:

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

SUMMARY AND FUTURE GOALS
There is still a lack in research about diversity. We want to fill the gaps and discover a differentiated perspective on diversity. As future goal we want to find a suitable target group for our project.

MEMBERS: Anna Pontz, Albulena Selmani, Feridos Sillio-Simon, Mehmet Ali Tas, Valentina Ustinova, Johannes von Stetten, Felicitas Weiss
TUTORS: Wolfgang Enzi, Johannes Herms
MENTORS: Prof. Dr. Lisa Herzog, Prof. Dr. em. Franz Hofmann

inspired by TUM Junge Akademie

OCTOBER 2017

POSTER 1: In the first months we focused on the determination of the main aspects of diversity and tried to establish a common understanding of the term. However, because of the wide-ranging nature of diversity and its role in our society, we decided to narrow down the social groups affected by it and selected “teenagers” as the group to focus on.

Diversity

150 Jahre culture of excellence TUM

ABSTRACT
Diversity becomes more and more important in these days, leading to a high importance that people are educated about it from an early age on. However, contact with diversity is only rare at schools and if there is contact it is highly specialized to single dimensions of diversity. The goal of our project is to complement the existing formats with a summer program for teenagers that covers a complete range of diversity dimensions. We aim to design a program that supports students in the development of their competence for diversity and evaluate it with two surveys before and after the event.

HYPOTHESIS
Our project will examine the hypothesis that we can develop and strengthen the awareness and acceptance of diversity in our society with an experiential pedagogical summer program for teenagers.

RESEARCH PROCESS
We started our research by contacting various educational psychologists and social education workers. In interviews we gained valuable insights about the ongoing projects at those schools and the current interaction with diversity in general. We had the chance to see the factual issues faced by students.

METHODS
One of the key decisions of the project is the target group. We choose to work with teenagers because we assume they have a greater opportunity for development in the direction of openness and inclusivity.

The date for the summer program was set in the summer holidays. This way school-related limitations due to school timetable and curriculum are reduced.

In line with teaching and education research the summer program has the concepts of experiential education and activity-orientation as a basis. These theories and concepts focus on experience and activity as initial points of learning.

We will perform a survey before and after the program to ascertain data about various aspects in the fields of “diversity” and “tolerance for (cultural) differences”.

The purpose of the evaluation is to allow conclusions about the teenagers’ perception of other people before and after learning about diversity. A further aim of the survey is to find out about the impact of the workshops as a basis for developing this kind of summer program.

RESEARCH RESULTS
Our research showed that there are currently no projects at high schools in Munich concerning diversity in general. There are a few projects at schools that address only one specific dimension of diversity like ethnicity, race, gender, sexual orientation or physical disability.

Our conclusion is that there is a need for a project focusing on the generic topic of diversity and aiming for a general diversity competence.

MILESTONES
In February and March 2018, we will create a concept and work on the organization of the project. In April 2018 we will start the announcement of the summer program. The conduction of the summer program will take place in August 2018. The evaluation will be completed until October 2018.

MEMBERS: Anna Pontz, Albulena Selmani, Feridos Sillio-Simon, Mehmet Ali Tas, Valentina Ustinova, Johannes von Stetten, Felicitas Weiss
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MENTORS: Prof. Dr. Lisa Herzog, Prof. med. em. Franz Hofmann

inspired by TUM Junge Akademie

JANUARY 2018

POSTER 2: Our initial research made it clear that there were no projects at high schools in Munich concerning diversity in general. So we decided to develop and carry out an experiential pedagogical summer program on diversity. We aimed to verify the hypothesis that teenagers’ competence for diversity can be improved through such a program.

Diversity

Our research aims to explore whether an experimental pedagogical summer program for children at the age of 11 to 13 can develop and strengthen their awareness and acceptance for diversity.

PROCESS AND MILESTONES

We organized a program of three days including activities like percussion, capoeira, improvisation theater, cooking and group games. These were carried out by professional course leaders and supervised by the organization team. The participants were children aged between 11 and 14. We had 17 participants in total. For the application process, we established a website to simplify the process. We hung posters in several public schools and various locations across the Technical University of Munich. We handed out flyers at public libraries around Munich. What really helped the recruiting process was an article in the Süddeutsche Zeitung about our camp. Other than that we also benefited from social media channels such as Facebook and announcing our program to professors of the TUM was really helpful. At the beginning of the summer program, children, who participated at our program, filled a questionnaire. The questionnaire contained questions about basic statistical relevant information such as age and sex but also aimed to capture children's affinity with diversity, discrimination and minorities. We also wanted to find out their expectations of the program and the reason for their participation. During these three days, benefiting from the relaxed environment of the summer program, we observed the participants and conducted interviews. At the end of the program, we distributed another questionnaire, this time more focused on the aspects and associations made with the term diversity, to see the impact of our program. In addition to the questions about diversity, we also wanted them to evaluate their competencies and their willingness to work in teams. Another important aspect of the questionnaire was the appraisal of the workshops and recommendations of the participants for possible improvements.

RESULTS

In the following, the results of the interviews, conducted at the end of the program, and of the observations, made by the organization team, will be described.

At the first and second day all 17 signed up participants took part in the program. At the last day there was one case of illness. This fact implies that the children favoured the program. Furthermore the children gave a positive feedback about the workshops. They said they had fun participating and trying new things. This corresponds with our own observations.

We noticed that the children quickly started interacting with the others and taking part in the group plays. In the interviews most children reported that they think the other participants are nice and they made new friends. All of them replied that they could get along with the others.

In one of the workshops, in which the meaning of diversity was introduced to the children, they had the chance to discuss whether they think diversity has advantages or not. We realized the oldest participant (14 years old) of the group having a more critical opinion on working in a diverse team. He mainly associated diversity in a group with the potential of conflicts and difficulties. While the two youngest (11 years old) said they generally preferred working in a group and did not like working alone. The analysis of the questionnaires will show whether an age trend can be confirmed. After being asked in the interviews about if they knew the word „Diversität“, almost all children said they did not know the word or meaning before taking part in the program. All of them were able to explain the meaning of diversity in the interviews.

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NEXT STEPS

The two questionnaires, that were filled out at the beginning and end of the program, and the interviews will be analysed soon. After obtaining the results, we are going to construct further hypothesis, which can be interesting for further research. We also want to pass on our experiences on organizing this summer program and give recommendations for organizing a summer camp about diversity.



Summer of Diversity



SEPTEMBER 2018

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TUTORS Wolfgang Enzi, Johannes Horms
MENTORS Prof. Dr. Lisa Herzog, Prof. med. em. Franz Hofmann



POSTER 3: At the time of the preparation of the third poster, we had successfully elaborated the abstract idea of a summer camp for diversity and were able to increase awareness of our program thanks to newspaper articles promoting our camp and the numerous posters and leaflets we distributed throughout Munich. Although we were unable to meet every milestone on time, we successfully organized and executed the three-day holiday program and it received an enthusiastic response from the participants. ■

Diversity Leaving the Pigeonhole

RESEARCH QUESTION AND HYPOTHESIS

Our research aims to explore whether an experimental pedagogical summer program for children at the age of 11 to 13 can develop and strengthen their awareness and acceptance for diversity. The conception of our program is designed to communicate "diversity skills" i.e. the ability to be accommodating to various lifestyles and needs, to accept and appreciate different point of views without bias in a diverse society.

METHODOLOGY

Our methodology was to carry out an event where the target group feels well, and can be exposed to the topic in a positive environment. We wanted to use this event to make observations and inquiries for obtaining further insights into research questions and for generating new assumptions.

Therefore we organized a summer program for teenagers of the age of 11 to 13. It included such activities as percussion, capoeira, improvisation theater, cooking and group games in order to establish a positive environment. These workshops were selected in order to have a wide variety of activities with content from different cultures and fields of activities. As inquiries we used questionnaires before and after the event and interviews at the end of the event.

The methodology of our program's conception can be subsumed under the term "experiential learning". To support and release the main idea of this methodology, the following pedagogical principles were considered in our program:

- learning is based on individual activities,
- these enable to gain experiences,
- the teenagers are seen as active players and as self-determining subjects of their own learning.

FINAL RESULTS

According to our questionnaire made at the beginning of the program, only 15% of the participants were familiar with the term diversity before our program. Although most of the participants regard themselves as German (near 90%), around 50% of them also feel that they belong to another nation. It was found that even when the diversity in group might be perceived as advantageous and society can gain a lot from it, the participants also acknowledged the fact that it also causes some misunderstanding and conflicts in the group communication. Moreover, it was noticed, that the children quickly started interacting with each other and took part in the group games. In the interviews most of the participants reported that they could get along well with the others and that they made new friends. Our questionnaire also supports this result. After being asked in the individual interviews if they knew the word "Diversität" (diversity), the prevailing majority of children responded that they did not know the word or its meaning before taking part in the program. However, all of them were able to explain the meaning of diversity in the interviews at the end of the program.



MEMBERS Anna Pontz, Abulena Schmitt, Ferides Sille-Simon, Mehmet Ali Tas, Valentina Ustinova, Johannes von Stietzen, Felicitas Weiß
TUTORS Wolfgang Enzi, Johannes Horms
MENTORS Prof. Dr. Lisa Herzog, Prof. med. em. Franz Hofmann



OCTOBER 2018



Summer of Diversity



DISCUSSION

The event successfully provided a positive environment for the children. The inquiries show that the awareness of diversity has risen significantly over the course of the program. Due to the fact that the observations were only obtained on an event with 17 participants further investigations have to be done to reach high confidence in our results. Additionally the quality of future results could be improved by a closer collaboration with a social scientist.

SUSTAINABILITY

We highly believe in the positive impact and exciting experience which our holiday program could give the participants. As the questionnaire and conducted interviews have shown, children not only have learned definition and meaning of "diversity", but also could gather valuable experiences in working and communicating with diverse people and thus explore the contents of the taught core skills in practice. The program aims to give children an idea of tolerance and respectful interaction with each other into the future, so that they can carry it on and apply the skill set in their daily life. Although our research project is done on the voluntary basis and does not charge fees from participants due to its academic purposes, the actual costs per child to cover expenses are rather high (300 euros per child according to our calculations). Thus, it would make it difficult to bring into reality one project on the coast of state without sponsorship of different organizations or private persons. However, a possible support of such organizations, as banks, voluntary organizations, various funds and private investors would make it possible to organize the three-day program every summer. Moreover, as TUM offers different holiday programs and could apply the design and content of our program or use some parts of it in these other programs for children. The latter especially could be an interesting and rewarding option as many children asked about continuing the program next year.

POSTER 4: In our final poster, we gave an in-depth description of our methodology. In addition, we presented and discussed the results of our summer program. From these results we drew conclusions on the sustainability of our project. ■



Project Report **MatchBOX**

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Mentor preface MatchBox

The MatchBox project team engaged with a particularly self-reflexive topic in the context of the TUM: Junge Akademie. As the scholarship to the Academy is all about preparing young people for project work with a variety of different players, the MatchBox team set itself the goal of discovering ways in which project teamwork itself can be made more effective.

At our first mentoring meeting in the summer of 2017, MatchBox had a rather ambitious vision in mind, which would have required a full-time commitment of eight persons over the next eight years. Hence, we had to refine and scale back the project's main idea.

This was to do with a web-based platform which would enable users, both project owners and project seekers, to link up with one another. To ensure a sustainable and successful long-term working relationship, the matching method envisaged was based not only on users' skills but above all on their personality profiles. The platform, that is, would enable the matching of team members who not only complemented each other in terms of their skills, but also in terms of their interpersonal compatibility.

Therefore, the mentors' task now was to help the team to refine their aims and methods along more realistic lines. In the course of our discussions, the emphasis of the project began to move away from a matching approach based on the model of dating services to one based on expertise drawn from the field of coaching for start-ups.

This line of development proved to be successful and was adopted. The next step was to limit the target group. Initially, the players to be matched could have been spread throughout Europe, at a later stage, the potential reach was reduced to TUM and perhaps one or two other universities. In the end, however, the team decided to focus on evaluating the effectiveness of teams only within the TUM: Junge Akademie.

The idea of a visual final presentation, such as a Youtube video series, was also discussed, as it would have perfectly matched this year's overall Academy theme, "Idee-Kommunikation-Rezeption" (Idea-Communication-Reception). Unfortunately, the workload related to the rest of the project seemed too great to allow for this,

so the team decided to restrict themselves to the essentials of their research.

The project was, then, an investigation into the collaborative effectiveness of the other Academy project teams with the aim of identifying positive factors for success. At the same time, negative experiences of former Academy teams were also gathered and presented on a platform for all Academy members, together with the corresponding solutions that had been found to their problems.

This idea of sustaining a web-based archive of team experiences immediately appealed to the office of the TUM: Junge Akademie, so it has now been made part of the program of team development for new intakes.

Although the project's methods for measuring the success of the intervention did not completely meet scientific requirements, the team nevertheless recognized the importance of basing their approach on the relevant recommendations found in the scientific literature.

In the end, the team was able to look back on a wealth of experience regarding project planning and teamwork, and this project will have a lasting influence on the collaborative efforts of other Academy teams.

We, as mentors, greatly enjoyed working together with this highly motivated team of students, with their various personalities and the numerous challenges they faced – all of which were overcome in the end! It was fascinating to see how, in the beginning, interdisciplinarity and the different personalities in the team were considered a challenge, whereas, in the end, these factors evolved and united into a fantastic driving force. Despite the chronic lack of time of a professor, it was both personally and professionally a rewarding task to accompany this team at least part of their way.

Alwine Mohnen and Michael Krautblatter

“The magic of teamwork happens when experts, the well-prepared people, bring everything together.”

Team MatchBox met with Dr. Elisabeth Raes – and asked her, among other things, how teams can be guided towards their goal the fastest. These were her answers.

Dr. Raes, you have made a lot of experiences – what has been your worst experience as a member of a team?

I had been researching teams and thought I knew how things are supposed to be, and then came the disappointment that theory can't always be translated into practice easily. I thought: “Let's talk openly with each other and see how our strengths complement each other and how we go forward together!” That was a challenge for me in my first job after finishing my doctorate.

Could you elaborate? Does that mean that, after your doctorate, working together was initially more important than the goal of the team?

No, because to me, teamwork is only a means to an end. There is no team without a mutual goal. The question is though: “Into what do I invest my energy first?” I think one will reach one's goals faster or even reach better goals if one first organises the team and repeatedly reflects and re-evaluates.

Now we are curious: We as Team Matchbox have investigated measurability of team success – which criteria are there apart from profitability?

I believe every team can think about their own criteria: If one works in a customer-oriented project, customer satisfaction will surely be important. So, the question is as well: “What makes us successful as a team?” In research we always have three important aspects: Firstly, performance, as in profitability and the achievement of goals. And there is efficiency, the good usage of time and money.

Can you give us an example? What is a common mistake here?

If you spend twenty hours a week on preparing a meeting, the question arises whether that is effective. The third commonly used variable is viability. (editors' note: functioning of the team over longer timespans).

We have teams of 15 and of 7 members in the Academy. Does the measuring of performance differ between these?

Not per se. If the teams have defined a common goal, performance is measured by whether they reach it or not. With larger teams, one must invest more effort into working together before moving on to performance and tasks. In theory, the best size for a team is four to seven members.

There are short-term and long-term teams. Does one choose different criteria for evaluating team success for them?

I think the danger with temporary teams is that they think: “Let's just finish our task!” That can be effective for a while, but the question remains whether it is efficient and whether the potential of the team members can be reached.

Many think (...) either “achievement“ or being a “cuddle team“ where everybody thinks everybody is likeable. But in reality, there are two dimensions resulting in two axes. Consequently, the best option is “high safety – high achievement“: you know what the goal is and want to progress but giving feedback and building trust is important as well. Of course, there are always exceptional teams who achieve very good results without that part. There is theory but there are always teams that do not fit the theory.

“There is no team without a mutual goal.”

In your experience: What are the three most important factors for successful teamwork?

Trust, trust and trust... (laughs) No, but trust is certainly one of the most important ones. (...) Everybody wants to co-

operate trustfully, of course, but, in reality, one can't only hire trustful people. In my opinion, the better question is how to increase the trust employees have in my company. Thinking one step further, one can then question the entire HR hiring process. People write hundreds of motivation letters that nobody will read anyway. The actually interesting part is the probationary time! “Do I fit in? Am I feeling at home? Is this job for me?” That is what I would call company culture, a business asking itself how it can design this whole process. (Editors' note: hiring process) Of course, I don't have the answer, but one could set up a process with a company to try out new things.

(...) Let's interpose a question: Why do you think there are only few businesses trying this?

Because many companies just copy-paste. Human Resources is a good example. I know hardly any businesses doing it differently. Everybody does exactly the same. I am no fan of changing things that need no changing but here I think is an example where there is room for improvement.

Teams being able to learn is also central. Diversity is important too, but one needs to invest more energy to deal with diversity. The more diverse a team is and the more energy has to be invested into that, the more effective it will be eventually.

Is outsourcing to a foreign country a form of diversification then?

Surely, but only if it is actual teamwork. If the person only gets an allotted task, then that isn't teamwork to me. If I am in real cooperation with someone, there is almost no individual work, only in preparing for the work together. The real insights and results only happen after I and everybody have prepared in that way. “The magic of teamwork” happens when experts, the well-prepared people, bring everything together. The form of diversity that is most beneficial for team success is so-called cognitive diversity: “I think differently, I see the world differently, and I analyse my environment differently.” If you manage (to work) with people who think differently, no matter whether they are men or women, Indians or Americans, that is the factor most closely connected to team performance.

Can diversity be an obstacle to successful teamwork?

Diversity is the reason we bring teams together and diversity is the reason why we have conflicts in teams. That is, one actually wants conflict when bringing a team together. But then that team has to learn to deal with conflicts. In that sense, diversity in teams is difficult, if not the most difficult (element).

How do the teams of the TUM: Junge Akademie compare to “wildlife” teams in start-up companies or other institutions?

colourful group in the workplace are relatively small. On the other hand, the teams of the Academy aren't that diverse in age and background. They are mostly privileged, rich people of Caucasian descent who were well-cared for by their parents. I also include

myself in that description. I think, as a student one should happily use every chance to cooperate with others because it will help you later on.

There has been research on the phases of team development. (...) Teams that know they have to go through these phases will go through them faster. That means certain issues, certain conflicts will keep re-appearing. And if you know that, it will be easier to deal with them.

“Diversity is the reason why we have conflicts in teams.”

Is there a point at which teamwork should be terminated because it will simply not work out?

To be frank, I have thought that quite often with teams, when it was obvious that cooperation will only waste energy. (...) As far as the right moment is concerned, I prefer “earlier rather than later.“ When my gut feeling is bad, I try to stop as fast as possible. But it is rather difficult.

Have you managed to turn situations like that around, so it would work out again?

One can always do something to bring new energy into a team. But the problem is that many teams continue on this energy for two months only to crash much worse after that, because nobody dares to ask “does what we are doing make sense?”

In your experience, what are the best measures to improve teamwork?

Making things explicit. (...) It is a lot easier to talk about interpersonal things and soft skills if one knows what one is supposed to talk about. Making things measurable somehow is often helpful as well. The people who deal with these things professionally, those are the real professionals to me.

What are the most common and gravest mistakes made in teamwork?

Naturally, one shouldn't make problems where none exist, but it is a big mistake not to dare to bring certain issues to the table.

“There is theory but there are always teams that do not fit the theory.”

Bad planning is one too. Recently, we ended a Skype meeting with “somebody should do that then”. That is a common mistake, not communicating responsibilities with people, resulting in a lack of accountability. (...) Better be concrete: (...) “Who is responsible for what and how do we proceed from there?” Another big mistake is blaming people for things that went wrong. Sometimes one has to, to help process it, but most of the time it is a waste of energy. Forming a shared vision is important too, because one can fall back on it in times of conflict.

Is there empirical evidence whether teams in open or closed structures work better, for instance a team in a company versus a team of students in the Young Academy?

I find it a difficult comparison (...). Teams with autonomy tend to work well. Those with a certain freedom to organise themselves (...) I think it is affected by commitment. In a team of students

with a common goal, the question “Are we enthusiastic about the topic?” is as important as the skills of the individual. That aligns with my experience with student teams and start-ups. That is also what Human Resources is about: if there is no power behind the people, nothing will happen. And power comes from motivation. I think it is smarter to aim to unlock motivation in people. As a final factor, it is also about the proper fit (editors’ note: best person to fill a position).

Thank you, Dr. Raes, for this enlightening conversation! ■

Elisabeth Raes received her PhD in Psychology and Educational Sciences from KU Leuven. In her work as a team coach, she focuses on transferring research and theory into hands-on practical experiences for corporate teams, start-ups and other cooperative projects.

MatchBox – teams support teams

In a Nutshell:

This report deals with

- the definition of team success in a scientific environment
- consequently the potential improvement of team success
- with different approaches.

The opportunity of this research lies in the utilization of the acquired knowledge for a long term enhancement of the team structures in TUM: Junge Akademie. A practice-oriented approach to seek tools in order to fulfil this challenge represents one of the strengths of Team MatchBox.

The most prominent lesson that was learnt is the scientific evaluation of assumptions in order to measure the impact of this research.

Abstract

In today’s corporate culture, teamwork is identified as an integral part of a promising work philosophy. Research in this area mainly focuses on a business environment. Project MatchBox pursues the endeavour of examining the current project teams of the TUM: Junge Akademie regarding their team composition and success, thus aiming to improve team performance based on experiences of previous teams. For that we decided to combine two different approaches:

Tool A: Project MatchBox used the tool Team Canvas to stage an intervention with current teams of TUM: Junge Akademie to help them improve their reflexive ability about their ability to reflect their project work to help them gain insight into the status quo of their teamwork, including personal and interpersonal aspects. Framing this exercise, teams of TUM: Junge Akademie analyzed variables identified to be responsible for team success. To this end, a questionnaire was set up and evaluated. The results showed that the team members’ impression about these variables differed a lot. This leads to the assumption that there is a need for reflexion in the majority of the analyzed teams. Team Canvas might be a specially helpful tool for this.

Tool B: Project MatchBox implemented a platform which offers future scholars the opportunity to benefit from the experiences of past teams. For that, the critical challenges in the project work were identified. Subsequently, current and past scholars were asked to share their experience pertaining to each of these aspects by online survey. In future, this could enhance the efficiency with which obstacles are addressed within teams as well as result in improved personal development for team members of TUM: Junge Akademie.

structure

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2. Goals and Methods
 - 2.1 approach of Tool A: implementation of the tool Team Canvas
 - 2.2 approach of Tool B: making use of the experiences of the former teams
3. Outcome and Discussion
 - 3.1 experience in teamwork within TUM: Junge Akademie
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4. Vonclusion and Future Goals

1. Background: current state of research

Teamwork plays a central role in successful working environments. Furthermore, it is crucial for the potential for success within a working group.¹⁻⁴ There has been great interest in factors positively impacting teamwork.⁵⁻¹⁰ In this context, scientific literature provides a multitude of studies analyzing characteristics of team members and their effects on the success of a team.¹¹⁻¹³ After focusing mainly on established major enterprises and the analysis of their respective process of performance, studies have recently shifted to assessing start-up companies and their team structure. The correlation of individual traits with successful teamwork is often defined based on psychological studies.¹¹

The Aristotle project that was implemented by Google in 2012 is an example of research on teamwork within the economic environment.^{14,15} The goal of this project was to identify the factors that are particular to effective teams. Google defines a team as a group of people with highly interdependent working relationships.¹⁴ Based on that, they measured team effectiveness in four different ways:

- 1.The evaluation of the team by the executive
 - 2.The evaluation of the team by the team leader
 - 3.The evaluation of the team by the team members
 - 4.The sales performance against quarterly quota
- The analysis of the different measurements showed that the cooperation within a team is more important than each member’s individual characteristics. The following parameters emerged crucial for team effectiveness:
- Psychological safety: Perception of the consequences of taking risk. When psychological safety is high, teammates feel safe to take risks, asking questions and offering new ideas
 - Dependability: Completing work on time and exceeding the expectations
 - Structure and clarity: Having clear roles, plans and goals
 - Meaning: Finding a personal sense of purpose in either the work itself or the output of the work
 - Impact: When team members think their work matters

Interestingly, in the Google study variables like team size, colocation of team members or a consensus-driven decision-making process were not significantly connected with the effectiveness of teams whereas other studies draw different conclusions.^{14,16}

While the knowledge thus collated sheds light on teams and their success in an economic and entrepreneurial context, project MatchBox examines these dynamics in a scientific working environment. The TUM: Junge Akademie provides an especially suitable setting for exactly this. This is mainly because TUM: Junge Akademie is a self-contained institution, where comparable teams are not defined by economic feasibility, presenting an opportunity of independent research on team dynamics.

For the analysis of the teams of TUM: Junge Akademie, project MatchBox concentrated on the factors revealed by the Aristotle project to be the crucial ones for team effectiveness (see above). However, whether or not the definition of project success in an economic environment is also suitable for the scientific environment had to be examined. Based on expert opinion from the field of team research as laid out in the interview with Dr. Raes, three separate factors might instead be appropriate for evaluating successful scientific teamwork:

- Performance: Achievement of mandated and self-imposed goals
- Efficiency: Utilization of personal and mutual resources as well as team management (scheduling, work flow)
- Viability: Long-term capability of working, functioning, and developing adequately



Figure 1: factors for successful teamwork

Taking into account the factors identified by the Aristotle Project, we developed a model for the evaluation of team success. Any insights gained from evaluating TUM: Junge Akademie teams by such assessment may well be valuable to future teams. According to Tuckman, teams generally experience defined phases and common challenges.^{17,18} It has been demonstrated that being aware of these phases enables teams to traverse these phases more quickly. Together, it stands to reason that they can be empowered to be more successful via the direct communication of such knowledge. This is particularly relevant considering that there is no organized exchange of experience between the teams yet.

All in all, these assumptions lead to the hypothesis that deliberate intervention and making experience accessible leads to improved teamwork within the TUM: Junge Akademie.

2. Goals and Methods

Through refinement of the specifications and the analysis of crucial factors, two methods were defined. To satisfy the focus on scientificity, we decided to use TUM: Junge Akademie as our survey group providing us with a homogeneous collective.

2.1 approach of Tool A: implementation of the tool Team Canvas

The basis of Tool A was the method Team Canvas. This method allows a team to evaluate themselves with regard to important contributors to successful team-work, such as psychological safety. Project MatchBox used the Team Canvas to stage an intervention with active teams of the TUM: Junge Akademie to help them gain insight into the status quo of their teamwork, including personal and interpersonal aspects.

Before guiding other teams through this method, the members of project MatchBox sought professional input so as to optimally prepare. For that, we organized a workshop with Dr. Elisabeth Raes (PhD in Psychology and Educational Sciences and expert in the field of team-work) in which we were “coached to be coaches”. This workshop included the implementation of the Team Canvas with our team. While actively reflecting on our teamwork as stipulated by

the workshop, we were acutely observant of how the experienced coaches acted and reacted during implementation. Through such observation and careful consideration subsequent to the workshop, we gained insight into effective discussion within a team with the express purpose of gleaning information relevant to teamwork.

After the workshop with Dr. Elisabeth Raes, a questionnaire was sent to the active teams of the TUM: Junge Akademie to assess the current state of teamwork within those teams. The questions were related to the five factors defined in the Aristotle project.

Subsequently, the Team Canvas was applied to seven teams of the TUM: Junge Akademie at a two-day seminar. In order to evaluate whether or not and to what extent the intervention affected teamwork, a second questionnaire was sent to the participating teams after the intervention.

2.2 approach of Tool B: making use of the experiences of the former teams

In order to make the experiences of former teams accessible to current and future scholars, project MatchBox has designed a web-based platform for information exchange. The platform's goal is to provide solutions to recurring problems, thus helping scholars to solve these more efficiently.

Based on the assumption that many teams face similar challenges during their project phases, assistance in overcoming these could lead to more successful teamwork due to problems being resolved faster. Therefore, providing suggested solution strategies to common challenges could prove valuable for future generations of scholars.

The experiences of individual scholars were collected via online questionnaires. These referred to subjects priorly defined as central for team success:

- organisation: time-wise structure and assignment of tasks
- project phase: project-related steps from the beginning to the end of the project phase
- interaction: principle of communication and working together

- final product: end product and its distribution
- personal aspects: personal attitude and experiences
- involved parties: people and institutions that were most helpful during the project phase
- hints & tricks

In order to allow for further specification, these categories were divided into sub-categories as well. Scholars provided approaches to solutions in those sub-categories they felt had been challenging during their project phase. They also had the opportunity to record items which were not directly related to one of these seven categories. Prior to implementation, a dummy run of the questionnaire was performed with a TUM: Junge Akademie sub-committee. This led to further optimization of the questionnaire. The results will be made available on an internet-based platform to provide easy access for scholars. In line with current data protection legislation, the data-base will be integrated into the framework of WIKI. The overall design of the platform will be organized in line with the categories and sub-categories of the questionnaire. Entries will consist of a short description of the challenge and a subsequent approach to solve it. The platform will enable teams to look up solutions to challenges they have identified in connection with the Team Canvas intervention.

3. Outcome and Discussion

3.1 experience in teamwork within TUM: Junge Akademie

After our team initially formed at the kickoff seminar, we quickly discovered a shared vision: namely, to analyze the impact of personality traits on team success in teams each having a different context. Subsequently, we began detailing how to best implement this vision but, upon feedback by tutors and mentors, were forced to revisit the feasibility of our goals as well as to posit a precise hypothesis. FutureLabs and input from our mentors helped us narrow down our goals and approaches to focus on the teams of TUM: Junge Akademie instead of investigating external teams. However, we then encountered a setback in the form of diminished motivation to pursue these newly defined goals, in part due to a temporary absence of two members. This we

became acutely aware of at the spring 2018 FutureLab. To reflect on the status quo as well as address feasible objectives for the future, all available members met in Berlin for a “power weekend” of intense discussion and re-evaluation of MatchBox. Ultimately, we succeeded in elaborating a new concept complete with detailed timeline of envisioned milestones to be reached until project termination. These being, respectively, the practical Tool A and data-based Tool B. In order to obtain scientifically valid information, we focused on TUM: Junge Akademie teams as a homogeneous survey group.

3.2 Tool A: development of teamwork within TUM: Junge Akademie

As described in the goals and methods section, the questionnaire on the topic of teamwork in TUM: Junge Akademie was run prior to and after the Team Canvas intervention. Unfortunately, response was limited, with 41 respondents before and even fewer (17) after the intervention. This was far less than team MatchBox expected. The assessment of the utility of Team Canvas at TUM: Junge Akademie is therefore limited in terms of statistical significance.

Each item on the questionnaire was assigned to one of the five categories. Every respondent was thus evaluated within these categories, and the results were compared within the team to elucidate similarities and discrepancies in individual perception. The results of the questionnaire which was set before the Team Canvas are delineated below.

Within each team, we found that individual team members differed greatly in how they perceived important aspects of team and project work. This is evident from highly discrepant individual ratings on numerous questionnaire items, which is mirrored by the large standard deviation.

■ **Psychological Safety:** In the area of psychological safety, the perception within the teams varied considerably (in questions 1, 2, 4, 5, 6, 7, 8). This implies that the team may be lacking communication touching upon such personal perception. This finding emphasizes that teams need to promote more exchange about psychological safety.

■ **Dependability:** Individual team members were in disagreement about perceived dependability. Thus, sustainable structural improvements in team-work seem to be necessary in TUM: Junge Akademie (questions 12, 16). The Team Canvas is designed to lead to reflexion when having highly varying perceptions within a team. This is why it has the potential to evoke improvements in this area.

■ **Structure and Clarity:** It seems that the project goals haven't been clearly formulated in the teams (question 17) and the communication between the different team members lacked (question 20). That might be the reason why the perception of the goals differed between the team members. Furthermore, the impression of team members differed about what the other expect from one another.

■ **Meaning:** When goals haven't been defined clearly it was harder for the team members to see a purpose in their work (question 30, 31, 32). As Team Canvas confronts a team with the necessity to clearly define goals it can be highly effective in this area as well. Because of the fact that goals can change within the project phase, it might be especially important to discuss them more often.

■ **Personal experiences of the coaches:** The personal experiences of the supervising coaches who are members of team Match-Box serve as an element for the evaluation of the effectiveness of Team Canvas. The general perception was that conflicts were already present but not yet confronted, thereby impeding successful cooperation. Moreover, teams seemed to be quite different when compared to each other. Whereas some seemed to have problems with regard to open discussions, for other it was difficult to define goals. Especially in smaller teams tasks and task areas were not defined clearly and the envisioned objectives often differed between the team members.

Moreover, in some teams self-assessment and assessment by the group differed drastically. Surprisingly, the perception emerged

that individuals in these teams gravitated towards latent undervaluation of themselves. The expressed trust of teammates in their skills, however, then resulted in increased motivation after this prompted self-reflexion.

An other interesting insight was that members of the smaller-than-average team seemed to have a more cautious manner of interaction with each other. Besides that, the coaches got the impression that discussions could be provoked and conflicts could be resolved through the posing of precise questions by the seminar leaders. Nevertheless, difficulties in reaching a consensus remained in some teams.

The personal feedback of the participants at the end of the workshop were really positive confirming the impression of the coaches that the workshop was useful for the teams. The large majority would recommend the workshop to the other teams.

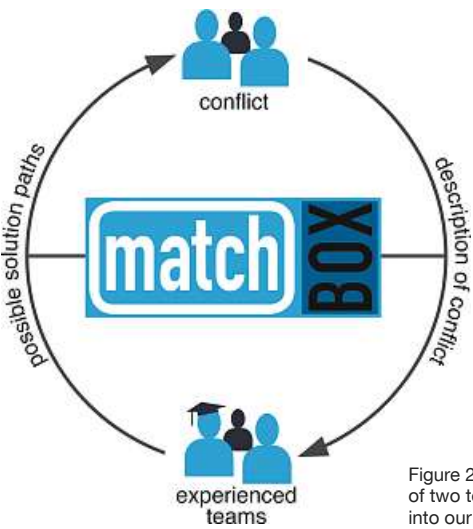


Figure 2: representative comparison of two teams (for an accurate insight into our data follow this qr-code)

3.3 Tool B: implementation of platform “MatchBox”

The implementation of the platform for Tool B is on the way and is to be finished in October 2018. Then, it can be used by the present and future team members of TUM: Junge Akademie.

The underlying tenet of Tool B is that teams of TUM: Junge Akademie often face similar challenges during the project phase. This assumption is based on the impressions of recent and former members. This provides the rationale for why we consider it vital that an organized exchange of experience between the former and the active members of the TUM: Junge Akademie is implemented. We consider it especially important when teams are confronted with the challenges which are enumerated below, including their sub-categories:

- organisation: time management, meetings, presence, assignment of tasks
- project phase: finding a topic, milestones, turning points, practicability, side projects, scientific practice
- interaction: communication, rules of working together, role allocation, liability, interpersonal conflicts, team reflexion
- final product: usability, sustainability, presentation, marketing and public relations
- personal aspects: motivation and personal attitude, time, personal advancement
- involved parties (that were most helpful): partners and external parties with either an economic, scientific or social background or parties inside the TUM: Junge Akademie including the main office, mentors, tutors and members
- hints & tricks: regarding team building, platform for working together, tools, legals, data privacy protection

In the future, the platform is intended to accumulate the experience of every new scholar at the end of their project phase. Thus, the platform is maintained up to date and is continuously provided with new information. This also allows the analysis of what topics are most difficult to handle for the scholars.

Whether or not the platform is used by future teams has to be investigated. Nevertheless, since it affords teams as well as the main office of TUM: Junge Akademie with the opportunity to benefit from past experience, we are confident that it has the potential to positively impact workflow within the TUM: Junge Akademie.

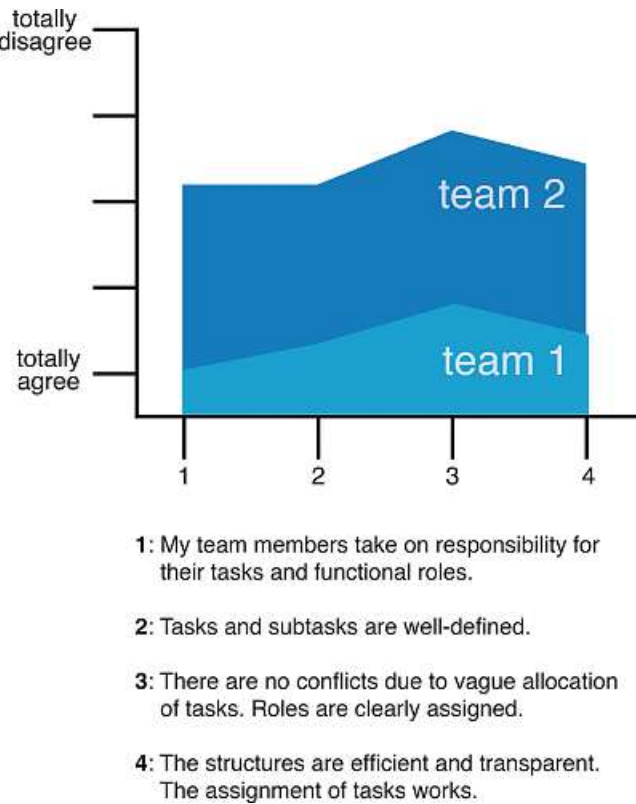


Figure 3: schematic illustration of Tool B

4. Conclusion and Future Goals

In conclusion, we are confident in saying that Team Canvas confronts the teams with their – evident and subliminal – conflicts, this tool is thus a recommended part of guided self-reflexion. For the TUM: Junge Akademie the Team Canvas could be a means of visualizing the status quo and helping to develop the team.

On top of that, existing conflicts can be unearthed and resolved via decisive intervention and prompted self-reflexion as represented by the workshop of Project MatchBox.

One could argue that this reflexion accelerates the storming phase according to Tuckman^{17,18}, empowering teams to reach the phases of norming and performing more efficiently. For one, such reflexion may trigger resolution of highly discrepant perceptions within a team as discovered through our questionnaire. This assumption was confirmed by the impression that we gained while staging the intervention, namely that the conflicts confronted then had been present long beforehand. Not least, feedback on the workshop was stellar, with most participants likely to recommend it to other teams.

This together heralds the conclusion that Team Canvas is an appropriate tool to uncover hidden conflicts and to advance their

treatment and solution. In order to be able to make more accurate statements about the impact of Team Canvas in the future, is advisable to have the workshop documented by an independent person as well. To counter the low response rate observed for our internet-based questionnaire, we recommend carrying out these surveys in a more fossilized manner in the future or replacing them in the form of a personal survey. This could also ensure that a control group of adequate size is formed to draw statistically relevant conclusions.

Personal experience shows that teams from the TUM: Junge Akademie face similar challenges during the project phase. That is why an orderly exchange of experience between the former and the active members is useful. An experience-sharing platform offers active members the opportunity to benefit from the experiences of former teams. In the long run, this should make teamwork more effective and successful. For this reason, this platform should be established long-term as an internet data-base. This project has the potential to make a lasting contribution to the vision of the TUM: Junge Akademie to bring young scientists together in a lasting and vibrant network. It analyzes TUM: Junge Akademie as a “matchbox”, i.e. in its capacity of bringing people together with the aim of successful teamwork, thus offering a basis for optimized matching procedures for societal value-creating processes. ■

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Self-reflection MatchBox

Acknowledgement

We would like to thank our mentors, Professor Dr. Alwine Moh-nen and Professor Dr. Michael Krautblatter, for their critical eval-uation and helpful advice. Furthermore, we thank Dr. Elisabeth Raes for her expertise on psycho-sociological aspects of our project and her assistance in implementing our workshops. We also thank our tutors, especially Vivien Lechner, for offering guid-ance during our journey though the project. Finally, we would like to use this moment to express our gratitude towards the TUM: Junge Akademie, Professor Dr.-Ing. Müller and particularly Maria Hannecker and Peter Finger for always being there for us.

Self reflection

After the initial formation of the team at the kick-off seminar, we quickly discovered a shared vision for the project and agreed upon possible paths to take. In the following weeks, the team members discussed how to reach this vision in increasing detail. After pre-senting our decisions to the tutors and mentors, we realized we schould critically examine the feasibility of our goals and therefore articulate a precise hypothesis. Consequently we then narrowed down our specific goals and approaches, utilizing feedback in the context of the future labs and talks with our mentors. With the ab-sence of two of our teammates – Philipp being in Singapore tem-porarily and Judith having to move permanently to another city for professional reasons – the group struggled to continue with the same enthusiasm and energy as before. Adding to that, the required emphasis on a scientific approach made it more difficult for us to precisely survey our subject matter due to the sociolog-ical nature of the project. Noting a lack of of true progress at the following future lab in early spring of 2018, we decided to take a

thorough look at the status quo and feasible objectives for the con-tinuation of the project. To this end, all available team members de-cided to meet in Berlin for a "power weekend" of intensive discus-sion and re-evaluation of Project MatchBox. This resulted in a new conception of the project and a detailed timeline of the envisioned milestones to be reached on the way to completion. To satisfy the focus on science, we decided to use the TUM: Junge Akademie as our survey group, providing us with a somewhat homogeneous collective. Invigorated by the re-imagining of MatchBox we divided the project into two parts, resulting in the more practical Tool A and the data-based Tool B. The former was soon implemented as a hands-on workshop for scholars and gave us the chance to apply our knowledge and research in a real-life setting. Following a pow-er project we temporarily toyed with the idea of designing a sci-ence-themed board game in parallel to our project. In the course of the following days, however, we decided not to follow up on this notion in order to focus completely on our original idea.

After the Berlin episode, the work stream picked up considerable speed, leading to the application of Tool A and subsequently Tool B. Both started yielding results. The scholars’ responses to our questionnaires however resulted in data amounts that fell short of our expectations and thus to results that were less usable than we had hoped for. Nevertheless, we were happy to receive positive feedback from the scholars and this has prompted the TUM: Jun-ge Akademie to continue using our workshop in the course of the program.

Despite the challenges we faced and the setbacks we suffered, working together always proved to be not only enjoyable but also the key to solving complex problems. ■



matching teams to be successful





Individual skills and abilities complement each other and result in a synergistically increased potential for success

BACKGROUND

In today's corporate culture, teamwork is identified as an integral part of a promising work philosophy. But what distinguishes successful teamwork in science? In which group composition can young researchers be brought together to attain successful and lasting teamwork? A potential platform for this purpose is provided by the Junge Akademie (Young Academy) of the Technical University Munich (TUM).

GOALS

Project "matchBox" pursues the endeavour of examining the current project teams of the TUM Junge Akademie with regard to their team composition and success. The first step involves the formation of a concise definition of successful teamwork. Subsequently, the interrelationships of individual traits for successful teamwork are defined based on comprehensive literature research. Several active teams of the TUM Junge Akademie are then analyzed using standardized survey and observation methods. In doing so, the individual traits of team members and the success of the teams are assessed, followed by an evaluation of whether these two variables are significantly correlated.

OUTCOME

Existing demographic data about the teams from 2013/14 until 2017 was used to get an general overview of the composition of the teams. This quantitative preliminary analysis revealed that the average age of the team members was 22,89 years at the beginning of each academic year. Differences in age amount up to twelve years but show a high variance between teams. Regarding gender distribution, a large imbalance can be determined as there have been more than twice as many male scholars as female ones (138 to 60) since 2013.

In addition to data gained by the following survey and observation of the teams, these results will be utilized to examine whether a significant correlation between them and the success of the teams can be ascertained.

SUMMARY AND FUTURE GOALS

The final step constitutes an assessment whether the interrelationships identified in this study correspond to established knowledge in scientific literature, therefore potentially providing a hands-on verification the concepts. This project will make a lasting contribution to the vision of the TUM Junge Akademie to bring young scientists together in a lasting and alive network. It analyzes TUM Junge Akademie as a "matchbox", i.e. in its capacity of bringing people together with the aim of successful teamwork, thus offering a basis for optimized matching procedures for societal value-creating processes.

OCTOBER 2017

MEMBERS

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TUTORS

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MENTORS

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inspired by


TUM Junge Akademie




During the 20-month project work, we, the team MatchBox, went through a long process of development of an idea and creating a successful team. The following steps shows the progress according to the posters, which were the official milestones of our teamwork.

POSTER 1: The first milestone was to create a hypothesis. After the initial formation of the team at the kickoff seminar, we quickly discovered a shared vision for the project and agreed upon possible paths to take. In the following weeks, the team members discussed how to reach this vision in increasing detail. After presenting our decisions to the tutors and mentors, we realised we should critically examine the feasibility of our goals and therefore articulate a precise hypothesis. We narrowed down our target group from young European citizens to teams of the scholarship program Junge Akademie.

Consequently we then also narrowed down our specific goals and approaches, utilising feedback in the context of the future labs and talks with our mentors.




matching teams to be successful



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excellence

In a team, individual skills and abilities complement each other and result in a synergistically increased potential for success.

Project "MatchBox" pursues the endeavour of examining the current project teams of the TUM: Junge Akademie regarding their team composition and success. To this end, we evaluate existing sociodemographic data and survey individual traits by use of the Big Five. Subsequently, we aim to ascertain correlations with success as assessed by defined parameters.



RESEARCH

TEAMSTRUCTURE

PERSONAL QUALITIES

SUCCESSFUL TEAMWORK

In today's corporate culture, teamwork is identified as an integral part of a promising work philosophy. Scientific literature provides a multitude of studies analysing characteristics of team members and their effects on the success of the team. After being focused mainly on established major enterprises and the analysis of their respective process of performance, the focus of the aforementioned studies has shifted toward start-up companies and their team structure. The interrelationships of individual traits for successful teamwork are defined based on psychological studies. The Big Five personality traits, meaning openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism, are commonly used to assess personal qualities.

With these economic studies to build on, "MatchBox" aims to integrate this model into further research about successful teamwork in science to enhance a collaborative relationship within the teams.

APPROACH

This project aims to answer the question if individual skills and abilities complement each other and result in an increased potential for successful teamwork.

The first step involves the formation of a concise definition of successful teamwork. Subsequently, the interrelationships of individual traits for successful teamwork are defined based on the Big Five of personality research studies.

Several active teams of the TUM Junge Akademie are then analysed using standardised survey and observation methods. In doing so, the individual traits of team members and the success of the teams are assessed, followed by an evaluation of whether these two variables are significantly correlated.

SUMMARY AND FUTURE GOALS

The final step constitutes an assessment whether the interrelationships identified in this study correspond to established knowledge in scientific literature, therefore potentially providing a hands-on verification of the concept. This project will make a contribution to the vision of the TUM: Junge Akademie to bring young scientists together in a lasting and alive network. It analyses TUM: Junge Akademie as a "matchbox", i.e. in its capacity of bringing people together with the aim of successful teamwork, thus offering a basis for optimized matching procedures for societal value-creating processes.

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JANUARY 2018

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TUM Junge Akademie



matching teams to be successful

In a team, individual skills and abilities complement each other and result in a synergistically increased potential for success.

Project "MatchBox" pursues the endeavour of examining the current project teams of the TUM: Junge Akademie regarding their team composition and success, thus improving team performance based on experience of previous teams.

RESEARCH

During an intensive evaluation and re-design of the approach towards the project's goals, MatchBox defined two sub-projects to be included in the course of the remaining project phase. Dubbed Tool A and Tool B, these sub-projects were implemented to improve the efficacy and efficiency of TUM: Young Academy teams. Members of MatchBox joined either of the sub-projects, forming teams within the project. Progress and milestones of both projects are discussed regularly with all project members to provide cooperative and efficient workstreams.

APPROACH

For Tool A, members of MatchBox underwent a training course in team dynamics and the improvement of teamwork according to Team Canvas. The gained skills and knowledge were then applied to all active teams currently in the project phase of their Young Academy scholarships via an interactive seminar. In connection with this workshop, MatchBox handed out before-and-after questionnaires to be filled out by participants. The comparison of said forms will allow analysis on whether the tool is perceived as being helpful to team processes and whether it actually was able to improve efficacy and efficiency in the teams participating in this experiment.

Sub-project Tool B focuses on the conceptualisation and implementation of a database spanning TUM: Young Academy as a whole. After defining areas of challenge for active scholar teams, a questionnaire was designed to inquire after whether and which of these challenges have presented themselves to former and current projects in TUM: Young Academy. A test-run of the survey has been implemented and will serve as direct feedback to improve the finalised questionnaire which is waiting to be sent to all active members.

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RESULTS

The teams of TUM: Young Academy are comparable to teams surveyed by scientific literature and can be judged by the same criteria. Team Canvas is applicable to the teams TUM: Young Academy and was generally received well by the participants. The extent of the intervention's effect on the teams will be shown by the results of the analysis in a later stage of the project.

MILESTONES

MILESTONES REACHED:

Tool A:

- Training to apply Team Canvas
- Application of Team Canvas to all currently active teams
- Acquisition of feedback before and after Team Canvas workshop

Tool B:

- Definition of areas of challenge and/or difficulty in project phases
- Questionnaire design according to clustered and categorized areas
- Visual conceptualisation of MatchBox database
- Test-run of questionnaire

MILESTONES IN SIGHT:

Tool A:

- Statistical analysis and graphic representation of results
- Interpretation of efficacy of Team Canvas intervention

Tool B:

- Survey and data acquisition for database
- Evaluation of programming and design feasibility
- Implementation of database

In total, project MatchBox is well on its way to improve team efficacy and efficiency in the teams of TUM: Young Academy, therefore paving the way for more successful teamwork!

MEMBERS

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inspired by
TUM: Junge Akademie

SEPTEMBER 2018

POSTER 3: Process and a working team structure was possible after we decided to take a thorough look at the status quo and feasible objectives for the continuation of the project. To this end, all available team members decided to meet in Berlin for a "power weekend" of intensive discussion and re-evaluation of Project MatchBox. This resulted in a new concept of the project and a detailed timeline of the envisioned milestones to be reached until completion. Invigorated by the re-imagining of MatchBox we divided the project into two parts, resulting in the more practical Tool A and the data-based Tool B. The former was soon implemented as a hands on workshop for scholars and gave us the chance to apply our knowledge and research in real life setting. Following a power project we temporarily toyed with the idea of deigning a science-themed board game in parallel to our project. In the course of the following days however, we decided not to follow up on this notion in order to focus completely on our original idea.

matching teams to be successful

Final Results and effect (Impact)

RESEARCH EQUATION AND HYPOTHESIS

Project MatchBox pursues the endeavour of examining the current project teams of the TUM: Young Academy regarding their team composition and success, thus improving team performance based on experiences of previous teams.

METHODOLOGY

Tool A: Project MatchBox used the reflexion tool Team Canvas to make an intervention with teams of TUM: Young Academy to help them improve their reflexive ability about their project work. Based on that purpose, teams of TUM: Young Academy were analyzed regarding identified variables responsible for team success. For that, a questionnaire was conciliated and analyzed.

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FINAL RESULTS

The results showed that there is a need for reflexion in the majority of the analyzed teams. Team Canvas might be a specially helpful tool for this. Tool B: Besides that, Project MatchBox implemented a platform which offers future scholars the possibility to benefit from the experiences of past teams. For that, the most critical challenges in the project work of TUM: Young Academy was identified.

DISCUSSION

However, whether or not the definition of project success in an economic environment also fits for that in a scientific environment has to be examined.

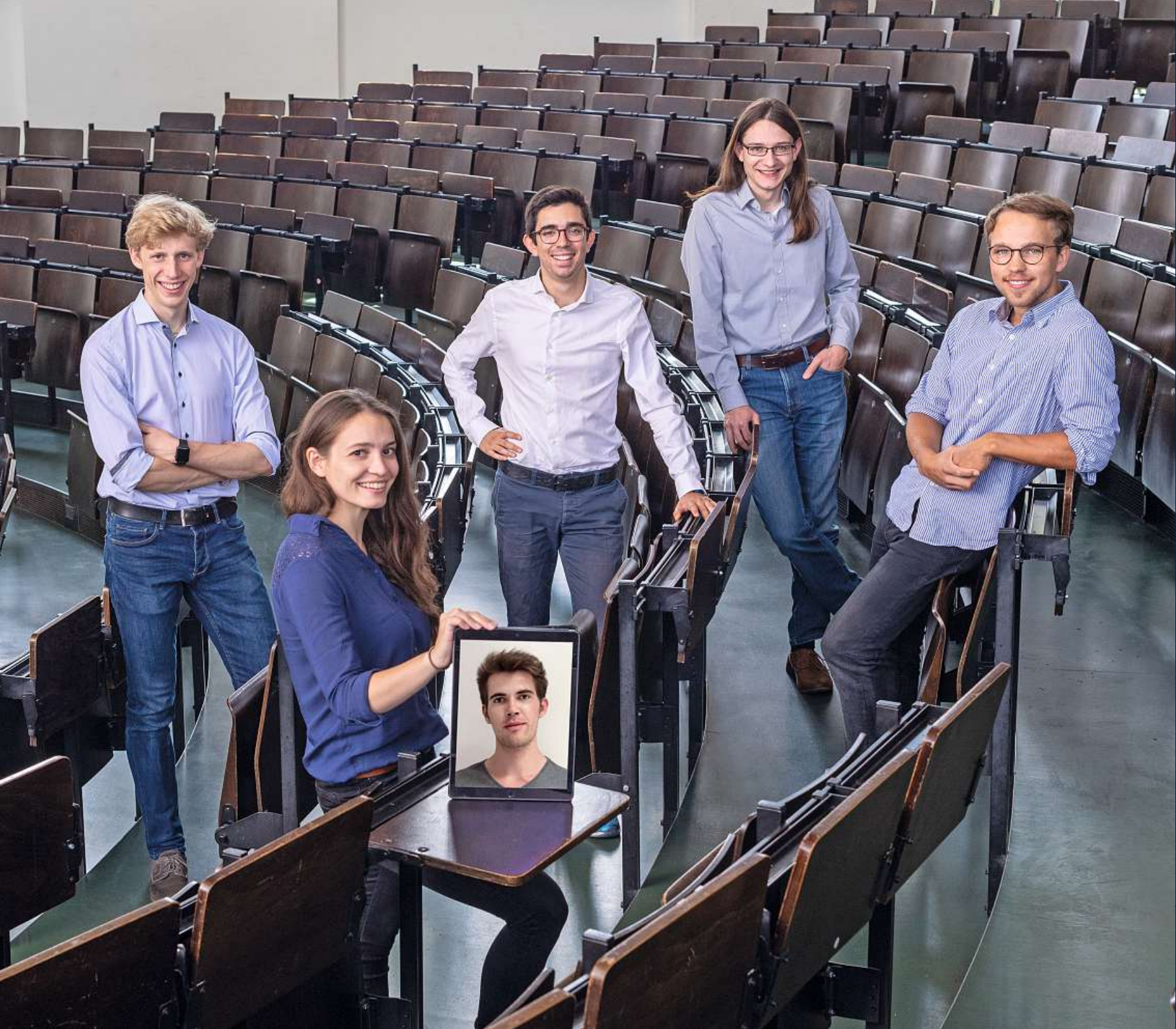
Considering the factors identified by the Aristotle Project, a model for the evaluation of team success within the aforementioned boundaries evolves.

All in all, these assumptions lead to the hypothesis that deliberate intervention and making experience accessible leads to improved teamwork inside the TUM: Young Academy.

OCTOBER 2018

MEMBERS	Karim Aly, Lukas Egerer, Philipp Hölzenbein, Julia Polak, Netsy Precht, Nicolas Rohrer
TUTORS	Vivien Lechner, Nikolai Morin
MENTORS	Prof. Dr. Alwine Mohren, Prof. Dr.-Ing. Michael Krautblatter

POSTER 4: Results: After the Berlin episode the work stream picked up considerable speed, leading to the application of Tool A and subsequently Tool B. Both started yielding results. The scholars response to our questionnaires however resulted in data amounts that fell short of our expectations leading to results that were less usable than we had hoped for. Nevertheless, we were happy to receive positive feedback by the scholars prompting TUM: Junge Akademie to continue using our workshop in the course of the programme. Despite the challenges we faced and the setbacks we suffered, working together always proved to not only be enjoyable but also to be the key to solving complex problems. ■



Project Report **muc.me**

Team	Ramses Alejandro Grande Fraile Matthias Passek Philip Petzoldt Nelly Prechtl Simon Rehwald Jonas Ruchti	Greetings from the Mentors 68 Journalistic part..... 70 Scientific part 72 Self reflection..... 84 Posters 86
Tutor	Rupert Heindl Dominik Irber Dr. Matthias Lehner	
Mentor	Dr. Alexander Lang Prof. Dr. Sabine Maasen Prof. Dr. Stefan Wurster	

Political communication and learning in the digital age How to bring citizens and politics closer together?

In times of digitalization, politics and the dissemination of political knowledge face many new challenges. One of them is that public opinion-forming processes are increasingly taking place in the digital space. This is becoming particularly important for democratic decision-makers. Conversations, newspaper articles and television appearances are no longer sufficient for an informed exchange with citizens. Today, chats or tweets find themselves among the new digital forums. However, there are still few formats that bring politicians and their constituents into a productive and sustained conversation. It is therefore an important task, especially for students of a technical university, to develop such formats at the interface of politics, society, education and new technologies. Two projects of the academic year 2017/I have done this, each with a different focus.

The group "Politics and Fun" has set itself a goal of making political education work with young people interactive, while remaining sharply focused on politics. For this purpose, it has developed a program that allows students in political education to witness the parliamentary week of a deputy, thereby helping them to understand the influence of politics on very specific everyday problems and, at the same time, providing them with an insight into the complexity of political decisions.

However, new information technologies are not just a way for citizens to learn about politics. Conversely, it is also important for politicians to record discussions on the Internet and to pick up articulated opinions and interests there. In this context, "muc.me" offers the possibility to make statements and preferences posted by citizens on the internet accessible and transparent to the political decision-makers. The voting tool developed in this project can provide valuable help in concrete decision-making at the municipal-political level.

As mentors of these two groups, we defined our task as sustaining the motivation of the groups over a period of eighteen months, during which our continual substantive input not only facilitated elaborate discussions, but also promoted more profiled projects, opened doors, supported the organization of the projects, and offered ongoing academic advice. At the beginning, both teams were struggling with the complexity of the task, the challenging scientific program of the Junge Akademie, and the considerable time constraints. However, the results achieved so far make us confident that, in addition to the benefits for the participating students themselves, not only innovative but also socially relevant products have emerged that are worth further development.

Sabine Maasen, Stefan Wurster and Alexander Lang ■



Since August 2018, there has been a new way to submit ideas and motions to the borough councils of Munich

Do you know who to approach if you had a suggestion for your immediate surroundings? Do you know which politicians you would have to contact if you had concerns about the local infrastructure? Do you know how public financing works for newly planted trees or public art installations? If your answer is “no” to all of these, you are not alone. A great number of citizens neither want to be bothered with the legal and political details of a formal application to their councils, nor do they have much time to sacrifice to delve into such matters.

A group of six students from the Technical University of Munich (TUM) hopes to offer a solution with its digital participation platform for local politics. Supported by the scholarship program TUM: Junge Akademie, the students have established a website, <https://muc.me/>, where citizens can easily post their own ideas on topics of local significance to Munich’s borough councils.

This platform is intended to facilitate the introduction of ideas and motions to the relevant committees of local councils. Anybody can submit proposals in the platform’s various categories and view the suggestions of other users, voting on them with a five-level rating system. The resulting picture of public opinion may then be used

for a formal motion to the respective council committee, to stress its importance.

The main goals of muc.me are to inform people about the possibilities of direct participation in local politics and to appeal especially to Munich’s younger citizens. It is focused deliberately on borough-related topics. “We see a lot of potential in borough politics to reach out to politically disengaged citizens, because local decisions influence our everyday lives and the council committees are easily accessible – provided one knows how,” says Prof. Stefan Wurster, Professor at the Bavarian School of Public Policy associated with TUM, and mentor of the team behind muc.me.

The council’s budget as a cornerstone of muc.me’s offering

Particularly worth mentioning is that muc.me offers a place for discussion of the so called council’s budget (“Stadtbezirksbudget”), which was just introduced in 2018. This budget shall be used specifically for ideas proposed by citizens. The amount is defined by the number of inhabitants in a district: Each council has 2€ per citizen at its disposal for this. Thus, muc.me allows its users to submit proposals for the described council’s budget which other users can then vote for or against.

The council’s budget category stands equally next to muc.me’s other categories which boil down to: Health & Environment, Construction, Infrastructure, Culture, Social Affairs, and Education & Sports. These are inspired by the organizational departments of the city council of Munich. This eases the processing of the resulting proposals in the councils because the responsibilities can be attributed directly.

When registering, users specify which district of Munich they live in. This information is supposed to be displayed in the poll results so that the borough councils know what their residents think about a specific topic or if a certain topic is seen differently across the boroughs. “It’s indispensable information for a borough’s politicians whether it’s the local residents who favor a road rerouting or the commuters passing through the borough, for example,” explains Jonas Ruchti, Electrical Engineering student and core member of the team.

Current outreach and plans for muc.me’s future

On questioning, the students commented that their greatest specific challenge was to do with data privacy and all the bureaucracy

associated with it. “TUM puts great stress on data privacy and protection. But as we all know, this is very important and just has to be done,” comments Simon Rehwald, co-founder of muc.me and Master’s student in Information Systems. Additionally, the scientific evaluation of the work is important for the students. To be more precise, they want to find out how well users accept the platform and what demographic characteristics, such as age and level of education, registered citizens have. These results can be used to assess their efforts and improve the platform or other digital participation offerings further.

So far, the team has successfully convinced the politicians of the borough councils of Maxvorstadt, Aubing-Lochhausen-Langwied, Ludwigvorstadt-Isarvorstadt and Feldmoching-Hasenberg to support and use muc.me. More boroughs will be approached in the future. The project will definitely run until the end of November 2018, i.e. until the end of the active membership of the respective students in the TUM: Junge Akademie. What will happen afterwards is not clear. One possibility under consideration by the students might be to seek a further collaboration with the city of Munich. However, concrete steps in this direction have not yet been taken. ■

muc.me – SWOT & In a nutshell

<p>Strengths:</p> <ul style="list-style-type: none">■ Simple and minimalistic■ Low initial hurdle for participation■ Available everywhere at any time <p>Weaknesses:</p> <ul style="list-style-type: none">■ Continuous inflow of new content needed to keep platform interesting■ Large number of users required to generate reliable results <p>Opportunities:</p> <ul style="list-style-type: none">■ Unique in Munich■ Supported by local politicians	<p>Threats:</p> <ul style="list-style-type: none">■ Incentives required to make users come back■ Problematic content (e.g. racism) <p>In a nutshell:</p> <ul style="list-style-type: none">■ Design and Development of the digital platform muc.me for civic participation in Munich■ Evaluation of marketing effectivity and demographic characteristics of the platform's users■ Groundwork for the research question: Which features does such a platform require to be successful?
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Abstract

This paper outlines the relevant political processes for general affairs in Munich's citizen councils and the councils' budgets introduced in 2018. Based on these, an overview of the design process and operation of a digital citizen participation platform is presented. Our research's aim is to define features such a platform requires to be relevant and useful for Munich citizens. In the course of this, we conducted an intermediate evaluation based on usage statistics and a survey among newly registered users. The results suggest potential behind the idea, especially since the majority of our users were previously not involved in local politics. Nevertheless, a definitive conclusion cannot be drawn due to the short time span of platform operation and the small data set.

1. Background

Democracy is based on political participation. Human beings living in a democratic state have the powerful right to influence politics by voting for a specific party, taking part in meetings of local borough councils or generally expressing their opinion on certain topics. However, political participation is unequally distributed from a demographic perspective. Kroh and Könnicke [4] state that unemployed and low-earning people are less politically active than people who work and earn enough salary so that they live above the poverty line. According to them, inequality in Germany regarding political participation is higher than in other European countries. In Brooks and Hodkinson [1], the authors describe that interest in politics among young people has declined over the past years in many countries. They also note that digital media and the internet seemed very promising in the 1990s to reverse this trend, yet the expectations were too optimistic. Still, using new technologies in politics is of high interest. These results are similar to those of Zepic et al. [8]. They explain that e-participation among municipal households was implemented in many German cities, but the citizens' interest in it and their actual participation is rather low. As a result, the authors analyze and categorize potential barriers for the non-participation. Besides that, it is also worth mentioning that the degree to which citizens should be able to influence politics is controversial according to Vetter [7].

At the same time, Vetter [7] states that democracy needs participation and citizens can bring in valuable experience. Especially in relation to topics which directly affect them, citizens might be excellent consultants. This is particularly true for local politics represented by borough councils, as for instance in Munich. Unfortunately, experience from our own meetings with politicians has shown that citizens are either not aware of the different opportunities for taking part in political discussions or are not interested.

Consequently, our project is about the development and evaluation of a digital solution, namely a platform for enhancing civic participation in Munich's local politics. Even though there has been limited success in using digital media over the past years as we have explained, we think that our new attempt is worthwhile: On one hand, we can use our own experience and design the platform to fit the needs of actual users. On the other hand, recent developments, as for instance the greatly increased usage of smart phones, might have changed the situation as compared to the 1990s. In the course of our project, we developed and evaluated the online platform muc.me, which allows people to create posts other users can vote on and that can subsequently be transformed into a formal request submitted to a responsible council.

The ultimate question we would like to answer is which features such a platform requires to be relevant and useful for Munich citizens. Due to time restrictions, our evaluation is so far mostly based on demographic data obtained from the platform's users. A follow-up survey on the features of muc.me and how it is perceived in general is planned for the future.

The remainder of this report is structured as follows. In the next two sections, we continue with important background to our research. More specifically, we describe relevant political processes in Munich (Section 1.1) and the council's budget (Section 1.2). Following that, we present our goals and methods (Section 2). The outcome of our research and its discussion is part of Section 3. Finally, this report is concluded in Section 4 with a short summary and outlook.

1.1 Relevant Political Processes

The city of Munich is divided into 25 districts, e.g. Maxvorstadt, Ludwigsvorstadt-Isarvorstadt, Feldmoching-Hasenberg, or Aubing-Lochhausen-Langwied, each of which has its own council committee. The latter consists of politicians democratically elected on a six-year basis by eligible citizens. The councils are usually concerned with topics that are local and very specific to them. For instance, they have to decide on where public restrooms shall be located in a specific area or whether they financially support cultural events, e.g. concerts, that take place within the borders of their respective district. Additionally, councils can be further divided into subcommittees that concentrate on a particular subject, e.g. infrastructure or culture. Items on the agenda of a meeting may not only come from the politicians themselves, but also from citizens who have a request or proposal. For this, they need to contact the council committee in written form, i.e. by letter or email, and state their matter. The committee then decides on when (and possibly if) this can be discussed during an official meeting. The proposer is expected to attend and has again the ability to describe what they want. Following that, each member of the council can state their opinion on it and finally a decision, i.e. whether they accept the proposal and follow up on it, is made based on a majority vote.

1.2 Council's Budget of Munich

In January 2018, the city of Munich introduced the so-called council's budget ("Stadtbezirksbudget") for each council, which shall be used specifically for ideas proposed by citizens. As described to us during meetings with local politicians, the amount each of the 25 councils has at its disposal is defined by the number of citizens living in a district in Munich, namely 2€ per inhabitant. For instance, Maxvorstadt with its approximately 53 000 residents¹ receives 106 000€. However, according to the politicians we talked to, the problem seems to be that only very few people are aware of that budget and its possibilities. Additionally, official information about the council's budget found on the internet is currently rather sparse. We only found one web page² containing some general information. All in all, the general idea of the council's budget is very

promising, but further publicity and support during the process of handing in ideas is necessary to carry out its full potential.

2. Goals and Methods

In the following, we point out the goals and methods within our project and research.

2.1 Goals and Scope

As mentioned in the sections before, there is a need to enhance civic participation in Munich. With our project, we try to solve this issue by developing a digital solution that is concerned with Munich's local politics. Along with that, we evaluate our platform. In particular, we want to find out which features such a platform requires to be relevant and useful for Munich citizens. Our ideal goal is to especially reach young people who have not been politically active so far.

Our research comes with a few limitations. Due to a long period of ensuring that data privacy on our platform follows the requirements of TUM, its release was rather late. Therefore, we were only able to collect data in a first survey for a short period of time. Additionally, a second survey which we would like to run when users have had enough time of working with the platform, has thus not yet been sent out. Consequently, our current research results are still in a preliminary state.

2.2 Method: A Novel Digital Platform for Political Participation

In this section we present our research method, a digital platform. We start with reviewing similar platforms and then describe the way we designed our own platform. Lastly, we give insights into conducted and planned surveys.

2.2.1 Review of Existing Platforms

Answering our research question presented in section 1 involves creating a custom-built internet platform. As a first step, we examined different existing political internet platforms. These were not

limited to the scope of our project (politics on borough level) and ranged from map-based services to call attention to inconveniences like potholes, to discussion platforms about statelevel politics.

Because this review justified the larger part of our design decisions for our platform, some notable examples are listed in this section.

mein-marburg-biedenkopf.de was one of the first platforms we investigated. Being limited to one district, it was a main influence towards our plan to work on the involvement of citizens in local politics. The platform focuses on the informative aspect of citizen participation but invites the citizens to voice their opinion with a combination of online surveys and real-world meetings. In all cases, politicians are responsible for bringing up a topic and starting the discussion. Initiative by citizens is not intended online.

represent.me, originating from and mainly used in Great Britain, is a featurerich platform centered around short, easily answered questions of opinion from a broad range of topics. Because of its extensive feature set, e.g. allowing subscribing to users' activities and joining sub-communities, and its feed of short surveys, it has the look and feel of a social network. Additionally, it provides detailed insights into a surveys' generated data with demographics and heat maps of each answer option. The minimal initial hurdle, also seen in the minimal set of personal data queried in the registration process, formed one key aspect in designing *muc.me*.

meinemaxvorstadt.de (now defunct) was established by the CSU fraction of the borough Maxvorstadt. It is clearly not a fully-featured internet platform, but nevertheless it was an early attempt by politicians to gather anonymous opinions from the general public online. In personal meetings with the politicians we discussed their experiences and heard that the platform was not successful. This was traced back to the fact that it consisted only of a few questions with large, empty free-text fields to be filled in by the citizens. It provided little to no user feedback and interactivity and had thus a similar initial hurdle like writing an email directly or using a contact form.

muenchen-transparent.de is Munich's purely informative platform for local and city-level politics. Politicians share all documents, protocols and reply letters disclosed to the public here.

The major difference of these platforms to what we developed as part of our project is that we focused on the support of the process of creating a proposal towards a council committee in Munich. Hence, our scope is not as broad as in *represent.me* and more specific than *mein-marburg-biedenkopf.de*. Additionally, we wanted to design an easy-to-use tool that offers a better user experience as for instance *meinemaxvorstadt.de*. At the same time, it is our goal to encourage users to actively create content; this is in contradistinction to *muenchen-transparent.de*, which is built for an information flow only from politicians to citizens.

2.2.2 Design and Operation of a Digital Platform

As our review included platforms with widely different scopes and orientations, the exact scope for our project needed to be clearly defined as a starting point for the user interface design. The representation in figure 1 symbolizes this orientation in a two-dimensional plane. The endpoints of the axes in this sketch are not completely contradictory, hence a platform can cover a larger area of focus. Yet the platforms we analyzed in our review revealed shifts in either one or the other direction, and we thus used this model as a visualization.

On the vertical axis, the diagram ranges from a platform which provides diversified entertainment (e.g. by focusing considerably on gamification), but would need sophisticated filtering tools or manual sorting to capture wellfounded, serious contributions, to a platform for exchange between people with in-depth knowledge, with a difficult to obtain user base.

The horizontal axis represents the amount of insight required from a user. On the left-hand side, the decisions the user can influence on the platform involve a large amount of background information the user would either have to have previous knowledge of or have

¹ <https://www.muenchen.de/stadtteile/maxvorstadt.html> (accessed: September 21, 2018)

² https://www.muenchen.de/rathaus/Stadtpolitik/Bezirksausschuesse/BA_Zuwendungen.html (accessed: September 21, 2018)

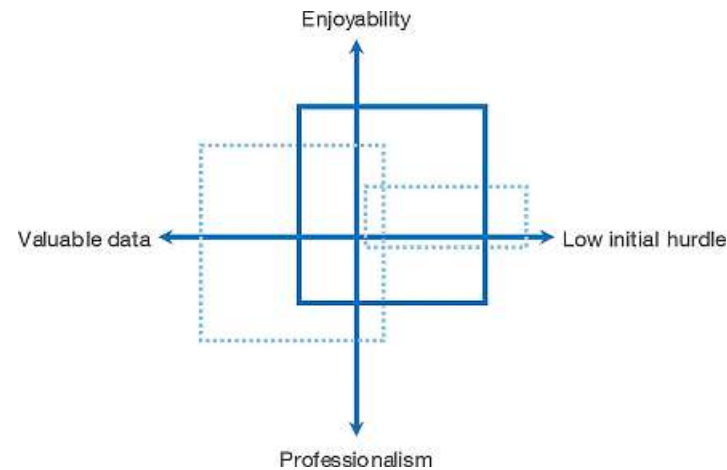


Figure 1: Example areas of digital platform orientation (dotted) and chosen orientation for *muc.me* (solid line)

to familiarize themselves with. On the right-hand side, there are only trivial decisions to be taken. In our case, this axis correlates with the level of politics, with federal politics more to the left and local politics more to the right.

As the ideal case of combining all four axis end points would be an unrealistic aim, we needed to find the middle course which best fitted our hypothesis. Because we wanted to focus on younger citizens, we shifted the focus from the center towards the upper right hand side quadrant. This also allowed for a simpler platform design, because the amount of information to be provided is comparatively small.

In addition to our platform review and the chosen focus, *muc.me*'s design was influenced by feedback from politicians, mainly of Maxvorstadt, during the design and implementation phase and also during the later operation of the platform.

2.2.3 Conduct of Surveys

For measuring our impact on the public's interest and eagerness in political participation, solely using our website traffic or other usage statistics would be insufficient. Using our platform's built-in surveys provided an easy, but restricted in terms of question format, means for our evaluation. Thus, online surveys were used as another source of data, conducted using the survey system EvaSys.

Directly after registration, every new user was asked to fill out a short survey, because we wanted to determine the experienced development of our users' participation. This survey is presented to them before they were lead to the platform, but it was not required for using *muc.me*. Because the survey was opt-in, we tried to keep the questionnaire as short as possible. We focused on a few aspects:

- Because our target demographics are an important aspect of our research question, we wanted to know our participants' age and profession.³
- We queried our user's borough of residence and workplace. These questions were asked mainly because they facilitated interesting correlations to the posts we later saw on *muc.me*.
- We wanted to know about the participants' commitment to their immediate surroundings in the city. Thus, we included questions on how many years someone has been living in Munich and how much they (subjectively) identified with their borough.
- It seemed to us like the simplest measure for a person's general political interest to ask how often they discuss political topics with their family and friends.
- We had some questions about our users' prior knowledge of their opportunities to participate in politics on a local level, namely if they knew how they could approach the politicians of their borough, if they knew about *muenchen-transparent.de* and if they had heard of the citizen's budget. We also included a question on whether they had personally contacted their local city council.
- Based on the citizens' knowledge of their opportunities, we inquired about their general satisfaction with them, i. e. if they feel their concerns were valued and taken seriously by the politicians

and if there were sufficient digital means of citizen participation in Munich in their eyes.

- The survey concluded with a question how the participants became aware of *muc.me* (for evaluating our marketing efforts) and a free-text field on what should be addressed in a digital political participation platform.

For the home and workplace location questions, we offered our participants the options to state their borough or their zip code. Since we are mainly interested in boroughs and not in the resolution provided by zip codes, the zip codes were mapped to boroughs in case no borough was given.⁴

After three months of platform operation, we plan another survey in order to monitor the development of *muc.me*'s participants' political engagement. At the time of writing, the questionnaire design for this survey, whose results we could compare with our first survey's, was not completely finished. This survey will thus include many of the questions from the first one to aid a direct comparison. Additional questions will be included about their experiences on our platform which we hope to improve further based on the feedback.

3. Outcome and Discussion

This discussion of our method's outcome is split into two parts: The first part contains a description of the final digital platform *muc.me* as the outcome of our research regarding digital political participation platform. The second part focuses on the outcome of our first survey, giving an estimate of *muc.me*'s success.

3.1 Final Platform

The final version of *muc.me* was launched on August 9, 2018. Nonetheless, the development is still active and various updates

have been published since the release. So far, we support the boroughs Maxvorstadt, Ludwigsvorstadt-Isarvorstadt, Feldmoching-Hasenbergl and Aubing-Lochhausen-Langwied. That is, we have agreed with these boroughs' politicians that posts created by users on *muc.me* relevant to one of these boroughs will be considered in the councils. The platform was built using the web framework *Angular*⁵ and *Node.js*⁶ on the server side. The web hosting is done on *Uberspace.de*⁷. Data processing and storage is performed using the infrastructure of cloud-provider *Heroku*.⁸

In the following, we present and explain the core features of *muc.me*. Additionally, we point out some usage statistics of our platform.

3.1.1 Core Features

muc.me's main purpose is to ease the creation and submission of proposals to a borough council. As such, a user can create a proposal or post, as we like to call it at that stage, that describes their matter. Other users can then vote on the created post, i.e. they express their opinion and specify whether they agree or disagree. Each post can belong to one or more topics, which we describe in the next paragraph, and one or more boroughs. After a period of four weeks, a post expires and voting is no longer possible. The user who created it will then receive an email that contains a template for turning the post into a formal proposal to the borough(s) it is relevant for. This template will also contain a reference to the post on the platform. Hence, the idea is that *muc.me* on the one hand makes it easier to submit a proposal and on the other hand allows us to create an overall picture, which could be helpful for the politicians deciding on a proposal. However, not each post needs to necessarily be turned into a proposal. Users and especially politicians might also just ask for opinions on a specific topic.

Having explained the functionality of *muc.me* from a high-level perspective, we now provide a walk through its most important

³ The former was inquired by month and year of birth, while we used a selection list based on [3] for the latter.

⁴ Because some zip codes are shared by multiple boroughs [6], the data analysis is complicated slightly. For ambiguous cases, all possible boroughs were counted, weighted with their respective population (based on current data from [5]).

⁵ <https://angular.io/>; accessed September 23, 2018

⁶ <https://nodejs.org/>; accessed September 23, 2018

⁷ <https://uberspace.de/>; accessed September 23, 2018

⁸ <https://www.heroku.com/>; accessed September 23, 2018



Figure 2: Landing Page



Figure 3: Landing Page when Signed In

features by using actual screenshots. When accessing the platform in a browser, the user will see a landing page describing what this platform is all about, how it works, and some general information about data privacy and our team (figure 2). The user can then sign in or create an account. Signing in leads to a page showing the topics found on *muc.me* only (figure 3). The latter are Health & Environment, Council's Budget, Construction, Infrastructure, Culture, Social Affairs and Education & Sport. The user can now click on one of these topics or on the button "All Topics." This will lead him to a page showing all posts tagged with the topic selected or all posts in general (figure 4). Additionally, a filtering feature is available that allows the user to define which posts should be shown. Filter options are the topic as well as the borough the post is relevant for. When scrolling through the posts, the user can express an opinion on a post by clicking on buttons of a five-level rating system ranging from -- (strongly disagree) to ++ (strongly agree). The vote is immediately processed and a diagram will be shown afterwards that displays how other users voted (figure 5). Besides that, users can also create new posts on their own (figure 6). In the course of this, a subject and description as well as the topic and

borough the post belongs to need to be specified. When submitting the completed form, the newly created post is immediately visible to all other users. Lastly, *muc.me* also offers a few general features such as showing a list of posts voted on so far, displaying a user's profile and the ability to change the password.

3.1.2 Usage Statistics

Currently, 225 verified⁹ users are registered on *muc.me*. So far, 21 posts have been created; nine of them were published by users outside of our project team. However, posts received between 3 and 121 votes and 21 votes on average. That is, users are genuinely interested in some of the topics. Nevertheless, we would like to have more activity and especially content on our platform. We consider the number of registered users in general as good for a start. Thus, we need to increase our advertising and make sure that citizens actually use *muc.me*. In particular, we experienced the problem that users do not re-visit *muc.me* after their registration and first usage. We therefore plan to implement a newsletter (including opt-out functionality) for bringing already registered users back to the platform.

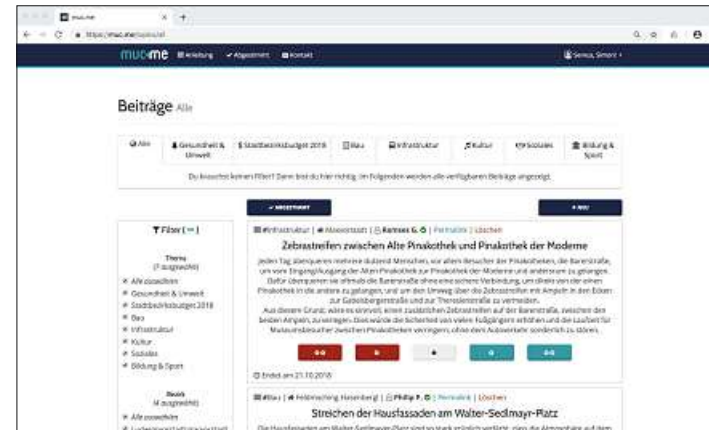


Figure 4: List of Available Posts

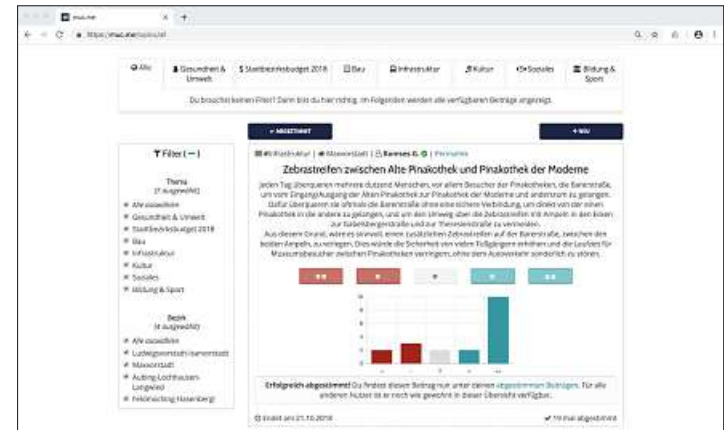


Figure 5: Adding a Vote

3.2.1 Demographics

66 participants indicated they were male and 55 female. Figure 7 shows some additional demographics based on the collected data.

3.2.2 Political Involvement

Most of our survey's questions regarding political involvement were planned for an evaluation in contrast to the second survey, hopefully indicating some development. Nevertheless, figure 9 shows the answers of *muc.me*'s current user base to questions about their past political experiences. It is thus valuable for evaluating if our concept is able to attract people who would otherwise not be involved in politics.

3.2.3 Marketing and Outreach

The most mentioned reason for registration in the survey was, by a large margin, information from friends and family (43 participants), followed by facebook (16 participants), direct contact from us (14 participants) and newspaper articles (12 participants). Our information stands at the TUM main campus and the StreetLife festival were indicated a total of two times.

Because of the small numbers, no meaningful correlation between the mentioned reasons and our marketing campaigns could be

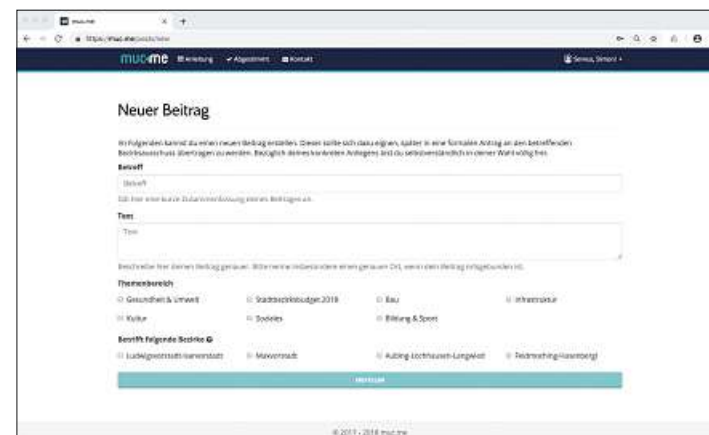
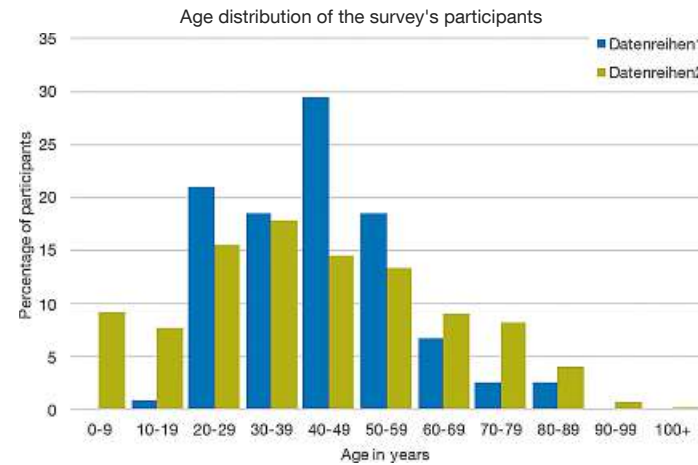


Figure 6: Creation of a New Post

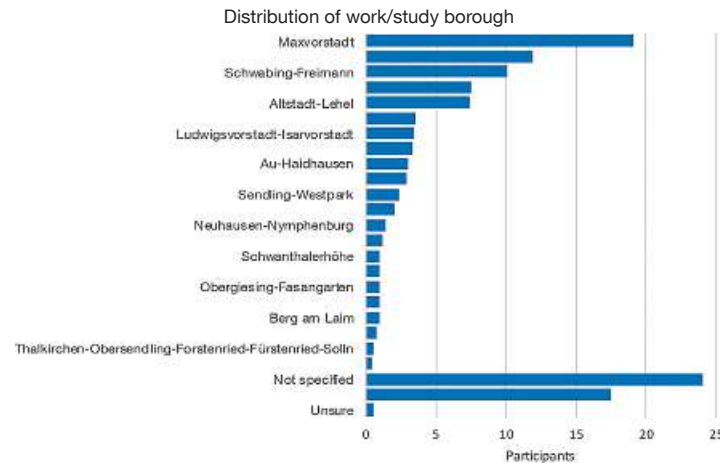
3.2 Results from the first survey

In our first survey, we analyzed questionnaires from 128 participants. Some questions were omitted from this section as their results will only become relevant when compared to the results of our the second survey we are planning. This sections briefly presents the relevant results, which will be discussed in section 3.3.

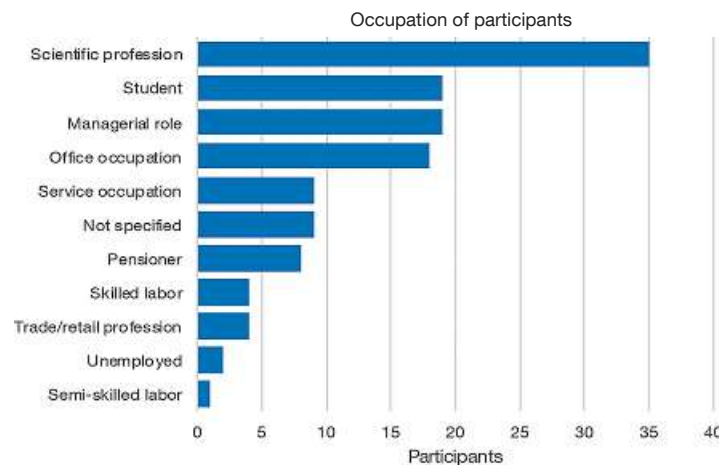
⁹ We call a user verified, if they used the link provided in the email received during the registration process so that we know that this email address actually exists.



(a) Age distribution, compared with 2017 Munich census data [2]

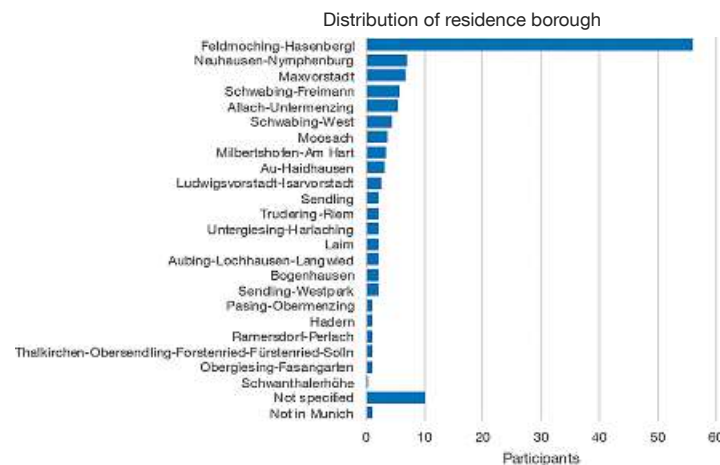


(a) Work/study borough distribution



(b) Current occupations

Figure 7: Demographic insights



(b) Residence borough distribution

Figure 8: Participants' boroughs of residence and work/study place

made. Thus, just the number of registered users on the platform over time, as displayed in figure 10, was used for the analysis.

3.3 Discussion of the Results

The collected data allows for some preliminary assessment of the demand for a solution similar to our platform, but also lets us evaluate our marketing strategy so far. It is thus a first step towards answering our actual research question.

3.3.1 Survey Sample Size and Bias

On their own right, the results from our first survey have little significance for general cases. This is mainly due to two reasons:

- The sample size is comparatively small with 128 participants.
- The sample suffers from a strong bias: The initial user base for the platform was formed mainly from our and the participating politicians' acquaintances. The marketing channels provided by TUM also had their effect, reaching mainly people with a scientific background.

Later, we reached a broader audience with our marketing campaigns (cf. section 3.2.3), but a small number of groups, e. g. citizens active in *Interessengemeinschaft Fasanerie aktiv e. V.*, an association cooperating with the local politicians supporting our project.

The sample bias can be seen best in figure 7b, where the prevalence of scientific occupations and students is apparent. Similarly, figure 8a shows a dominance of Maxvorstadt, the location of TUM and LMU main campuses, as a work/study borough. The noticeable number of participants from Feldmoching-Hasenbergl in figure 8b can be traced back mainly to Interessengemeinschaft Fasanerie Aktiv e. V.

Our primary concern was acquiring a large enough user base for our platform. We thus accepted the resulting bias for our survey as a deliberate selection of participants would have either decreased the number of users or necessitated additional means of acquiring participants for our survey.

As a consequence, our research question cannot be reliably answered at this point in time. Nevertheless, the gathered data provide means of intermediate evaluation of our efforts.

3.3.2 Demographics and Political Involvement

Because of this strong bias, the results are to be taken with a grain of salt. The age distribution visible in figure 7a indicates that our platform gained popularity outside our targeted younger audience. Instead, 40 to 49 year old citizens are disproportionately over-represented in our user base.

Similarly, the answers to the yes/no questions graphed in figure 9 show that the user base acquired satisfies key aspects of our aim:

- The majority of users were not in contact with their council (figure 9b). This means we did not only motivate citizens who already took advantage of their possibilities in Munich. Additionally, a large portion would not even have known whom to approach with their suggestions (figure 9a).
- An even larger number of users did not know muenchen-transparent.de, which is the most direct source of information from the city councils (figure 9c). We hope to change this as some posts on *muc.me* link to documents on muenchen-transparent.de.
- As we suspected when conceptualizing the platform, the knowledge of Munich's council budget is still not very widespread (figure 9d).

As the platform operation and our marketing efforts continue, we hope to acquire more citizens previously not involved in politics as users for *muc.me*.

3.3.3 Marketing Effectiveness

As mentioned in section 3.2.3, the number of users over time provided a sensible way of determining the effectiveness of our campaigns. In the plot in figure 10, some jumps are visible. These correlate with some specific events:

- (1) The most notable increase coincides with our article in the *Süddeutsche Zeitung*¹⁰ from August 12, 2018

¹⁰ <https://www.sueddeutsche.de/muenchen/muenchen-online-mitreden-1.4090637> (last accessed September 23, 2018)

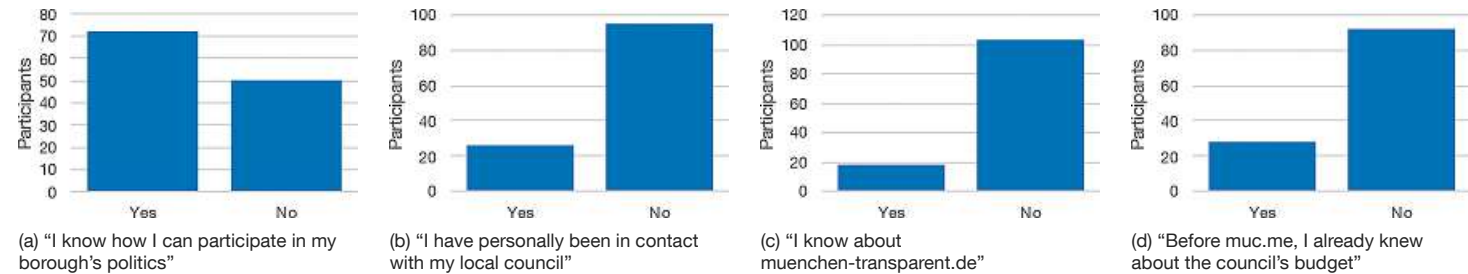


Figure 9: Several yes/no questions regarding political involvement

- (2) Our facebook campaigns took place between August 30 and September 6, and from September 12 onwards. Naturally, they did not effect a sudden increment, but rather a increase in the slope of the graph.
- (3) Our presence at StreetLife on September 8 and September 9 did not have any visible effect. Indeed, there was only one mention of the festival in the survey.
- (4) Another "step" in the graph could be explained with the Future-Lab II of the TUM: Junge Akademie on September 14, where we were able to reach additional people within our scholarship program.
- (5) On September 16, a post¹¹ went online. Usage statistics suggest a large number of our users registered solely for this post, as the author further publicized it themself. Thus, we trace back the large number of users joining around October 5 to this post.

3.3.4 Conclusion

Our preliminary results show that people are, in general, interested in the idea of a digital platform for civic participation. The fact that a large portion of our users registered after reading about *muc.me* in the newspaper or hearing about it via facebook indicates that our platform seems to be reasonable and valuable at least in theory. However, we so far can answer neither whether *muc.me* is really needed in Munich nor whether its design is sufficient for the use case, mainly because of two reasons: First, we do not track how often users visit our platform because of privacy concerns and thus

cannot measure their interest in new topics and ideas. Second, we yet have to discuss the quality of the created posts with politicians, as the launch of our platform coincided with the summer break of the councils. As a consequence, we can only estimate that there is some general interest in our concept at this point in time.

4. Summary and Future Goals

Within our project we were able to develop and finally launch a digital platform called *muc.me* for enhancing civic participation in Munich. Our main research question was which features such a platform would require for being successful. For this purpose we planned two surveys, one asking for general information at registration time and another one specifically focusing on our research question. While the former is already in progress and currently has a sample size of 128, the latter is still part of our future work. That is, our research results are still preliminary and cannot decisively answer our original question. However, our data show that the idea is promising: The majority of the citizens we reached has not been actively involved in political participation.

In general, we see a lot of potential in our idea for a very simple and easy-to-use way of participating in local politics and the number of users we managed to acquire in the short time frame is a sign of the demand for a solution. In the short term, we thus want to continue our platform development ourselves and develop a num-

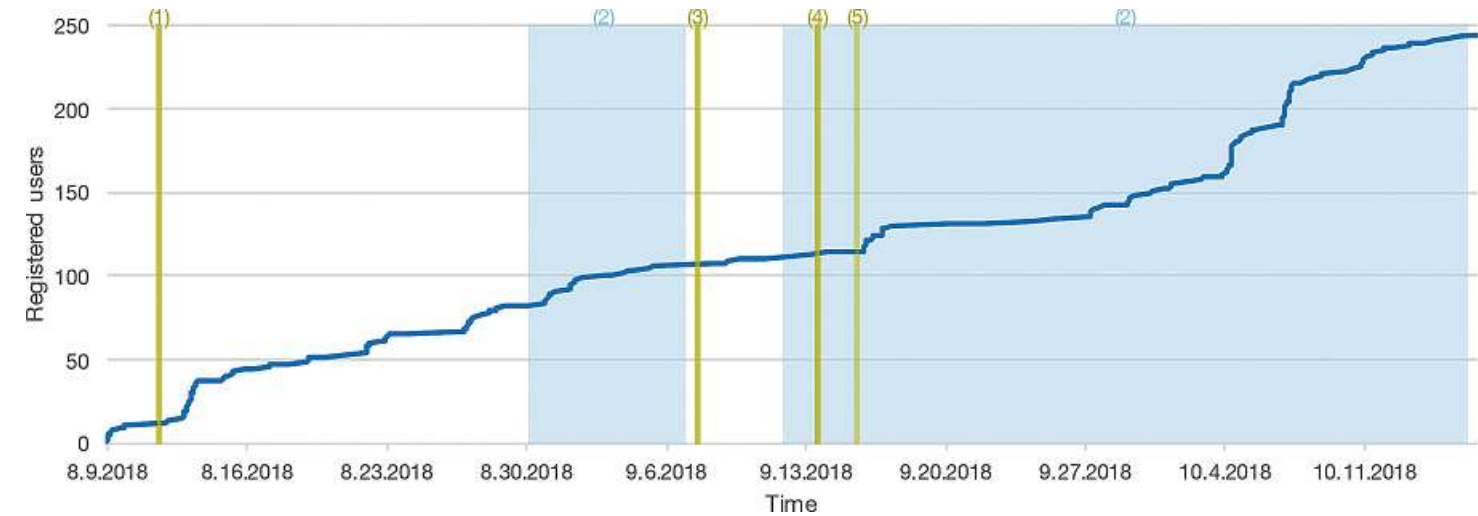


Figure 10: Number of registered users over time

ber of additional features like more data analysis capabilities, better filtering and other usability improvements. Our aforementioned second survey will provide additional insights into the demand for a digital platform for local politics in Munich. It will help us to improve *muc.me*'s offering further by validating our key assumptions in the design process.

For the long run, however, we are looking for a partner to take over the platform operation. We hope to permanently establish *muc.me* or a successive platform in Munich's local politics, not only simplifying the ways citizens can submit their suggestions and work closer together with the politicians, but also motivating citizens about their rights and opportunities for influencing Munich's local politics. ■

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Self-reflection muc.me

Citizen Engagement in post-Brexit times

“It is a truth universally acknowledged” that the year 2016 marked a before and after in how citizen participation in politics was perceived by society and academia: On June 23, 2016 the majority of British citizens voted in favour of leaving the EU in the “Brexit” Referendum. On October 2, 2016, 50,2% of Colombians rejected the Colombian Peace Agreement Referendum that proposed to put an end to fifty years of conflict between the Colombian government and the FARC guerrillas. Finally, on November 8, US citizens elected Donald Trump as President in the US Presidential elections against Hillary Clinton. While “the majority” of people who voted were celebrating their victories, a large number of people, including ourselves, could not believe what was happening in front of our eyes, asking ourselves the question: “How did we get here?” The general belief that citizen participation in politics was always beneficial was no longer an uncontested truth.

“Idee-Kommunikation-Partizipation” (Idea-Communication-Participation): Participating in a TUM: Junge Akademie project on citizen participation

In the following months after these traumatic events, TUM’s Junge Akademie raised a call for the Class of 2017/I titled “Idee-Kommunikation-Rezeption” (Idea-Communication-Reception/Processing). At our first get-together at Lake Starnberg in May 2017, a large group of scholars assembled around the project title: “Politics and Participation.” In other words, many of us were interested in researching the communication process of decision-making by politicians to citizens and in analyzing the involvement of citizens in those decision-making processes – all of which links back to the Year’s call: Idea-Communication-Participation.

What we did not know back then was that in order to move forward from a project title to a 20-month project, a lot of participation from our side would be needed. With more or less uncertainty, we set out on a journey to understand the processes of citizen participation by participating ourselves in this joint endeavor.

From a Group of 13 to a High Performance Team in a Network of Excellence

The first memorable experience regarding our group formation was the project definition phase. In our endless “Group of 13” discussions, more than half of the group had a different idea in mind regarding the methodology to follow. Agreeing to disagree, two teams separated out, one of them focussing on Digital Political Education in schools (PiA), and ours, with the aim of researching citizen participation in political decision-making.

The months that followed were important to define our problem statement and project goals. At the same time, however, the engagement of our five members (back then) in the discussions and meetings provided each of us with understanding of our own team-building process and of each team member’s characteristics. In getting to know each other’s strengths and weaknesses, interests and motivations, participating in the development of this project became a much more engaging and exciting task. Our output became no longer a combination of several individual efforts put together but the result of a unified team moving forward as a “High Performance Team.” This feeling became even stronger when we successfully managed to incorporate our sixth member into the team, allowing us to grow in diversity and to learn about inclusiveness in team structures.

But our feeling of togetherness was not only experienced within our team. Without a doubt, our collaboration with several partners within the TUM: Junge Akademie’s “Network of Excellence” provided us with the necessary experience, insight and perspective (and sometimes a well-deserved call for driving forward our project according to our project plan) to guide our research toward a successful outcome and a tangible end-product. For that reason, we would like to express our most sincere gratitude to our Tutors, Matthias Lehner and Dominik Irber, and to our Mentors, Prof. Dr. Sabine Maasen, Dr. Alexander Lang and Prof. Dr. Stefan Wurster, who supported us tirelessly and contributed with their enthusiasm

and creativity in making our project happen. Our “Network of Excellence” certainly reached out much further than that. Special thanks to the excellent Management Team of the Junge Akademie, Maria Hannecker, Peter Finger and many others, to the Board of Members, Advisory Board, Emeriti of Excellence, TaskForces and Alumni, and last but not least Prof. Müller for his extraordinary engagement and support.

This list of gratitude could not be concluded without sending special thanks to our colleagues of the Class of 2017 I and II, with whom we had the opportunity to learn and grow together and whose valuable input in and outside the project realm was essential for our success and will continue in the form of lifelong friendships.

muc.me – a project on digital citizen participation in Munich’s districts

It was only then, on a dark Tuesday night in one of TUM’s rooms in the Main Campus, after a long brainstorming session by our team members, that the name of our project emerged: muc.me – digital citizen participation. After almost ten months of work, our concept began to take shape. And the pace and intensity at which it developed from that day on to our present day’s project is indeed something to be proud of.

Deciding to do a project on citizen participation at district level is surely an exciting task. Along the way, we believe that the encounters we have had with countless district representatives, often ordinary citizens who feel passionate about improving their living environment and that of their neighbors, have been one of the best experiences of this journey. In the process of researching citizen engagement at district level and trying to propose a tool to foster it, we have become ourselves active participants in our own district’s politics. This is, we believe, a “Windfallprodukt” or “unexpected externality” of our project. Our personal interest in local politics has grown considerably and our ambition to share our tool with the rest of society has grown as well.

As it is often the case in participatory planning, the process is often more important than the outcome. We believe that muc.me has initiated a process for Munich’s citizens that can lead to a more sustainable way of decision-making at local level in the future, thus contributing to the fostering of trust among citizens in open and inclusive ways of doing politics.

Participation, quo vadis?

With these reflections, we come to the end of our journey. Sadly, nowadays many people would agree in saying that Democracy, as understood by Western society, is under threat. Populism, media manipulation and fake-news have a strong influence on people’s opinions, often affecting political decisions with strong implications for the world’s society ...

Our project has shown us an answer to the question raised by ourselves at the beginning of this text and of our journey: Participation, quo vadis? Our answer is not that participation is in itself automatically beneficial for society, though neither do we believe that a society is sustainable without participation. We believe that informed decision-making by citizens is the key to a democratic system. Inclusive, transparent and informed participation can indeed help to fight back against populism and fake-news. For that reason, new digital and physical tools that foster informed citizen engagement and spark inclusive decision-making processes are essential for the sustainable development of our societies. ■

Citizen Participation

ABSTRACT Ongoing discussions and our research have shown that there is a lack of political participation opportunities and some people even have no idea of the significance of their political contribution. Therefore, our vision is it to tackle especially the first of these two findings by providing an easy and direct way for civilians to communicate their ideas and opinions.

GOALS

- Investigation of motivation and benefits for politicians in the engagement with citizen participation
- Establishment of a platform to connect politicians, NGOs and the citizens
- Simplification of communication and participation on political subjects
- Promotion of citizen consultation
- Enabling larger numbers of participants in grassroots democracies
- Encouragement of politicians to consult citizens directly
- Development of efficient feedback pathways

HYPOTHESIS

direct and objective exchange of views and information strengthen citizens perceived influence and political participation

TEAM STRUCTURE, PROCESS AND OUTCOME

Analysing the subject brought us to the conclusion that the citizens' perceived influence on decision making processes and information exchange are the two major problems concerning public participation. To solve this problem a digital platform offers significant advantages among all proposed methods – the main being avoiding the typical problem of grassroot democracies in the physical world.

After determining the scope of the project we will design and develop a digital platform for direct communication between citizens and politicians. We plan to test and evaluate the platform in a delimited pilot project. The platform holds the potential to be further developed.

SUMMARY

Our group's vision is to prevent a feeling of neglect and impotence in citizenry, to improve the integration of the folks in politics and to provide an easy and direct way for civilians to communicate their ideas and views.

BILDUNGSWEIT
University of Education Würzburg | Faculty of Education | Department of Educational Science | October 2017

MEMBERS Ramona Grande Fraile, Matthias Passek, Philip Petzoldt, Simon Rehwald, Jonas Ruchti

TUTORS Christoph Dehner, Rupert Heindl, Matthias Lehner

MENTORS Alexander Lang, Prof. Dr. Sabine Maassen, Prof. Dr. Stefan Wurster

inspired by
TUM Junge Akademie

POSTER 1: As the name indicates, our team wanted to work on the topic of citizen participation. For determining the scope of the project, we first had to analyze the predominant state of affairs. We did so by identifying the current problems of citizen participation and then researched their possible origins in order to understand their roots at first hand.

The main problem we identified was a general lack of interest – in participation (even where opportunities are available), information and communication. The decisive reasons for this problem are, in our eyes, as shown in the first poster: an often non-existent sense of political responsibility, the relatively large effort needed to get information, the lack of visible political influence and the lack of opportunities to participate.

To get a deeper understanding of civic participation and create an effective tool for the improvement of this initial situation, the hierarchy of participation possibilities was analyzed. As can be seen on the first poster, the lowest level of possible participation of citizens is in receiving information. Higher levels are: the feedback of citizens; consultation; joint planning; and, finally, citizen control. Citizen control gives people the opportunity to decide on topics themselves.

With all this in mind, we decided that we wanted mainly to address the two, in our eyes, most important deficits concerning participation: the citizens' perceived lack of influence on decision-making processes and the low levels of information exchange.

From our findings, we have derived the first hypothesis: “A direct and objective exchange of views and information strengthens citizens' perceived influence and political participation.” ■

Civic Participation

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Abstract

Beginning in 2018, Munich's boroughs command a yearly citizens' budget, however they are yet unclear on how to spend this money according the citizens' wishes. With this in mind, we want to develop an all new digital platform that simplifies civic participation. This platform will then be used for evaluating the benefits for participatory processes.

[Tell me more »](#)

HYPOTHESIS

A digital platform for the collection of ideas and opinions can help to lower young people's inhibition threshold regarding politics, build trust in civic participation, improve transparency and generate important information for Munich's local politicians for example concerning the citizens' budget.

RESEARCH

Having decided for the development of a platform supporting and enhancing civic participation, we searched for and tried out existing solutions on the market. We primarily focused on whether those platforms could also be interesting for younger citizens. This allowed us to familiarize with the topic and to get a first impression of what others have done so far as well as to determine in what way our platform could provide a useful contribution. Furthermore, a discussion with our mentor Prof. Wurster, who is an expert in political science, revealed important aspects that need to be considered when developing such a platform. Additionally, we had a meeting with a Munich politician, who is part of the city council in Maxvorstadt.

CONCLUSION

Our research has shown that a platform for civic participation is indeed something politicians would like to have. To provide the potential to be successful and to fulfill our own goals within this project, it requires the following properties:

- new and innovative
- interesting and relevant for young citizens
- focused on local/regional politics
- specialized to a few topics

VALIDATION OF THE HYPOTHESIS

Apart from creating new participation opportunities for citizens, the platform to be developed can also directly support the validation of our hypothesis. Statistical tools for analysing the generated data can and should be directly integrated into the platform because the results can be helpful to politicians and civilians as well. Additional surveys on topics like the enhancement of perceived trust, transparency and the usefulness of results will be conducted through the platform. The applicability of this data for our validation depends on the size and representativity of the user base and thus ultimately on the attractiveness of the platform. We found a market niche in the citizens' budget of Munich's boroughs for which no way of collecting and evaluating proposals from the citizens exists so far. We strive to unlock this potential and also offer other means of direct communication between politicians and citizens.

MILESTONES

15.01.18	Definition of Core Features Finished
01.03.18	Presenting the concept to boroughs (and other potential partners)
01.04.18	Marketing Start
15.04.18	Beta-Testing Start
01.05.18	Release
31.08.18	Evaluation Finished
16.10.18	Project Report Finished

MEMBERS Ramona Grande Fraile, Matthias Passek, Philip Petzoldt, Simon Rehwald, Jonas Ruchti

TUTORS Christoph Dehner, Rupert Heindl, Matthias Lehner

MENTORS Alexander Lang, Prof. Dr. Sabine Maassen, Prof. Dr. Stefan Wurster

inspired by
TUM Junge Akademie

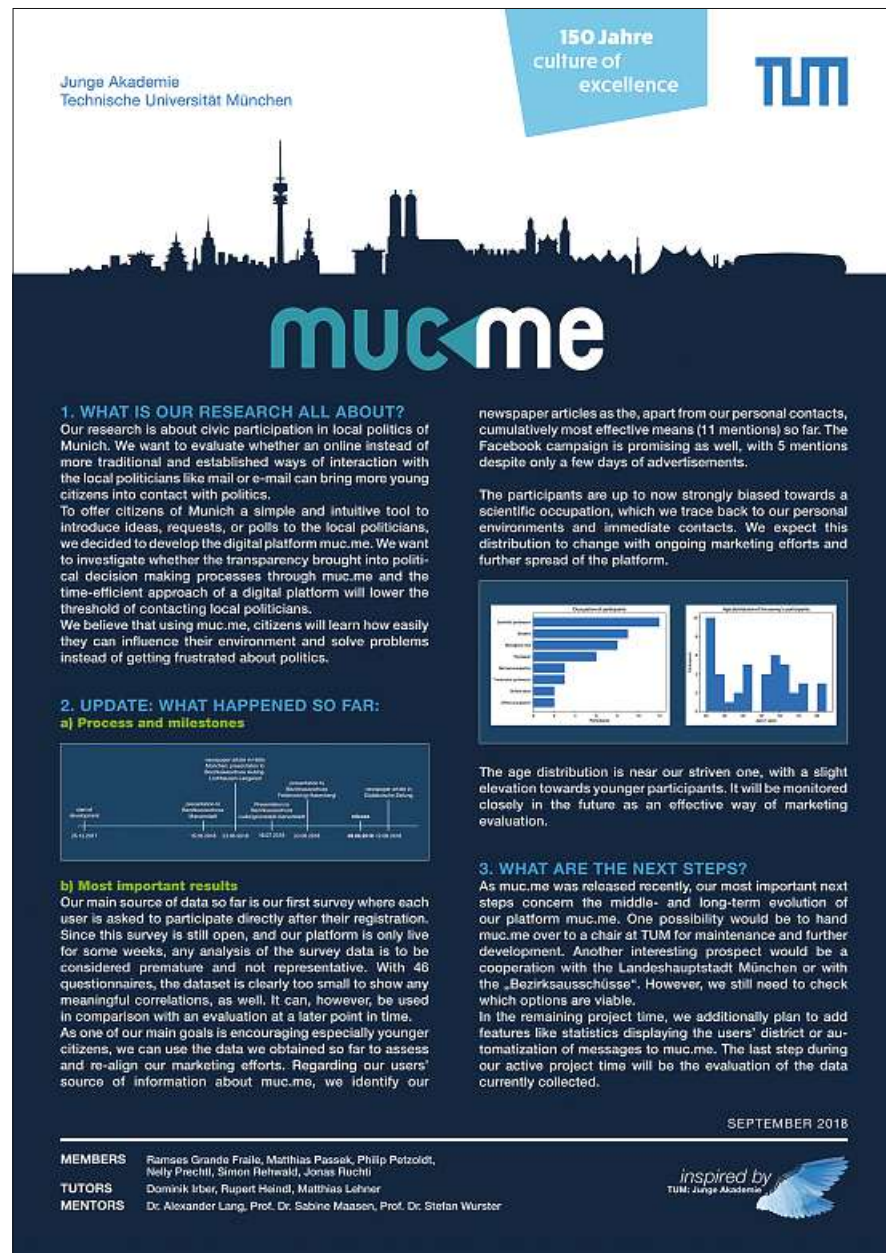
JANUARY 2018

POSTER 2: By the time the second poster was designed we had changed our project slightly. During research it turned out that, beginning in 2018, Munich's boroughs would have responsibility for a yearly citizens' budget. We agreed that this should be a core of our project. We decided to develop a digital platform to enable citizens to propose concrete projects on which that money could be spent, but also to come up with any city-improving ideas. All users should be able to rate these proposed projects and ideas. Furthermore, the proposals with good feedback should be forwarded to the responsible politicians to influence their decisions concerning these subjects. A non-negligible benefit of such a platform is the possibility of using it also for the evaluation of the created participatory processes.

Focusing on this idea we tried out existing participation platforms and had meetings with experts and politicians. The outcome of our research and the feedback of the consultants reaffirmed our plans. We are convinced that an innovative, simple and interesting platform that is specialized in just a few topics and allows citizens to communicate their demands and desires can be an enrichment for today's political world.

This idea led to the altered hypothesis: “A digital platform for the collection of ideas and opinions can help to lower young people's inhibition threshold regarding politics, build trust in civic participation, improve transparency and generate important information for Munich's local politicians (for example, concerning the citizens' budget).”

This platform should create a simple communication channel between citizens and politicians and at the same time reduce feelings of neglect and impotence concerning political matters. All, but especially young people, should be motivated to contribute. ■

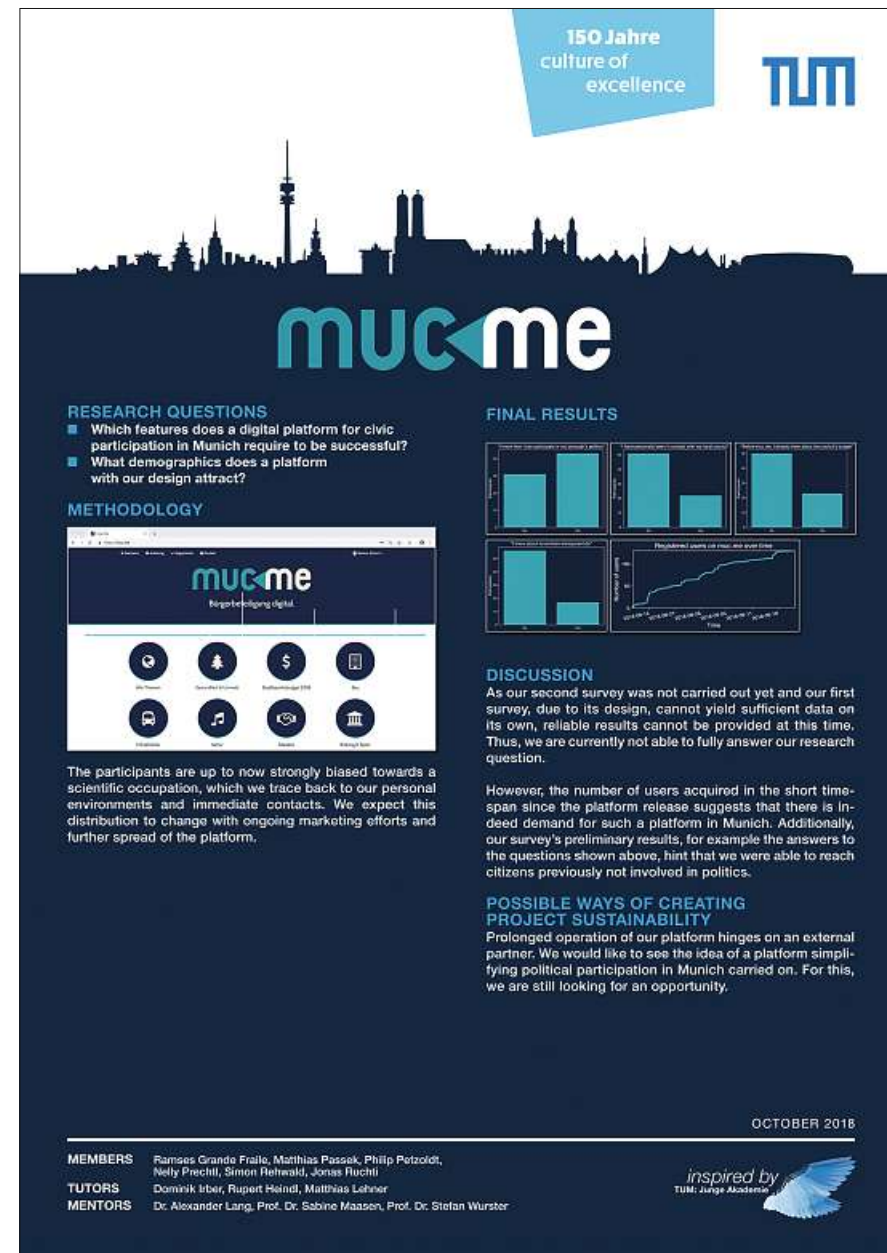


POSTER 3: During the time before the third poster was introduced, the platform “muc.me” was actively developed. The research questions we want to answer with the platform changed slightly from the last hypothesis. We now want to derive the features that a digital platform for civic participation in Munich requires to be successful. In addition we are interested in the demographics of the people who are attracted by the platform design.

Launch day was August 9, 2018. During the creation of “muc.me” the collaboration with the borough councils of Ludwigsvorstadt-Isarvorstadt, Maxvorstadt, Feldmoching-Hasenberg and Aubing-Lochhausen-Langwied led to further co-operation. Furthermore the third poster states clearly the goal we are trying to achieve with our project: We want to use “muc.me” to research the effectiveness of such a tool and the features it needs for success in Munich. The platform allows all registered users to propose and rate ideas and projects for Munich's benefit and to inform responsible local politicians about the outcomes of frequently rated ideas. We want to find out whether this time-efficient way of interaction and participation, which brings some degree of transparency into political decision-making processes, lowers the threshold of contacting local politicians.

We are collecting information by analyzing questionnaires that are filled out by the platform users. To get reliable results we are trying to attract as many participants as possible. The project has already been mentioned in newspaper articles in “Halo München” and “Süddeutsche Zeitung”.

The age and activity spread of the first “muc.me” users can be seen on the poster. Still unanswered is the question about the future of the platform: Possibilities might be to hand the platform over to a chair at TUM or to establish a cooperation with the Landeshauptstadt München or its borough councils.



POSTER 4: As mentioned before, we want to extract the features of a successful platform for civic participation and to identify the relevant demographics of engagement with the platform. To answer these questions we are on the one hand using data that is generated by the users of the platform and on the other hand two online surveys among the platform users. The users are presented with one survey when they first log in and with the second one after three months of using the “muc.me.”

Since the second survey's data is not yet collected, we are not able to answer our research questions fully at this stage.

The relatively high number of registrations over a short time on “muc.me” has already enabled us to conclude that there is a demand for such a means of participation. Furthermore the first survey indicated that it is mainly people who are not involved in politics who are drawn to the platform.



Project Report **PiA**

Team	Anna Verena Eireiner Carlotta Ferri Vadim Goryainov Kerstin Pfister Leah Schembs Laura Schütz Florian Tichy Katharina Tropschuh Jana von Trott zu Solz	Greetings from the Mentors92 Journalistic part.....94 Scientific part96 Self reflection.....104 Posters106
Tutor	Rupert Heindl Dominik Irber Dr. Matthias Lehner	
Mentor	Dr. Alexander Lang Prof. Dr. Sabine Maasen Prof. Dr. Stefan Wurster	

Political communication and learning in the digital age

How to bring citizens and politics closer together?

In times of digitalization, politics and the dissemination of political knowledge face many new challenges. One of them is that public opinion-forming processes are increasingly taking place in the digital space. This is becoming particularly important for democratic decision-makers. Conversations, newspaper articles and television appearances are no longer sufficient for an informed exchange with citizens. Today, chats or tweets find themselves among the new digital forums. However, there are still few formats that bring politicians and their constituents into a productive and sustained conversation. It is therefore an important task, especially for students of a technical university, to develop such formats at the interface of politics, society, education and new technologies. Two projects of the academic year 2017/2018 have done this, each with a different focus.

The group "Politics and Fun" has set itself a goal of making political education work with young people interactive, while remaining sharply focused on politics. For this purpose, it has developed a

program that allows students in political education to witness the parliamentary week of a deputy, thereby helping them to understand the influence of politics on very specific everyday problems and, at the same time, providing them with an insight into the complexity of political decisions.

However, new information technologies are not just a way for citizens to learn about politics. Conversely, it is also important for politicians to record discussions on the Internet and to pick up articulated opinions and interests there. In this context, "Mucme" offers the possibility to make statements and preferences posted by citizens on the internet accessible and transparent to the political decision-makers. The voting tool developed in this project can provide valuable help in concrete decision-making at the municipal-political level.

As mentors of these two groups, we defined our task as sustaining the motivation of the groups over a period of eighteen months,

during which our continual substantive input not only facilitated elaborate discussions, but also promoted more profiled projects, opened doors, supported the organization of the projects, and offered ongoing academic advice. At the beginning, both teams were struggling with the complexity of the task, the challenging scientific program of the Junge Akademie, and the considerable time constraints. However, the results achieved so far make us confident that, in addition to the benefits for the participating students themselves, not only innovative but also socially relevant products have emerged that are worth further development.

Sabine Maasen, Stefan Wurster and Alexander Lang



“PiA” – Politics in daily life

A group of three students from class 9c of a High School in Nürnberg has met up in front of the escalator in the school building. In their midst, they are holding a tablet. “Pick *a) Everyone should be able to move autonomously!*” one of the students says. But not everyone agrees: “Why not *c) Only, if a person is specifically affected?* It’s about accessibility!” another counters. The students had just scanned a QR-Code printed on a piece of paper, which was hanging on the escalator’s door. As soon as they had placed the tablet over the code, a video about inclusion in the school building and beyond was shown.

The students are out and about with PiA. That is not only the name of the protagonist from a video game with the same name. PiA also means “Politik im Alltag” or “politics in daily life” – in school daily life, more precisely.

PiA is the project of an interdisciplinary team which has emerged from the TUM: Junge Akademie. Since May 2017, the nine scholars have been working on their vision of temporary political didactics. At that time, they wouldn’t have anticipated that they would soon be driving around Bavaria with a classroom set of tablets. The goal of the game is to identify the influence of political decisions at school and thus to stimulate related discussions in class.

The project aims at drawing the young people’s attention to political issues that are present, even if mostly unnoticed, in their everyday lives. By a focus on their own lives, an image of politics that goes beyond the common media-defined horizons should be imparted. Instead of election campaign banter, long speeches or the Twitter account of the US President, it’s all about factual issues.

The Tablet App enables students in groups to embody the role of young politician PiA, who has to orient herself in her first parliamentary week. While the protagonist is making her way from briefings to commissions and interviews, the eighth to tenth graders are learning about selected topics from videos they are shown.

Factual issues instead of twitter debates

The Christian cross in the class room, questions of inclusion, as well as the menu of the school canteen are some of the issues discussed in the videos. Afterwards the students must choose their own answers to the questions that the journalists in the video ask PiA. The quiz is rounded off by questions that seek for the students’ own opinions about each of the political topics. Instead of identifying the right answer, the young people voice their opinion in a vote – for or against – depending on their own view on the issue. Combining a traditional paperchase with modern digital technology, the topics can be found by the students at stations located at suitable places within the school building. The paperchasers use the tablets to scan the stations and receive information and questions about integration in everyday school life or about the pros and cons of an all-day school.

After the students’ paperchase and PiA’s first parliamentary week, the results of the quizzes are evaluated in the classroom. An overhead projection displays the outcomes for every station. The award ceremony is followed by discussions: At first about the students’ impressions of the game, and afterwards about the questions of opinion raised at different stations. “I knew that how long you have to go to school for and what you get taught there is decided by our politics,” a student explains to her classmates. “However, I wouldn’t

have thought that decisions like ‘Christian crosses in classrooms – yes or no?’ require so much effort and regulations.” In class, this particular question generates disagreement. “For me, it’s part of the Bavarian culture,” one student says, encountering high approval in class. However, a classmate then asks the question: “Why can’t we hang up the symbols of all religions in our class room?”

Citizens of the future

Besides the three ninth grades of Nürnberg, several other schools got in touch with PiA at the end of the school year 2017/18. As a result, the students of an eighth grade in Kirchheim, as well as two ninth grades of a secondary school in Traunstein, had the chance to compete in the quizzes and to discuss their opinions. For the upcoming school year, several additional schools have expressed their interest.

Indeed, although for most of the students their right to vote will be long in coming, many of them care about politics already, particularly about the upcoming regional elections. They discuss matters with their parents and obtain information from the internet and radio and, sporadically, newspapers. On the other hand, some students don’t bother with politics at all. For them, there are more relevant topics to discuss with their friends and they don’t have a real say yet anyway.

Maturity via app?

According to one of the mandates of the Ministry of Education, schools are responsible for the formation of mature citizens. Of all things, might a tablet app contribute to such a task? Beyond worksheets and textbooks, there are various other formats aimed at giv-

ing students an understanding of politics. Even playful approaches are no novelty. Simulation games most commonly deal with equitable decision-making, for example regarding certain goods. The players slip into the roles of stakeholders or decision makers.

The increasing possibilities in terms of video games in the past years has enabled a new trend called “Serious Games” to develop. Embedded in a playful story, these programs aim at teaching sciences, languages or mathematics. However, political didactics have rarely been integrated, and not only in the German-speaking regions. PiA is intended to connect gaming fun with the appeal of technical innovation. In the students’ hands, the tablet enables them to explore their schools as political sites. As long as tablet classes are a rarity, the devices need to be passed on to other schools for their next mission. However, a critical eye on politics in young people’s daily lives might also be a trigger for them to ask new questions. Some students had already started thinking beyond what they had learned from PiA before they had even left the building. “I don’t like being told what I should or should not eat. But how about school arranging food information days, so we could learn about healthy food?” one highly-engaged young girl wondered. It appears that ideas continue to be born out of questions – even in the digital age. ■

Scientific part

What happened:

Conceptionalization and design of an app-based interactive educational game. The goal was to teach about the role of politics in the everyday lives of students as a form of civic education. The app was tested and evaluated.

Strengths:

- game mechanics connect analog and digital potentials within the didactics of politics in an outstanding way
- bottom-up instead of top-down education: the concept starts from the student's personal experience instead of abstract subject matter

Weaknesses:

- the game's complexity is limited as we needed to balance scarcity of resources with a do-it-yourself approach
- more iteration is needed for the elaboration of design, game experience, stand-alone operation, testing, and evaluation

Opportunities:

- the concept is prototypical for future development in educational games (for social science subjects)
- the game raised interest from relevant publishers for politics education materials

Threats:

- problems with Wifi in school buildings might spoil parts of the game experience
- tablets are required and this may be a disadvantage for schools in poorer/more rural regions

Lessons learnt:

- communicating with the help of a prototype is more effective than without such an aid and allows for more precise discussions
- students more eagerly discuss political topics when they are not abstract, but linked to their personal experiences
- although stakeholders agree with the concept, the need for IT software/hardware increases the number of issues to negotiate and find work-arounds for

1. Background

Dingpolitik & The Fun of Discovering Politics in Daily (Student) Life

“We don’t assemble because we agree, look alike, feel good, are socially compatible, wish to fuse together, but because we are brought by divisive matters of concern into some neutral, isolated place in order to come to some sort of provisional makeshift (dis) agreement. If the Ding designates both those who assemble because they are concerned as well as what causes their concerns and divisions, it should become the center of our attention...” (Latour, 2010:201)

The renowned French philosopher, anthropologist and sociologist Bruno Latour’s call is “Back to Things!” He asks, “isn’t this a more engaging political slogan?” With our project, we follow this notion. We wanted to show students in high and middle schools, that politics is not something that exists in the far universe of national capitals or exclusively within the realms of the European parliaments. Quite the opposite is true: Politics touches upon all aspects of our lives. With this conception of politics at the back of our minds, we set out to conceptualize a fun, engaging game for students. After all, today’s students are the tomorrow’s voters! Research indicates that different methods and tools support different learning environments, opportunities and cultures. Thus, variety can positively impact the learning process, especially if the tool is fun, motivating students and feeding their interests (Lang, 2002). We found that history and social studies lessons are valuable for building a solid foundation about the macro- and micro aspects of political processes, historical developments and what democratic decision-making means for a society, yet it did not leave over-much room for discovering how politics figure in aspects of everyday life. Instead of looking at seemingly “hard facts,” we wanted to see how artifacts that surround every student assemble and disassemble. The cross on the wall, the elevator that enables disabled individuals to reach their classrooms; these are some of the artifacts that illustrate these complexities. Bruno Latour acknowledges these convolutions and suggests an alternative conception of politics – from “Realpolitik” to “Dingpolitik”

so to speak. It is quite a thrill to discover that seemingly mundane things are not simple truths but complex assemblages that convey meanings, opinions and theories. Consider the cross on each wall of Bavarian classrooms for instance. This has the power to separate and divide as much as it can serve as a unifying symbol for groups. We decided to make a game that allows students to discover these patterns. It was very important to us that the game should be fun and engaging, nurturing a desire to learn more. We wanted to create a game that allows students to discover that they, too, are part of the entanglements, that they should want to reflect upon political questions and to see how and why politics are relevant in their lives. Many people say that young people today, specifically the ominous “generation Y” have no interest in politics whatsoever. Studies show that this is far from the truth and our work with the students on the project reaffirmed these findings (Deutschland, 2015). Students today have a higher interest in politics than the generation before. And how could they be a-political? They are growing up in times of Brexit and a Trump presidency, after all. Our presumption on embarking on the creation of the game was never that there is a “deficit” of student political knowledge or engagement. Instead, we wanted to create a game that reaffirms their curiosity and that can be a fun add-on to the syllabus. Our team took a lot of time and effort to research which didactical methods would best fit our purpose. In Germany, there is an excellent base of political games and simulations that have been developed by political organizations, both state-run and non-profit. The German Federal Agency for Civic Education (Bundeszentrale für Politische Bildung) offers various online and offline formats, for all age groups (Bundeszentrale für Politische Bildung, n.d.). Foundations that are associated with political parties offer other opportunities to learn about politics (e.g. Friedrich Ebert Stiftung, 2018). Most of these games are simulations or workshop-events. We quickly decided that we wanted to create something that could be used in the future as well, as opposed to a one-time event. A digital application seemed to fit the bill quite well: It can be uploaded to the app store and installed on devices, without the need to send out physical materials, and without the need for one of our group members to be present. We also found that an educational app has a novelty factor for most students,

which makes them even more eager to try our game. Combining the digital with a walk around the school building was also a conscious decision: It gives students a break from sitting and listening and lets them see their everyday surroundings in a new light. Our game, PiA (“Politik im Alltag”, *politics in daily life*), combines all the features that we felt were most conducive to facilitating political education: It is eye-opening, engaging, fresh and most of all – *fun*!

2. Goals and Methods

Although there is plenty of political games in didactics, our research and reflections suggested that a game set up on digital devices would be beneficial to interest students in politics and increase their competences. Politics is a wide-ranging topic and didactical methods are only capable of addressing a limited amount of aspects at the same time. Including too many aspects in one method can be as counterproductive to learning as singling out one specific aspect without linking it to the different contexts, in which it might appear in our political landscape.

The route between these pitfalls points towards the question, what ‘competence’ in the context of political or civic education is. Richter has diagnosed issues in distinguishing politics-relevant competences from others, such as general literacy, in skill-items of past studies. Her response to these demarcation-issues is focusing on different hermeneutical aspects that link to political or civic competences (Richter 2006).

Instead of analysis of political texts, as in Richter’s case, our research project’s matter of concern were the political dimensions behind objects in the everyday lives of students. Similarly, we focused on hermeneutical aspects of this matter of concern. In consequence, the question that was guiding our research was, whether an interactive digital game would be suitable to interest students in political topics and increase their competences to recognize political dimensions in their everyday lives.

We therefore wanted to design an interactive digital game for students that

- a) provokes thought about the political dimensions of everyday environments,

- b) provides knowledge to engage with related deliberative processes/controversies, and
- c) entertains while it simultaneously informs in the fashion of a so-called serious game.

According to our hypothesis, this game would be able to succeed in these goals, thereby becoming a prototype for future political serious games. PiA would become a combination of a classical scavenger hunt through classroom and school building with a quiz about the politics behind common objects in these spaces. It would be staged on a portable digital device to meet demands for durability past our project phase, for effects of excitement by novelty and relatability for the students.

In the game, the students walk around the school building and search for clues of politically relevant topics in everyday life. They follow the story of Pia, a fictive member of parliament, who has to collect information on various topics before voting in favor or against a policy. The five topics that we included in our game are: all-day schooling, integration, inclusion of disabled students, food laws and the Christian cross in classrooms. Upon finding a clue, the students receive information on that topic and are asked follow-up questions on the information they received. After that, they are asked to give an opinion based on the knowledge recently obtained. In order to include an innovative and fun way of interaction, we have included a digital component: an app that is developed for mobile devices (such as smartphones or tablets).

The clues, which the students have to search for, are QR codes attached to objects that have to do with one of the five topics we have included in the game. The students are given hints on the location of those objects by the app. When they find a QR code, they scan it with the camera of their mobile device and are subsequently redirected to the information concerning the topic they have discovered. This information is presented in an attractive and easily digestible way: the students watch videos that explain the political decisions that are involved in the object they have found. The videos make heavy use of graphics and illustrations and are about one and a half minutes long. Once the students have watched all the videos on a certain topic, they are faced with questions on the matter discussed in the videos. The questions are made in a

style reminiscent of the popular mobile game *Quizduell*: there are always four options to answer the question and only one of them is the correct one. Additionally, there is a time limit on each question in order to prevent the students from seeking the help of external sources to find the correct answer. After the quiz, the students are asked to give an opinion on the topic they have just examined.

The performance of the students in the quizzes and their opinion on the topics become relevant after the game has finished (which should take approximately 45 minutes): we have also built a website for teachers where they can view those results. On this website, teachers can create a *game ID* which is used as a unique – yet anonymous – identifier of their class. The students enter this ID when the game is finished to send their data to our server. The teacher then can access a webpage linked to the game ID in order to view the results. There is a ranking of the students in respect to their performance in the quizzes. The printed names are nicknames which the students have chosen when starting the game – no personal data is ever saved on our servers. Additionally, for every topic, there is a pie chart depicting the overall opinion of the students on the given question. This data is used for an in-class discussion after the game.

The following example illustrates the process of playing one station: The students find a QR code located at a clock. They scan it and receive three videos dealing with the topic of all-day schooling. The videos talk about the pros and cons of all-day schooling and

sum up the current political situation in Bavaria. After watching the videos, they answer four questions on the information discussed in the videos e.g.:

In which city is the Bavarian Ministry of Education and Culture located?

- a. Munich (right answer)
- b. Fürth
- c. Augsburg
- d. Nuremberg

Upon completing the quiz, the students are prompted to answer a question on their opinion:
Do you reckon that the state should invest more money in the expansion of all-day schooling?

At the end of the game, two kinds of charts are automatically generated by our web server and these can be reviewed by the teachers.

So far, our game has been played in three Bavarian schools with six classes in total. The students were either in eight or ninth grade.

3. Outcome and Discussion

From the results of the evaluation, it was possible to observe the different perspectives of teachers and students. With the help of the teacher, we evaluated the reactions of the students during the session. All of the teachers who have been interviewed through the

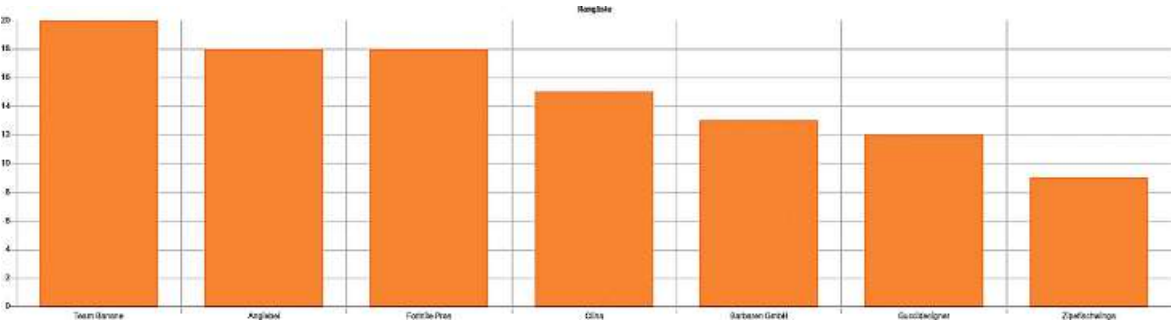


Figure 1: This bar chart shows the score distribution among the students in one of our games. Each of the bars represents a team of students and shows the number of correctly answered questions out of a total of 25. The nicknames have been chosen by the students themselves.

Findet ihr, dass Bayern vermehrt in den Ausbau von Ganztagschulen investieren sollte?

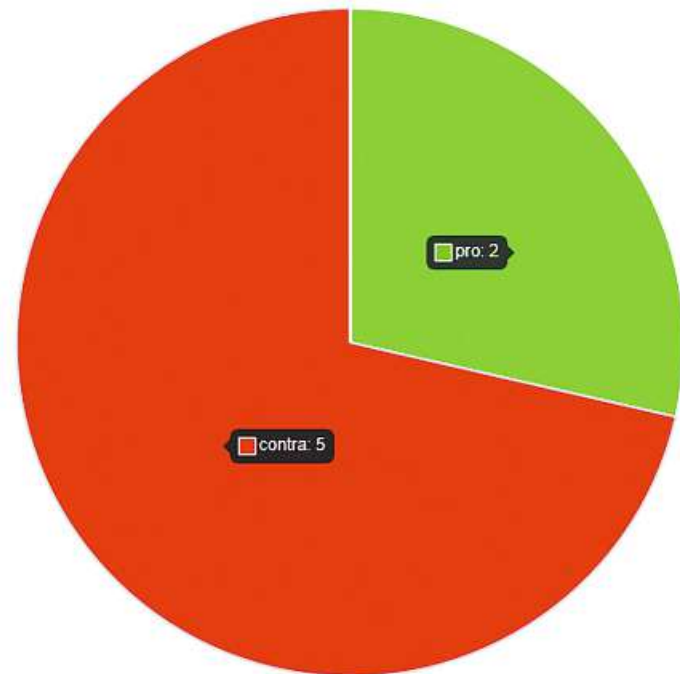


Figure 2: This pie chart shows the answers of the students in one class to the question above. The green part shows the advocates of the idea, the red part shows the opponents.

Evasys questionnaires agreed that during the project the students' motivation increased considerably. In their opinion, the project PiA had a positive impact on students and generally inspired them to take a greater interest in political topics. They all anticipated that, thanks to this activity, students will be more actively interested in political topics in their everyday life. As confirmed by the teachers, PiA would not interfere with the normal course of instruction. Considering all these aspects, the teachers would be very interested in applying PiA during their lessons.

The students' opinions have been evaluated by two separate surveys: one before the activity with PiA and another one afterward. The majority of the students participating in the study were male (68,5%) and studying in the 9th grade (70%).

The study before the activity recorded a rather low interest in politics, as shown in figure 1. A reason for this apparent lack of interest might be that the students did not recognize the involvement of politics in daily life, as we observed in the study results represented in figure 2 and figure 3. This result does not match with broader studies about political interest in the current generation that we have investigated during our project (i.e. Shell Study). The reason for this discrepancy might be the different scales of the studies. While large-scale studies offer a considerably higher amount of better-refined elements, the PiA project was structured in a simpler manner and was also constrained by time and by the size of the sample reached (106 students).

From the evaluation form that the students received after playing PiA, the students' impressions regarding the PiA project have been evaluated. In general, the majority (81%) considered the activity entertaining. The figure of the Assembly woman, Pia, was interesting for 44%, while almost 41% gave an average evaluation of it. Nevertheless, almost 91% of the students expressed a willingness to play something like PiA again, since the majority found it easier to concentrate on the topics than during a conventional lesson, confirming the teachers' impression. What also becomes clear from the evaluation process is that the students particularly enjoyed the interaction with each other and the fact that the activity had to be conducted in teams. After the project, there was only a slight increase of students more interested in political topics than they were before, as shown in figure 4. However, from the results depicted in figure 5 and figure 6, students seem to have changed their opinions regarding the impact that political decisions can have on their daily life at school. Additionally, students felt that the commitment of politicians to students' interests is not high enough.

Looking at the technical aspects, the students evaluated the App as not too fast, the graphics as amusing and the quizzes as not too easy nor too difficult. However, the students considered the amount of text excessive.

From the study's results, it was unfortunately not possible to give a definitive evaluation of the competences of students regarding politics. In fact, this was not the aim of the project, since further scientific research in the sector of civic education has to be conducted in order to go deeper into this topic. However, it appears very clearly from this specific project evaluation, that a playful or play-related way of learning consistently increases

the concentration and motivation of students. This might be reflected not only in greater competence and knowledge but also, as observed in the evaluation results, in the general enhancement of political interest among the participants. Additionally, students have recognized the influence of politics in their daily lives, which could raise their future participation and active interest in political topics.



Figure 3: Question from the study before the activity: "I am interested in Politics." Answer: Yes, a lot – Absolutely not.

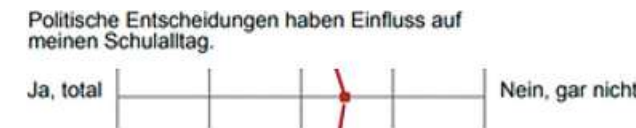


Figure 4: Question from the study before the activity: "Political decisions have an impact on my daily life." Answer: Yes, absolutely – Absolutely not.



Figure 5: Question from the study before the activity: "Politics does not have anything to do with my life." Answer: On the contrary, it has a great deal to do with it – Nothing at all.



Figure 6: Question from the study after the activity: "I am interested in Politics." Answer: Yes, greatly – Absolutely not.

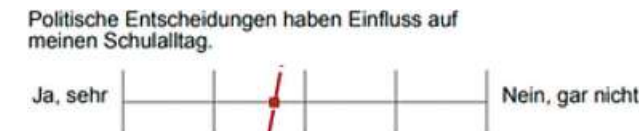


Figure 7: Question from the study after the activity: "Political decisions have an impact on my daily life." Answer: Yes, definitely – Absolutely not.



Figure 8: Question from the study after the activity: "Politics does not have anything to do with my life." Answer: On the contrary, it has a very strong one – Nothing at all.



Figure 9: Question from the study after the activity: "Politicians do not greatly concern themselves with students' interests." Answer: Yes, I completely agree – No, I do not agree at all.

4. Summary and Future Goals

Contrary to common misconceptions of generation “Y,” today’s students have a higher degree of interest in politics than previous generations (Deutschland, 2015). We aimed to reinforce this political interest in high school students, contributing to the political education of tomorrow’s voters. The significance of politics in aspects of everyday life is under-represented in current political education. Therefore, our goal was to provide an educational tool that would allow students to discover the complexity of political opinions and decisions embedded in everyday artifacts around them. By acknowledging this complexity within the school surroundings, students are encouraged to realize the relevance of politics in their own daily lives.

We created a mobile app that invites students to explore the politics behind their school surroundings in an active and engaging way based on a scavenger hunt in the school building. The narrative of the game lets students slip into the role of PiA, a member of parliament, and allows them to follow her daily schedule. In the app, students team up in small groups and watch videos to acquire knowledge and answer quizzes. Further, forming and giving one’s opinion is required for each topic. Both the quiz-results and the distribution of opinions within the class can be visualized using a website. Crucially, this provides a basis for in-depth discussions in class once the game is finished.

We piloted our app in three Bavarian schools with 106 students from six 8th and 9th grade classes. Confirming the observations of the team members present at the schools, the great majority of students found PiA entertaining and would be interested in playing the game again. This is related to increased levels of concentration during engagement with the interactive and digital educational tool as compared to conventional lecture-style teaching. Moreover, the fun of working in teams seems to contribute to this effect. The teachers were generally convinced that the project inspired political interest in the students. They did not perceive the project as a disruption to the curriculum, and generally expressed interest in applying PiA in future lessons. When comparing students’ pre- and post-project evaluations, we found no increases in political

interest, or in the desire to discuss politics more often with family and peers as a consequence of our app. Yet, importantly, students acknowledged the influence of politics on their daily lives more strongly after the lesson with PiA than before it. This confirms our hypothesis and indicates the effect of our app on increased understanding of the importance of politics in the everyday surroundings of students. Unfortunately, an increase in political competence could not be measured and needs to be addressed by further research, for instance by developing adequate tools to measure short-term increase in political competence.

The main impact of PiA was the students’ increased appreciation of the influence of politics on their daily lives. Both students and teachers were convinced of the app as an engaging and fun addition to classic politics lessons. The app and supporting material allow teachers to employ it without the assistance or presence of a team member. Therefore, PiA is now independent of its developers and might be able to support many more students in recognizing the importance and the impact of politics in their daily lives. Eventually, we hope that PiA supports teachers in their endeavor to educate politically interested and committed voters.

All in all, our project shows that an interactive and engaging educational app can increase awareness of the importance of politics in students' daily lives.

Now as we are completing our active project phase, it is essential for us to advance our project in order not to leave it as a “one hit wonder” but – in its best achievable state – to pass it on for continued use and even further future development.

Our ideas for realistically attainable exit strategies were very broad and led to numerous lively discussions during our team meetings. Options ranged from founding a start-up, selling the application, giving the project over to a non-profit organization, an association or a political foundation etc., to transferring the project to a publishing house. As our primary interest was not to rise from rags to riches and to commercialize our project, nor to get involved with a specific political party or organization (and thus endorse a particu-

lar set of viewpoints), we decided on the option of getting in touch with publishers. After several meetings and lots of exchanges regarding form and content, we made a successful agreement with the leading publishing house in the field of politics and political didactics in the whole of Germany. Satisfied with this future development, we can now support our new partners with tips and ideas regarding further improvements and supplementary features. With great interest and pride, we are very much looking forward to

observing how our project continues to “live on” and to doing our best to provide continuing assistance.

Furthermore we are glad to announce that many of the schools we visited during our project trial phase were so convinced by PiA that they have decided to rerun the digital political scavenger hunt with even more classes and thus higher numbers of pupils. The best feedback we could possibly have wished for!

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PiA

Self-reflection PiA

“Why do you think that high school students in particular should be given a better understanding of politics?” – “High school students are tomorrow’s electors and will influence and form our democracy of tomorrow. Therefore we cannot accept disenchantment with politics to spread and young people to be influenced by populists and their allegedly easy answers.”

This statement from one of our members sums up well our initiating motivation to illuminate political education in German high schools. However, during the first weeks and especially in autumn 2017, we had some difficulties in concretizing our visions and transform it into a feasible project: “We discussed a lot but accomplished little.”- This tested our motivation and we had some weeks with little progress. Our mentors and tutors helped us during these times of drought with practical recommendations (e.g., doing a timeline) and provocative questions like “What is your hypothesis?” and “How could this be realized?” However, when we overcame these early difficulties, our motivation and commitment to our developing project returned. “When we gained a common vision and our ideas took better shape, the atmosphere as well as the motivation improved drastically.”

Another obstacle that had to be overcome concerned the management and coordination of our ten member group. Among those ten members, two were not located in Munich for nearly the whole project phase. “I welcomed it greatly when we decided to nominate a ‘liaison officer’ with special responsibility for communicating with the ‘foreigners’. This improved collaboration beyond Germany’s borders.” This member took responsibility for allocating current tasks and overseeing their fulfilment, as well as for communicating progress and issues at hand.

“Politics are very important and to engage in it is fun! Unfortunately, in the curriculum there is not much opportunity to teach more than fact-based knowledge. We wanted to improve this.” This state-



ment sums up perfectly why we opted for “Politics and Fun” as our preliminary team name. We always aimed to promote something innovative and different from pre-existing classroom methods. Our mentors encouraged us to pursue this idea, giving us advice on how to realize it and raising awareness of how we can indeed make it pleasurable to play. “Bread and circuses – a concept that has been used for a long time. Young people can be addressed and wowed a lot better through playful methods. When something is fun, one likes to engage in it and tell others about it. To make it fun was, for sure, very important for us!”

But it was not only fun that was of high value for us, we also aimed to convey a message. We decided to thematize “politics in everyday life”, as we, too, were interested in areas where we are in contact with politics without realizing it. “We interact with many juridically detailed regulations every day without noticing it. Especially the complexity of the interaction of communal, cantonal and federal institutions surprised me.” For the stations of our treasure hunt, we chose controversial topics that could be related to objects found in every classroom or high school building. As the



evaluation showed, students and teachers welcomed these new perspectives. It also illustrated that our initial hypothesis about students lacking political interest and motivation was not correct. Instead they demonstrated substantial knowledge and interest in discussing current topics. As one of our team members said: “I was astonished by how much the students know about politics and how thoughtfully they can advance their views. It is not true that students are not interested in politics. On the contrary, in these times of Trump and Brexit, rather the opposite is true. This intrinsic motivation makes it easier for us to make everyday politics also seem accessible.”

However, our goal was not only to create a pleasurable way to convey knowledge, but also to extend and diversify currently predominating classroom methods. We decided to do so by creating an App and, in this, we were greatly encouraged by our mentors and tutors, respectively. Although we were faced with a variety of difficulties to overcome – such as the commissioning of a server and the immense workload of programming for which only one of our team members was qualified – we eventually finalized a functioning



and attractive App. We believe that by choosing a technologically up to date pedagogical approach, we ensured its appeal and sustainability. And, as the evaluation showed, students agreed and appreciated the opportunity to work on a tablet. As one PIA-Member phrased it: “It was my dream to create something sustainable. And I think we managed to do so!”

Of course we could not have realized our project without the great help of our three mentors, Prof. Dr. Sabine Maasen, Prof. Dr. Stefan Wurster and Dr. Alexander Lang. Their valuable advice was always welcomed and their in-depth knowledge and variety of contacts were a big asset to us. Thank you very much! We would also like to acknowledge the guidance provided by our tutors, Dominik Irber, Rupert Heindl and Matthias Lehner. Their practical advice on every step of our project navigated and helped us throughout. Thank you! Furthermore, we would also like to thank our partners, in particular PIXIDA, for help with the setup of the server, but also the regional high schools that gave us the opportunity to field-test our App. Thank you!

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PiA

Politik im Alltag - Process and team structure

1. Project

Many people say that young people today, specifically the ominous "generation Y" has no interest in politics whatsoever. Studies show that this is far from the truth and our work with the students on the project reaffirmed these findings. Students today have a higher interest in politics than the generation before. And how could they be a-political? They are growing up in times of Brexit and a Trump presidency, after all.

Our presumption going into the creation of the game was never that there is a "deficit" of student political knowledge or engagement. Instead, we wanted to create a game that reaffirms their curiosity and that can be a fun add-on to the syllabus. Our team took a lot of time and effort to research which didactical methods would best fit our purpose. In Germany, there is an excellent base of political games and simulations that political organizations, both state-run and non-profit, provide. Most of these games are simulations or workshop-events. We quickly decided that we wanted to create something that could be used in the future as well, as opposed to a one-time event.

A digital application seemed to fit the bill quite well. It can be uploaded to the app store and installed on devices, without the need to send out physical materials, and without the need for one of our group members to be present. We also found that an educational app has a novelty factor for most students, which makes them even more excited to try our game. Combining the digital with a walk around the school house was also a conscious decision. It gives students a break from sitting and listening and lets them see their everyday surroundings in a new light. Our game, PiA, combines all the features that we see fitting to convey political education: It is eye-opening, engaging, fresh and most of all – fun!

2. Process

Testing phase

Having finished our first prototype of the application in June 2018, we began the in-field testing phase. Meaning that in order to gather relevant insights according to our research question, we tested the app in classrooms in several schools in Bavaria. We have so far been able to conduct our research in 6 classes, both 8th and 9th grade. The test-app was tested in one middle school and two high schools. The age of the pupils varied between 14 and 16 years. Depending on the availability of tablets, the group size, in which the game was played ranged from one to six students per tablet. A rough assumption of ours is: the smaller the group size is, the more likely it is to achieve high scores in the game.

Along with the actual execution of the game, we had the students as well as the class teachers fill out surveys. These surveys were developed while carefully considering the research topic at hand. The incorporated questions gather information on various topics, from the overall procedure of the game to the formal appearance or the given interest in politics.

Evaluation

The collected data is currently under evaluation. Part of the evaluation is the merge of the different sets of data and analyzing these under certain aspects. In the final stage of the evaluation a feasible number of graphics will be created in order to visualize the collected insights. As part of the evaluation we will make an attempt at describing the demographic group that has taken part in our experiment.

Furthermore we aim at discussing the results at the Symposium in October. We will prepare open questions which derive from the qualitative and quantitative analysis, highlight results and reduce them into key questions that enable comparison and hopefully answer our research question. The discussion will critically examine the relationship between the method and the outcome and take into account further qualitative data from participant observations and interviews by team-members.

3. Next steps

In the following weeks we will examine if a direct relationship between the discussed outcome and the goals is given. Apart from the collected data we will try to evaluate the applied methods and their suitability. We will try to visit even more schools and increase the amount of collected data and qualitative insights in order to formulate outcomes which are even more profound.

Other future tasks are to address the potential of the ongoing use of the application after the determination of the project and the negotiation with interested publishers or institutes.

SEPTEMBER 2018

MEMBERS
TUTORS
MENTORS


Verena Eresner, Carlotta Ferri, Vadim Goryainov, Karstin Pfister, Leah Schombs,
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POSTER 3: An app's interface does not tell you about the background struggles, compromises, workarounds and decision-making in a non-ideal world. All these challenges disappear behind smooth design, intuitive control, and transitions faster than eyes can track. Accordingly, this poster reports our project's progress as if surrounding conflicts had never occurred.

When we made the controversial decision to focus on a digital application, we did so on the basis of an estimation of our resources. Unfortunately, it turned out that we were misinformed about the financial part of them. Barely had we nursed our bumps from the fights over digital vs. analogue, when this blow put us into crisis mode. We tried to reconfigure our timeline and redistribute tasks, but it was an evening walk together in the foggy Isar valley at the interim evaluation weekend at the end of January 2018 which restored our belief that we could nevertheless realize our project.

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PiA – Politik im Alltag

Background & Aim

Contrary to common misconceptions of the generation "Y", today's students have higher interest in politics than previous generations (Deutschland, 2015). We aimed to reinforce this political interest in high school students, contributing to the political education of tomorrow's voters. The significance of politics in aspects of everyday-life is underrepresented in current political education. Our goal therefore was to provide an educational tool that would allow students to discover the complexity of political opinions and decisions embedded in every-day artefacts around them. By acknowledging this complexity within the school surrounding, students are encouraged to realise the relevance of politics in their own daily lives.

Methods & Implementation

We created a mobile app that invites students to explore the politics behind their school surrounding in an active and engaging way based on a scavenger hunt in the school building. The narrative of the game lets students slip into the role of Pia, a member of parliament, and allows them to follow her daily schedule. In the app, students team up in small groups and watch videos to acquire knowledge and answer quizzes. Further, forming and giving one's opinion is required for each topic. Both the quiz-results and the distribution of opinions within the class can be visualised using a website, which provides a basis for in-depth discussions in class once the game is finished. We piloted our app in three Bavarian schools with 106 students from six 8th and 9th grade classes (ages 13-17).

Results

Confirming observations of the team members present at the schools, the great majority of students found PiA entertaining and would be interested in playing the game again. This is related to the increased ease of concentration during the interactive and digital app compared to conventional lecture-style teaching. Moreover, the fun of working in teams contributes to this impression. The teachers were generally convinced that the project inspired political interest in the students. They did not perceive the project as a disruption to the curriculum, and generally expressed interest in applying PiA in future lessons.


When comparing student's pre- and post-project evaluations, we found no increases in political interest or in the desire to discuss politics more often with family and peers as a consequence of our app. Yet, importantly, students acknowledged the influence of politics on their daily lives more after the lesson with PiA than before. This confirms our hypothesis and indicates the effect of our app on increased understanding of the importance of politics in the everyday surroundings of students. Unfortunately, an increase in political competence could not be measured and needs to be addressed by further research, for instance by developing adequate tools to measure short-term increase in political competence.

Impact

The main impact of PiA was the student's increased appreciation of the influence of politics on their daily life. Both students and teachers were convinced of the app's engaging and fun character. The app and supporting material allow teachers to employ it without the assistance or presence of a team member. Therefore, PiA is now independent of its developers and might be able to support many more students in recognizing the importance and the impact of politics in their daily lives. Eventually, we hope that PiA supports teachers in their endeavour to educate politically interested and committed voters.

Future

We are glad that many of the schools we visited plan to implement our scavenger hunt in more classes. Moreover, we could establish a collaboration with the leading publishing house in the field of politics and political didactics in Germany and look forward to supporting our new partners with tips and ideas for further developing the project.



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OCTOBER 2018

inspired by
TUM: junge Akademie

POSTER 4: Finally, we achieved the goals we had set. We were incredibly happy to see our app in completion. Unfortunately, there still was an issue to address, and that was the export to the iOS platform. We had previously tested the app on Android devices and had fixed the biggest bugs. But the devices that the TUM School of Education lent to us ran with iOS. The development policies of Apple made it much more difficult to build our app for iOS devices. In the end, we used up most of the two days before our first test run with trying to deploy the app to the devices.

But the effort we put in was not in vain: we were eventually able to make it work and to test the app in three schools. We were happy to see that the children were intrigued by the unusual format of lecture that they had the chance to experience. Also, we received positive feedback from the teachers. We were glad of all the experiences that we encountered during the project. Although we had our ups and downs, it all paid off in the end. Not only did we make a great project come to life, but we also – and more importantly – made new friends.



Project Report **StreetScience**

Team	Henry Lindner Danilo Hackner Felix Niemeier Jara Meier Konrad Weiss	Greetings from the Mentors112 Journalistic part.....114 Scientific part116 Self reflection.....128 Posters130
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Management and Communication of Knowledge

Within the projects of the TUM: Junge Akademie, students learn, in interdisciplinary groups, systematic project work on an exemplary socially-relevant scientific topic in preparation for their future professional practice in a permanently changing world. Our project group has been formed with the topic "Management and Communication of Knowledge" in mind. It was clear from the outset that, within this very broad area, a more specific and delimited project had to be defined. The project group had set itself the goal of finding new ways to achieve more public interest in science and the students of the project group discussed ways to develop a new format in which scientific results could be conveyed to a wider public.

After thorough discussions of various options, the students proposed the idea of presenting interesting areas of TUM research at an information booth at the Munich Street Life Festival. The Street Life Festival is a street party in Munich that has been organized since 2000 by the environmental organization "Green City." Core topics are environmental protection, healthy living, urban design and renewable energies. The Street Life Festival is held twice a year, on a weekend in early May and early September. Its many showplaces attract numerous visitors. In recent years, about 250,000 people have visited the festival on each occasion. With its comprehensive technical equipment and infrastructure and its

relaxed atmosphere, it offers ideal conditions for dialogue with the public and the organization of an interesting supporting program. People visit the festival for entertainment and the idea was to attract people to the TUM booth by offering entertaining presentations of serious scientific research and thus encouraging a greater interest in TUM research and a broader understanding of its significance. The students set themselves the goal of increasing awareness of the importance of public knowledge via public engagement of TUM scientists and of disseminating knowledge and raising enthusiasm for knowledge in wider circles of society. Research should be understood and made comprehensible in its meaning as a well-founded scientific activity, yielding consolidated and well-founded scientific knowledge. For the project group, the scientific aspects of the project consisted in the conception, planning, and execution of the event and, in particular, the systematic evaluation of the audience's reaction.

The idea was implemented through the conception and realization of the StreetScience event, in which scientists directly reported on their research at first hand. The first StreetScience event took place on Munich's Leopoldstraße as part of the Street Life Festival on May 5 and 6, 2018. For this purpose, and in a good location, a 50m² TUM-flagged tent with information booths and benches was built for the public.

The project group was able to attract an impressive number of TUM scientists to give presentations. Worth mentioning here is the enthusiasm with which renowned TUM scientists agreed to participate, as well as the fact that they then invariably captivated their audiences with their excellent performances. The TUM scientists had one hour each for their presentations. This time was filled with demonstrations, short lectures, and answering questions from the audience. The selected format very effectively engaged the interest of the audiences while also clearly conveying the scientific subject-matter. Children were welcomed and were encouraged to learn playfully from small experiments.

For the project work, a hypothesis was first established and this provides the basis for a systematic evaluation. This evaluation will consist of two questions:

- Did we reach the desired target group with the event?
- Did we achieve the desired effect with this method of knowledge transfer?

Questionnaires were prepared for the StreetScience events in May and September. By ascertaining the socio-demographic characteristics of the visitors, it was determined whether the visitors at the stand constituted a representative sample of the general pop-

ulation. The qualitative comment fields allowed for an evaluation of both the speakers and the event. There were also questions facilitating the evaluation of the event's impact on the audience.

With the development of the event format for StreetScience, the Group "Management of Communication and Knowledge" has performed excellently and has demonstrated its ability to cooperatively and creatively execute an interdisciplinary project in an impressive manner. We strongly suggest that this StreetScience event should be continued and developed further by TUM in the coming years.

The task of the mentors and tutors was to share experience and knowledge with the students to help the progress and success of the project. The mentors guided the students through sensitive leadership and supported them as much as possible in developing their ideas, both on their own and within the group work. As the project progressed, the students made excellent progress and finally carried out the project completely independently, achieving a really impressive result.

At present, the systematic and scientific evaluation of the project has not yet taken place.

Ernst Mayr and Peter Russer

How to escape the ivory tower

To tackle the crucial problems of the future, further advances in science will not be enough.

It is necessary for society to reconsider its behavior in accordance with the correct measures predicted by scientific methods. This process would need a general consensus on which predictions we can trust and which we cannot. The term “alternative facts” used by the U.S. counsellor to the President Kellyanne Conway showed the audience one thing clearly: Acceptance of opinions over fact, of emotional judgement over scientific knowledge is on an all-time high. Science has always been humanity’s best tool for searching for objective truth. However, trust in the method and in the community that wields this tool has decayed in the last half century. To re-establish trust in the scientific method and community, it is not enough to communicate new knowledge. It is also crucial to reduce the perceived distance between society and science and to involve both in a process of integration. Society into science and science into society.

Science Journalism

Currently science, from our point of view, still seems to be communicated from within an ivory tower. Scientists are isolated and generally not considered to have the experience to communicate to the broad public in an understandable way¹. Here science journalists have found their niche. With a talent to simplify and contextualize information, and sometimes even a scientific training, their ability to explain scientific research and results to non-scientists is high. Additionally, they partially take over the public’s responsibility to serve as controlling instance to the scientific process. Still, if the underlying problem is mistrust in the scientific process or the scientists conducting research, relying purely on science journalists is not the solution. Having a herald bringing notice from the ivory tower of science may inform, but not build up trust in the scientists inside.

Scientific rock stars

Not all scientists are isolated from the public. Through digital media and hosted on various TV-channels, certain scientific rock stars have emerged. Some mostly communicate about their own general field, like Neil deGrasse Tyson or Stephen Hawking. Others go

beyond their personal research field and are expected to have a scientific viewpoint on all topics that concern society. Bill Nye in the U.S.A. and Harald Lesch in Germany are two such scientists who are held to act as experts for all scientific fields. Scientists in comparison to journalists have a better understanding of the scientific process and can inspire future generations to take careers as researchers or simply to keep interested in current scientific discoveries. But, as with science journalists they still lack the expertise and experience when it comes to fields in which they do not have their own research expertise. To rely on figureheads of science has its own disadvantages for science communication. First, a few scientists cannot cover all scientific fields in a depth that can inform and nurture a public debate over the newest scientific results. Second, even if we had a single all-knowing scientist, the amount of people that this voice of the scientific community can interact with is limited by the method used to communicate. In this case, science communication has to take place through the mass media, and this does not allow for all individuals in the audience to have a true dialogue with the scientist. Lastly, as with all rock stars, the trust is bound to the individual. Problems arise when the aim is to foster trust in science through popular individuals. Trust in one specific scientist still allows for distrust in results that come from other scientific sources. And when such a rock star of science is caught communicating wrong or inaccurate information due to him not being infallible, the whole trust put into science by his “fans” might be put in jeopardy.

New places and new communicators

Single scientists or journalists using mass media are not the only way of communicating science to the broad public. Institutions like schools or museums have done this for a long time. When it comes to science communication schools are not the place where the newest scientific discoveries are communicated. Museums on the other hand cover long existing scientific research as well as many exhibitions with findings that were made in the last few years. Although they are crucial for informing the public, they mostly lack opportunities of talking directly to the researching scientist and are located in places exclusive to the purpose of science communication.

When trying to tear down the image of scientists sitting in an ivory tower, it is not enough to roll out the red carpet from the main entrance. The nobility must interact with the commoners and do this outside of their intimidating halls. The approach to be taken here is twofold. First, science communication has to be based on mutual interaction between the researching scientist and members from the audience. This allows the public to ask questions no one can answer as precisely as the true expert, but also is, according to the National Academies of Sciences, Engineering and Medicine, “an important way to learn about the concerns, questions, and needs of the audience(s)”².

Integrating science into culture

Mutual learning, for the one about science and for the other about societal implications, generates benefits and trust on both sides. This is one step toward the ultimate goal of integrating science as part of a whole culture. Practicing science requires a specialist training and in that sense its practice will always be limited to a certain elite. But just as with music, theatre, cooking, movie making and more aspects of culture, lay people can enjoy and take an interest in science without practical expertise, and improve their lives by taking that interest. This societal view of science as part of general culture is even more desirable considering that science and technology more than any other part of culture transforms how we live our lives. As part of culture, science should not be reduced to the communication of findings. The process of how scientific discoveries are made and the personal motivation of researching scientists are just as important. Science has to be communicated by many researchers to have broad, high quality interaction between the public and science. The same conclusion was already drawn in 1985 by the Bodmer report which describes it as “each scientist’s professional responsibility”³. This means many scientists have to be motivated to engage in science communication with the public. This is still hindered by the fact that institutions, especially in Germany, nowadays mostly reward them for high quality research and the number of published research papers and rarely for broader science communications.

Furthermore, new formats of science communication have to complement the old, taking the process outside the enshrined locations such as research institutes, museums or dedicated scientific venues. Invasion of cultural spaces can be done in many ways. Considering that science communication through direct interaction with scientists has the character of an event, many non-scientific venues that offer cultural programs can serve as a focus for these attempts. Markets, festivals and fairs in public spaces are ideal for such initiatives. In England science communication has already been adopted in such venues where the public might not expect to encounter science. For example, since 2011, “soapbox science” has been transforming pedestrian areas in England into speaker corners for scientist since 2011 and have spread in the past seven years over all continents. Events like “Markttage des Wissens” and our own event “StreetScience” in Germany have been organized to motivate their respective audiences to take part in new and old formats of science communication in novel locations.

Science communication is an old discipline that grew to adopt certain ways of communicating and certain types of communicators. To tackle the re-establishment of trust in science, new ways have to be found to advance the mission of disseminating scientific knowledge in society and to encourage society to view science as an integral part of its general culture. Science communicators have to find the right formats to communicate science in open, non-scientific venues and still preserve the idea that science serves the search for truth and advice for the public. The approach can only function if a large number of researching scientists are involved in the endeavor, which makes this transformation of science communication also a problem of how to transform the view of scientific institutions as to what their scientists should be rewarded for. ■

¹ National Academies of Sciences, Engineering, and Medicine (2017), *Communicating Science Effectively: A Research Agenda*, p. 12

² National Academies of Sciences, Engineering, and Medicine (2017), *Communicating Science Effectively: A Research Agenda*, p. 25

³ Royal Society (1985), *Public Understanding of Science*

Scientific part

■ StreetScience represents a format for science communication which embedded lectures, experiments and exhibitions of science at a leisure-oriented festival.

■ Over both iterations of the event in May and September, we welcomed over a dozen scientists from TUM at the local Streetlife Festival Munich where they presented and discussed their research in front of roughly one and a half thousand pass-by visitors.

■ Using questionnaires completed by visitors during the festivals, we were able to prove that the format generates interest, is independent of publicity, and attracts visitors who infrequently attend other events for science communication.

Strength:

- We were in general able to include topics from all subjects represented at TUM and to present them by varying methods.
- The composition of the team facilitated organization, given that each campus of TUM and different faculties were represented within the team.

Weakness:

- The implementation time for both appearances was very tight in relation to the period of the project.

Opportunities:

- The festival offers the opportunity to have large numbers of potential visitors at the same place without additional effort for the implementation of the project.
- Visitors do not need to plan to visit, which means one hurdle less for a visit than conventional formats. In addition, visitors are found in a relaxed mindset (compared to formats designed exclusively for science communication).

Threats:

- Due to the location at a preset festival, the availability of space for the event and the duration is limited.
- The Streetlife Festival offers multiple forms of distraction and unpredictable disruptions.

Lessons learned:

- The communication of science within a leisure-oriented festival is a chance to supplement conventional formats.

StreetScience – Reaching the unreachable? Embedding science communication in cultural events

Science communication is a vital element of scientific culture and even more relevant in these days of a more critical society. To reach people who are deemed outside of the range of conventional events for science communication we created a format embedded in a non-scientific event, the Streetlife Festival in Munich. The event attracts different sorts of visitors than comparable conventional formats of science communication. Additionally, the event creates a similar amount of “Situational Interest” as an exhibition at the “Deutsches Museum”. The museum’s validated scale was adapted and included in the questionnaire to have a comparable metric. Overall, an event was created that has the potential to be replicated by other institutions at other venues.

1. Background

1.1 Science communication – rising importance and ongoing problems

Since the early beginnings of science, the dissemination of knowledge¹ was an important driving force for the process of generating discoveries. Academic controversies about elemental contestations mostly within the scientific community formed the fact-based side of communicating science. The involvement of the society as a wider public for scientific insights took place in the form of cabinets of curiosities or similar approaches. These neglected relevant scientific backgrounds and the underlying scientific debates in favor of immediately perceptible effects [1]. A phenomenon still found today. During the 19th century, the commitment to communicating scientific insight increased and led to the emergence of popular science. In the expanding industry of print media, for example, the focus was increasingly on science. This trend was supported by multiple debates, including the question of the origin of life solved by Louis Pasteur and developments challenging the prevalent worldview such as the Darwinian theory of the evolution of life. Even scientists themselves contributed to such popularization, using the

written word or open-lectures.² Alexander von Humboldt was one notable example – and the underlying motive was often to legitimize or finance oneself [2]. Indeed, the establishment of scientists as authorities increased rather than decreased, and the whole trend was reinforced by professional popularizers, like commercial publishers, scientific associations, science writers, and government agencies [1]. As the aim of popular science was questionable and the effects rather negative, the designation as “popular science” had a negative connotation. Consequently, a new name was established: “science communication,” with the aim of communicating “fact-based” science as distinct from “popular” science [3].

One reason for the necessity of science communication was mostly based on the assumption that science is part of cultural socialization and should therefore be part of the basic literacy of the public.³ A second reason was to create political legitimization based on the idea that a scientific education is necessary to be able to value the importance of science. This education takes place formally in schools and universities and informally in any other context [5]. This reasoning is based on the assumption of an insufficiently literate public, later described as the deficit model. It holds that in order to compensate this deficit, it is necessary to increase factual knowledge in the form of a one-way process from the scientific world to the public. The evaluation of the success of the model was mostly performed by testing knowledge-based questions. Critiques described the results as indicators of “textbook knowledge,” incapable of capturing the public attitude towards science, which strongly affects opinions on the public funding of research. Consequently, the focus of research switched towards the changing of attitudes and the understanding of science [6]. The overall goal of the following actions was summed up under the term of “public understanding of science” (PUS), which was coined and further defined in a report of the Royal Society [7]. The report not only claimed that the gap between society and the scientific world increased as a result of specialization, but also stated that as a consequence the

¹ In this report, defined as “scientifically proven information”

² The success of such lectures was already being questioned at the time by contemporary newspapers [1]

³ Defined as every person in society and, consequently, a very heterogeneous group composed of many different groups with different needs, interest and attitudes [4]

onus is on the scientist to try to work against this rift. Bodmer calls upon scientists to take responsibility for improving science communication in order to increase the understanding and acceptance of science in society, to improve attitudes to scientific topics, and to attract upcoming scientists. Nevertheless, the understanding persists that a well-informed society automatically draws the same scientifically correct conclusions as scientists. However, studies on the public attitude towards vaccination suggest that this can be challenged [8]. Despite improved sharing of information, no increase in the willingness for vaccination was found. It was shown that the opposite effect can occur and that in those cases, acceptance declined, or negative opinions were strengthened. The additional knowledge did not necessarily reinforce acceptance but sometimes also encouraged skepticism and uncertainty. This finding led to a paradigm shift in science communication before the turn of the millennium. The deficit model was exposed as incomplete and error-prone and replaced by a dialog-based approach, practiced under the term of “public engagement” [9].

1.2 The principles of Public Engagement

Ever since it was coined in the late 1990s plenty of different descriptions and definitions have been offered for the term Public Engagement (PE). From the United Kingdom, it has spread around the world and, with increasing proliferation, variations of the term have occurred. As we seek to encompass a wide range of benefits, the definition of the National Coordinating Centre for Public Engagement (NCCPE) is applied in this study [10]:

"Public engagement describes the myriad of ways in which the activity and benefits of higher education and research can be shared with the public. Engagement is by definition a two-way process, involving interaction and listening, with the goal of generating mutual benefit."

One important aspect of the above definition is the focus on mutual benefit. We want to emphasize here that PE is in fact not a one-sided process but has been proven to have positive effects on every party involved [11-12]. At first glance, it may not be obvious how PE can be beneficial for the researcher. Yet, a growing amount

of data and surveys suggests that PE is not only important but advantageous to the speaker [13], as the following aims and benefits of PE suggest:

- To inform and inspire the public: Researchers inform and inspire young people, adults and family audiences by sharing their research.
- To consult and listen to public views: Researchers become better informed about the public's views and concerns about their research, and also gain an opportunity to hear fresh perspectives and insights.
- To collaborate with the public: Researchers and the public work together on particular projects (citizen science) or help to define science policy regarding future research direction, policy or implementation of research outcomes.

The benefits for the public may be obvious but correlate closely with the aims of the communicator. There are five goals usually associated with PE: (1) to share findings and excitement about science, (2) to increase appreciation for science and thereby enhance legitimacy for science, (3) to provide information about specific topics to facilitate decision-making processes in politics or industry, (4) to change people's opinion on a given topic, or (5) to engage with the public to learn about its beliefs and perceptions.

There are multiple ways to achieve these goals but there is as yet no clear consensus as to which specific methods should be used or which have the greatest potential for success. A trial-and-error approach is still the most common way to define how to engage, where to engage, and with whom to engage [9].

1.3 Science communication and Public Engagement in Munich

To clarify the current situation regarding science communication in Munich we want to give a brief overview of the relevant existing projects and events. It is to be noted that mass media, social media and other parts of science communication not specifically related to Munich are not represented.

On the one hand, there are permanent venues, like museums dedicated to scientific knowledge such as the Deutsches Museum. These institutions present information throughout the year – mostly in the form of exhibitions. This limits the potential information gain to the presented content. Additionally, the degree of understanding is the perception depending on the visitor. On the other hand, there are projects which only take place on specific days in the year. For example, universities and other scientific institutions present their work on multiple occasions and at various venues during “Münchner Wissenschaftstage,” and also during open-door days at their own facilities. Even public lectures take place, either in lecture halls or at other places, e.g. TUM@Freising. These institutional projects are complemented by smaller events, like occasionally science slams, “Wissenschaft im Wirtshaus,” and science cabaret.

The shared pattern is that all of the events listed above take place in a venue associated with science or specifically designed to communicate science. Therefore, the majority of visitors are already genuinely interested in science. People with a low interest in science or those who may feel intimidated by science are less likely to be attracted. This raises problems if the whole population is to be reached by science communication.

2. Goals and Methods

2.1 Event design for science communication at the Streetlife Festival Munich

To engage with people of lower interest in science and those who might feel intimidated by dedicated scientific events, we created a venue for science communication at the Streetlife Festival Munich and employed it twice. Research conducted in the UK suggests, that science communication at generic venues can have an impact – largely because visitors are spending leisure time and are in a relaxed mindset [14]. Based on these findings, we created a booth at the Streetlife Festival Munich which was likely to attract people of all population groups and to facilitate the communication of science. First, it was stated that “simplicity mattered less than the opportunity for audiences to interact directly with scientists” [15].

Second, it was shown that classical formats of scientific presentation consisting of a lecture and a question-session have worked well in the context of similarly structured presentations on other topics. Third, the audience was able to understand challenging scientific issues [16]. Hence, we approached scientists from almost all fields of study represented at Technical University of Munich (TUM) and asked them to give short lectures including the opportunity for questions during and after the actual talk. To encourage the audience to engage and ask questions, a non-scientific moderator supported the lecturer. The lectures were held in a tent-like structure offering seating for around 30 persons. In addition, an uncovered area provided space for at least one exhibit visible from the far distance to help attract an audience. This meant that we could avoid classical methods of publicity and could make our event stand out more clearly from surrounding events. Furthermore, we offered the possibility – mainly, but not exclusively, to kids – of doing some small experiments, to handcraft platonic bodies or viruses, or to experience steps in the development of virtual reality glasses. The complete program is presented on our website [17].

2.2 Quantitative evaluation

The evaluation of our venue is divided into two subcategories. Primarily our evaluation consists of the testing of our initial hypothesis: “Science communication embedded in a public event can reach an audience that better reflects the public structure, in sociodemographic aspects, than an audience at an event that is primarily science-related.” This is done in two phases, corresponding to the two iterations of our festival. The evaluation focuses on answering three general questions:

1. Do we reach the public, defined as a cross-section of the population in Munich?
2. Do we reach a section of the public that is further away from practicing science or cannot be reached by other known formats of science communication?
3. Does our science communication achieve notable short- and long-term effects as well as sufficient audience-holding power to contribute to a successful event?

The secondary part of our evaluation is the qualitative feedback from speakers, exhibitors and the audience. The feedback is cru-

cial to the improvement of the event, as it gives insight into both the positive and negative experiences of all participants and can be used to further explore new scientific questions regarding the topic. The measurement was done by means of an anonymous questionnaire. Filter questions were used to determine the level of participation of members of the audience and to remove those who did not participate in our formats.

2.2.1 Sociodemographic analyses

The first part of our quantitative analyses tests our claim as to whether or not we reach an audience more representative of the public than other events. We measure the sociodemographic characteristics of our audience and compare it with the local population and audiences of other science communicating events and venues. More specific questions determine whether the audience has a higher pre-existing interest in science (e.g. because of an academic background) than the average population. Another question explores whether our audience visits other events or venues and consumes media that communicates science to determine if a large portion of our audience cannot be reached by conventional forms of science communication.

2.2.2 Pass-by visitors and degree of engagement

One of the reasons why we planned to communicate science in a non-science-related public venue is the attraction of visitors that do not expect to encounter scientists talking about their work. For one, up-front advertising is not necessary to attract visitors. Secondly, the pass-by visitors that finally attended StreetScience took this decision without having to drive to a specific science communication venue. For this reason, they might be different from visitors of other science communication venues.

Before the festival, a minimal amount of advertisement was done on various social media channels including those of TUM and other science communication events. This was asked for by various stakeholders in the project. To determine the relation of pass-by visitors to those that planned to visit StreetScience two yes and no questions were asked in the questionnaire:

- 1. Did you deliberately come to visit StreetScience?
- 2. Did you know about StreetScience from advertisement?

The four different combinations of answers that can be given to these two questions assign any visitor to one of four categories (see table 1). Category 1 contains the expected pass-by visitors. Category 2 are those visitors attracted by the advertisement. Visits from people in category 3 and 4 cannot be causally linked to the advertisement or the festival context. Visitors from category 3 may have needed the perception of StreetScience from another source like social media to have the impulse to visit StreetScience when they saw it during their general festival visit. Visitors from category 4 may have heard of StreetScience from another participant in another category.

Categories/Question	1. Deliberate	2. Advertised
1. Pass-by	No	No
2. Adv-Won	Yes	Yes
3. Adv-Immune	No	Yes
4. Secondary	Yes	No

Table 1: Classification of visitors to determine the impact of the advertisement.

In one question of the questionnaire, the visitors were asked about which activities they participated in. Visitors could indicate participation in multiple activities that were fixed on the questionnaire. These activities were not events on our program but a description of engagements possible at StreetScience. Further below they will be explicitly listed. In a second question, the visitors were asked to indicate if they agreed that it was interesting participating in the activities on a five-point Likert scale with the following options: “don’t agree at all”, “don’t agree”, “neither agree nor disagree”, “agree”, “totally agree”. This question served as a filter for two purposes: First, to filter out questionnaires of people who for some reason filled out the questionnaire without participating in any activity; and second, to filter out ratings of interest in an activity that people did not participate in and may have rated by mistake. The question

that determined how strongly visitors agree that an activity was interesting served to determine which activities are important to get and keep visitors interested. To do this, an algorithm ranking activities based on ratings given by the same visitor was used. Not many visitors would participate in multiple activities and thus the interpersonal differences in how they rate the same degree of interest may give wrong results when averaging across all ratings given.

2.2.3. Our visitor at other venues

To determine if we reach an audience not captured by other types of science communication formats, we asked if our visitors had attended the Münchner Wissenschaftstage, any open day initiative at a scientific institution or events like “Lange Nacht der Wissenschaften” or “Lange Nacht der Universitäten” in the past two years. As a comparison, we asked the same about scientific museums and scientific lectures.

2.2.4 Determination of the situational interest by catch and hold analyses

Communicating science in the context of a street festival has similar goals as museums. Knowledge should be transferred, interest generated and to no specific audience but the general public. Museums are free-choice learning environments and the same can be said about science communication formats during a street festival. When trying to measure the generated interest in selected scientific topics, two types of interest can be distinguished: Situational interest and long-term interest. Situational interest is developed in a concrete learning environment [18]. It can be subdivided into two aspects: The catch-component describes the first appearance of situational interest when a person's interest is aroused and directed toward an issue. The hold-component describes the longer-lasting and stabilized situational interest, where a person wants to deal with a certain issue, learn more about it and perceives it as meaningful. In particular, the repeated activation of the hold phase is supposed to lead to the development of a long-term interest [19]. Situational interest has already been shown to be crucial when trying to reach a museum’s audience and is therefore also a realistic aim for our format.

To measure the generated situational interest during the festival, the questionnaire used a validated set of items with a five-point Likert scale [20-21]. The original scale contained twelve items in total. Six items each for both the catch-component and the hold-component. To reduce the amount of time needed to fill out the questionnaire and not to overload the visitors, the scale was reduced by eliminating some items. The catch- and hold-components are further subdivided, so the process should eliminate an equal number of items in all sub-aspects. Together with Prof. Lewalter, the creator of the scale, we eliminated the four items that were least important for internal consistency and reliability of the scale. This was done by identifying the item among the sub-aspect that, when removed, would have the least impact on the scales reliability, compared by using the Cronbach's alpha value [22]. Scales and data are closely related when it comes to reliability and the scale was not validated in the context we used it in. For this reason, we will recompute Cronbach's alpha value to judge whether or not the reduced scale is still reliable for evaluating a science communication format in a non-scientific environment.

2.2.5 Indication for a long-term effect

As previously mentioned, situational interest is only one of the two types of interest one wants to generate with science communication formats. Longer-lasting interest is the desired outcome and situational interest is supposed to lead to it [19]. However, measuring the long-term effect of science communication events is problematic. Rewards for participating in a long-term study have to be neutral so as not to further increase the selectiveness of an already highly selective sample consisting of people freely willing to participate in the studies. Handing out science-related consumables, such as entry tickets to a science museum, would have to be kept secret from the visitors until after they filled out the questionnaire so as not to influence participants’ intentions. In turn, this would mean that free entry tickets could not be used as an incentive to complete the questionnaire but could be used as a measure for generated longer lasting interest, by counting the number of redeemed tickets. Creating a large sample size would have needed a large investment. Hence, we focused on measuring only the situational interest as it is considered as a strong influencing factor on generation of long-lasting interest.

2.3 Qualitative evaluation of the assessment of visitors and speakers

When evaluating the effectiveness of science communication events scientifically, quantitative methods are not sufficient. Qualitative interviews are used to gain ecological and socio-economic information on specific conservation issues. They help to understand the knowledge, values, beliefs or decision-making processes of stakeholders, and strengthening research design and output as well as getting valuable feedback on how to improve the format. Although they are indispensable, their results and execution have to be discussed critically and transparency is needed on the sampling strategy and the choice of questions [23]. To meet these transparency criteria, the details of the interviewees and question selection follow.

To capture the feedback from the audience, we added two open questions at the end of the questionnaire. One asked for specific feedback regarding the presented topics, the exhibited objects and the program presented in order to gauge content-specific experiences. The other asked for notes, suggestions and critique to capture general improvement advice and emotion-based experiences. Every slot of our lecture program was followed by a debriefing of the speakers containing the qualitative interview where we asked all speakers the same nine questions. The first three focused on whether or not the speaker participated in other science communication formats, had thought that StreetScience was a valuable addition to these, and whether, after participating, their opinion had changed. The next set of three questions were intended to identify if the scientists who presented their work had benefited from participating. The questions ask if participating helped them understand the point of view and concerns the public may have with regards to their research; if they believed they had communicated important aspects of their work or had changed the visitors' opinions with regard to their research area; and, finally, if they felt they had something to take away for their own research and work. The last three questions asked for feedback on how helpful the moderation was, what they would change about the format of StreetScience and an open question for general comments.

2.4 Context-dependent limitations of the evaluation

StreetScience is implemented in the context of public non-science related events with an expected majority of pass-by visitors. For this reason, a questionnaire or interview has to be short enough not to scare off visitors during their leisure time. Equally, it is important to capture visitors with the evaluation once. Doing a separated pre- and post-evaluation is not feasible because a visitor would have to be asked to take time twice for the evaluation process unless one were to deploy a new type of evaluation that follows visitors throughout their visit of StreetScience. Gaining participants for a follow-up study is problematic as they would be either a special subset of visitors that were more positively inclined toward the evaluation subject or a subset motivated by a neutral reward offered to all visitors alike.

As of 2018, the collection of the necessary information for a follow-up study is even more problematic because of the newly established General Data Protection Regulation (GDPR [24]).

To argue about the effectiveness and efficiency of a new communication format, the comparison with similar formats is necessary. This, however, is only partially possible, due to big differences from established formats such as museums, for example, and the small number of executed studies in the context of more similar formats. Especially in the case of similar events that took place in some public context, no quantifiable metric was available. This led us to compare our format with museum exhibitions according to the established metric of situational interest.

When trying to compare similar formats to StreetScience one more limitation hindered us from answering more precise research questions: the unavailability of raw data. This allowed us only to compare StreetScience with the published results of other formats but not to answer more differentiated questions on the composition of visitors.

3. Outcome and Discussion

In this section, we will present the results of our qualitative and quantitative evaluation. By asking for the activities our visitors participat-

ed in, we were able to filter out questionnaires of those who did not take part in our format. From the 915 collected questionnaires, we were able to use 873 for further evaluation. The sociodemographic data will be compared with another event-type science communication format that took place in the same city. This will allow comparison with respect to city-wide estimates on the composition of its population [25]. For the comparison, we choose the Münchner Wissenschaftstage. This event is also a format trying to communicate science to the general public but taking place in different locations that require the audience to plan a visit to the event. The comparison was done with this format as our hypothesis expected StreetScience to have an audience closer to the sociodemographic average than an event located at more isolated venues. At the same time, a difference in the audience's profile is valuable too, as we shall see later, as this helps to engage a different portion of society.

3.1 Sociodemographic analyses

During the two events hosted on the 5th and 6th of May and the 8th and 9th of September, we used the same four questions to measure age, gender, highest acquired educational degree, and state of employment. For this reason, the results will be presented together and only relevant differences in the data will be presented. Such differences might exist because of the different seasons the two iterations took place in.

The variation for gender was negligible for StreetScience and Münchner Wissenschaftstage. When compared to publicly available estimates of the gender composition in society, StreetScience had a few more female visitors in May ($f = 53.2\%$, $m = 46.8\%$) and a few more male visitors in September ($f = 47.7\%$, $m = 52.3\%$), averaging out so closely to the estimate that the difference is only about 2 per mill. Although the Münchner Wissenschaftstage had a higher difference of 3-4 % from the estimate, the difference cannot be considered high either.

When measuring the age of our visitors, the option was to select age groups in spans of 10 years, e.g. "30-39 years old." The only difference was the group younger than 19 but older than 12. Children younger than 12 did not get the possibility to fill out the ques-

tionnaire but their visit was captured by a question asking visitors how many children of that age they accompanied. The collected data at every single iteration, as well as taken together, made us reject our initial hypothesis. StreetScience was not closer to the sociodemographic age average than Münchner Wissenschaftstage. As illustrated in figure 1, visitors at StreetScience were overall younger, with a significant spike in visitors younger than 30. In contrast, the Münchner Wissenschaftstage have a higher relative number of visitors between 40 and 80 than the estimated population. The average age in the estimate was 41.2. At the Münchner Wissenschaftstage it was 44.2 and at StreetScience 31.1. When computing the standard deviation of the relative number of visitors in every age group at the events to the sociodemographic average, the deviation at StreetScience (18.7 %) was even higher than at Münchner Wissenschaftstage (10.4 %). This, however, is still a result that can be argued to be good as a format was developed that takes place in a context where a different audience is reached.

With regard to employment types, StreetScience had significantly more students and fewer retired people and pensioners. This goes

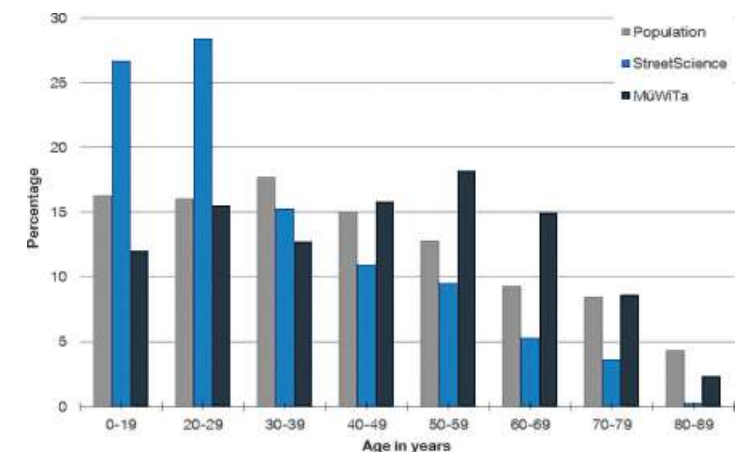


Figure 1: Age distribution of visitors from StreetScience in comparison to the Münchner Wissenschaftstage (MüWiTa) and the population of Munich.

along with the age difference seen before but there seems to be no possibility of showing how they are causally related. If we compare the highest educational degree achieved by our visitors with those of the Münchner Wissenschaftstage, figure 2 shows that our audience had fewer academic degrees. This could be an effect of our audience being younger on average. To exclude this correlation, we compared how the balance in relation to educational degrees changes when ignoring the younger audience. As soon as we filter out visitors below the age of 29, the average visitor achieved a higher academic degree. However, the same operation could not be performed for the Münchner Wissenschaftstage as raw data was not available.

For Munich, we could not retrieve a reliable estimate for relative employment or highest educational degree. For this reason, our comparison of the audiences of both events was made without knowing if their relative closeness to the real existing population in Munich.

3.2 Visitor types

As previously mentioned, we asked visitors whether or not they deliberately intended to visit our stand and if they saw an advertisement for StreetScience prior to the event. Additionally to filtering out visitors who did not report having participated in an activity, we also filtered out those who did not answer one of the two questions. Data of 869 visitors were taken into account. As expected, 68 % could be identified as pass-by visitors and only 8 % as visitors who were attracted because of advertisement. The remainder cannot be causally linked to either of these groups. Figure 3 strengthens the prediction that the achieved audience is not closer to the scientific community because of advertisement over the university's social media channels. Additionally, a high number of pass-by visitors indicated that the format is self-sufficient in attracting visitors because of the chosen location.

3.3 Visitors of other venues

When analyzing the visitors at other venues, museums and scientific lectures, we found that museums and scientific lectures were quite popular with the sample reflected in this study. 71 % went to scientific lectures during the course of the last two years – a fact

which is most likely to be attributed to the high number of students among our visitors. 80 % even visited a science museum in the last two years, which may be due to the famous Deutsches Museum located in Munich but might as well be positively correlated with the youthfulness of the sample. When looking at visits to other

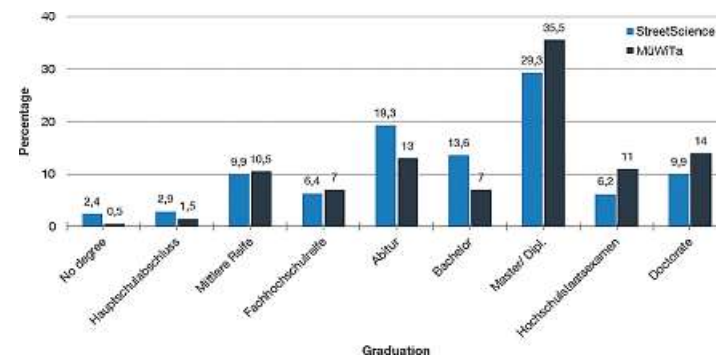


Figure 2: Composition of the audiences in relation to graduation, based on the German school system.

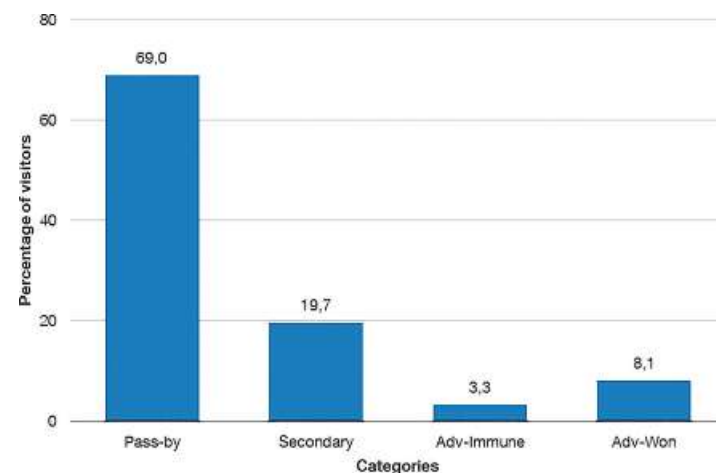


Figure 3: Visitor types at StreetScience in relation to the impact of advertisements.

science-related venues, the picture is different. Only 52 % visited any of the suggested event-like formats. Although this represents a majority, this still means that these other formats did not attract almost half of our audience. Hence StreetScience is a valuable addition to attempts to communicate science to more people.

3.4 Activities and rankings

We asked whether or not visitors took part in any of the following activities at StreetScience: "Listen to a presentation", "talk to a scientist", "ask a question", "view an experiment", "look at an exhibited object" and "try something out". When counting the number of the selected activities that were self-reported "listening to the presentation of a scientist" was mentioned the most with 47 %, followed by "looking at an exhibited object" with 18 %. According to our ranking algorithm based on self-reported interest "listening to a presentation" is ranked second place after "trying something out". This emphasizes the importance of the lecture-style format with dialogues and moderators for StreetScience.

3.5 Catch and hold analyses

From the answers to the five-point Likert scale, we computed the generated situational interest and the sub-aspects of catch and

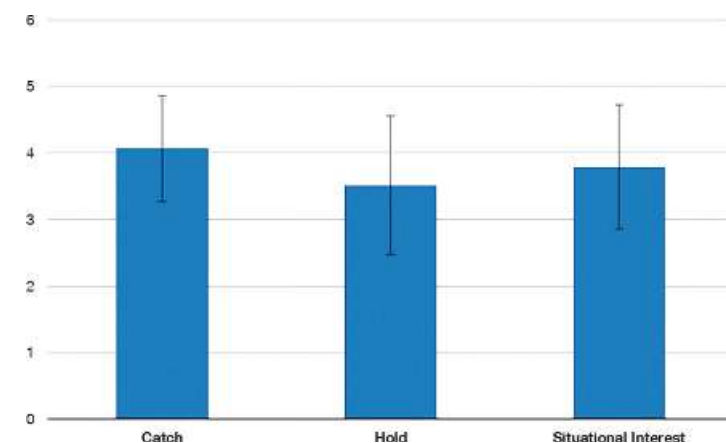


Figure 4: Situational interest.

hold that we explained previously. Figure 4 shows the values and the standard deviations. Compared with a report of the Deutsches Museum regarding the exhibition "Nano- and Biotechnology" [26] we reached similar values for the catch and hold aspect of the generated situational interest. Although being slightly lower, and with a slightly higher standard deviation, these results indicate a good arousal and retention of a visitor's interest during his or her visit. This is positive in the sense that, considering the less committed audience in the first place, similar values of generated interest to a museum's exhibition can be counted as a success.

We adapted a scale used and validated in the context of museum visits and school teaching. So, the validity and reliability of the scale in the new context can be questioned. To judge whether the reliability of the scale is still maintained we recomputed the Cronbach's alpha values for the entire scale and all sub-aspects. With the values for the situational interest ($\alpha = 0.866$), the catch-component ($\alpha = 0.81$), and the hold-component ($\alpha = 0.836$), the internal consistency can still be judged to be high enough for basic research [22]. To identify the importance of the content communicated by the scientist and the scientist's style of presentation, we filtered for the questionnaires of persons who "watched the presentation of a scientist" and were able to associate them with the specific slot of the speaker. A difference can be seen in numbers that would suggest that some topics or speakers were indeed better than others in generating situational interest. The averaged values for situational interest per slot ranged between 3.4 for the lowest-ranked lecture and 4.3 for the highest one. Per lecture slot, only between 12 and 32 questionnaires were available to give us insight into the generated values for situational interest. So, the sample sizes may not be enough to support the future selection of topics and speakers.

3.6 Qualitative evaluation

The number of different interviews was too low to be used for quantitative methods and the interviews were thus evaluated with qualitative techniques. The 18 scientists who participated in the lecture formats were debriefed after their presentation slots and we transcribed these interviews.

Seven of our speakers had other experiences when it came to communicating science to the broader public, and another seven had participated in formats where the audience was some specific interest group or a specific part of the public, such as politicians or stakeholders from the industries.

All mentioned that, prior to their participation, they thought that the format was a valuable extension to the existing formats for communicating science. However, as they would not have participated otherwise, this cannot be counted as evaluative evidence. The reasons mentioned for their participation were many and varied: to fulfill a duty to society; to legitimize research; to get feedback from an unbiased audience; to promote their universities; to demonstrate what student initiatives can do. Two speakers reported that the public audience at StreetScience was more interested than at other formats they had participated in.

When asked if they had gained a better grasp of the point of view and concerns of the public, five responded that they had noticed that there was still a problematic lack of understanding regarding their research. Three reported that they noticed visitors being interested more than they had expected. Some of the speakers that had also taken part in other formats said that they had already encountered these concerns. 14 speakers explicitly stated that they had successfully communicated relevant aspects of their topic, and four also believed that they had been able to change someone's opinion. Almost all lecturers had learnt something about how they might improve their presentations for better communication in such a context. The presence of a moderator was perceived as helpful by all speakers and some stated how important the moderator was for establishing a relaxed and open atmosphere, as well as in attracting the initial audience and helping to smooth things along during the presentations if the dialogue with the audience did not start right away.

The most important feedback on improving the format was related to problems experienced with acoustic feedback during the first event in May. This alerted us to the need for expert support from an audio technician during the whole festival and so the problems

were rectified for the second iteration in September. Some stated that a short presentation of only 5-10 minutes makes it difficult to communicate about their research and this led to us being less strict regarding that requirement. The major complaint at the second iteration was that there was too much noise from the surrounding festival, which, as one speaker also thought, is hardly avoidable in such a context.

The comment fields in the questionnaire were mostly filled out with supportive comments encouraging us to go on with the format. Some comments referred to specific content presented by scientists and we therefore did not include those as part of our overall evaluation. Only a small number of comments criticized the level of complexity of the content, and these inclined in both directions: too complicated and too trivial. This will not lead us to recommend a specialization in either direction for future events.

4. Summary and Future Goals

During our project, we developed StreetScience as a format for public science communication which is able to be embedded in non-science-specific public venues. The common positive feedback, from the visitors, as well as the speakers, showed that the tested structure is employable and has an impact. Our initial hypothesis, that we address the sociodemographic average, was falsified. Nevertheless, we were able to show that our format is a relevant complement to existing venues in Munich. First of all, many visitors reported attending no other comparable venues. Second, we were especially successful in addressing a younger audience than the Münchner Wissenschaftstage. Furthermore, we evaluated the number of pass-by visitors and publicity-influenced visitors and were able to demonstrate independence from advertising as a principal means of attracting a significantly large audience. To measure the quality of our format we slightly modified an established scale for situational interest. The results suggest that the generated interest is comparable to studies done at a local museum. Additionally, the usage of a standardized scale allows for future comparability between science communication formats that take place in public spaces.

In line with our belief that science should be communicated broadly by many scientists, we also need our format to be carried out more often. Therefore, our future goal is to establish StreetScience as an ongoing format supported and promoted by TUM. To increase the coverage of the public audience, future steps would include finding other public leisure-oriented events such as the

Streetlife Festival to serve as hosts for the format. To broaden the impact on society, additional research institutions should be encouraged to adopt such formats in the future. To further improve the effectiveness of StreetScience, more quantifiable methods on the long-term effect of the generated interest and the scientists' side-benefits need to be validated. ■

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Self-reflection StreetScience

Looking back, our project was an elaborate but very instructive experience at the TUM: Junge Akademie. As expected, our activities went far beyond purely scientific work and we had a free crash course in project management and event organisation in all their aspects. In the course of our work, we were confronted with interdisciplinary problems which, originally, we had not even imagined. These especially concerned the organizational effort required. We secured the financing of our event, designed a website, employed helpers, designed several flyers and had intensive contact with numerous professors and chairs of TUM. We were often carried away by our project and much of what we had planned at some point was ultimately unfortunately not achievable. However, our expectations were far exceeded and we were able to take an interesting look behind the scenes. And that's probably what makes the time as a scholarship holder at the Junge Akademie so special.

Right from the start, we were a comparatively small team with only five scholarship holders. This fact influenced our way of working during the project phase in many ways. Although we were slightly disadvantaged in terms of manpower and attendance, it also allowed for faster decision-making processes in a flat non-hierarchical team. All team members made the trendsetting decisions of our project work together after reaching consensus through discussion. Coordination processes and the distribution of tasks among ourselves could also be managed relatively easily. In principle, everyone always had an overview of the entire project, regardless of their own specialization. In this way, a well-functioning system was established over the months.

Furthermore, we formed a really quite diverse team. There was no duplication within the departments and despite the technical orientation of TUM, our team consisted of only three natural scientists, supported by a physician and an architect. Everyone was able to contribute their personal strengths and the specific approaches of "their" field of study. The resulting diversity of views on the same topic allowed for a wide variety of approaches. These were supported by the weekend seminars of the Junge Akademie, which presented new and innovative methods and approaches to self-evaluation for everyday project work. These often provided new impulses for teamwork and gave necessary motivational boosts. The exchange with other teams of the same year was es-

pecially helpful in making some internal problems visible. However, joint brainstorming also provided possible solutions.

These were particularly helpful during the topic identification phase. Due to the almost unlimited choice of topics, this decision was more difficult than expected and our discussions ranged from atomic semiotics up to an analysis of the current brain drain. Here, the structures of the Junge Akademie did not set any limits for us and we were curious to see what could be achieved. After a comprehensive background research on the given topic "Management and Communication of Knowledge", it was difficult to commit oneself to a single topic. Nevertheless, it was already clear to us at the beginning of the project that our commitment should also benefit people outside the university. This was what we set out to do and we were thus responsible for the success of our idea. This personal responsibility for the success of our own project is often not a matter of course outside the TUM: Junge Akademie at the university, because there is sometimes a lack of the support that is needed to carry through a plan to the end. However, we always received such support from the office or the Junge Akademie in general. And in some places, there was also simply no way back, so that our gaze was only directed towards the goal.

At some points, this pressure was certainly necessary for the success of our idea in its present form. Often our motivation declined unintentionally or was simply suppressed by more important university obligations. Then our mentors, tutors or the office of the Junge Akademie shook us up and the backlog was cleared again with motivation and commitment. Besides, numerous deadlines and "power projects" demanded our attention and reduced our personal free time sometimes to nearly zero. Especially in the last weeks before the respective festivals, the project work was certainly a full-time job, which caused some sleepless nights in front of the screen or during the dismantling of the festival tent. In the end, we can be more than satisfied with the outcome and the results speak for themselves. We are happy that everything went so smoothly and that we were able to realize our vision with the support of the TUM: Junge Akademie.

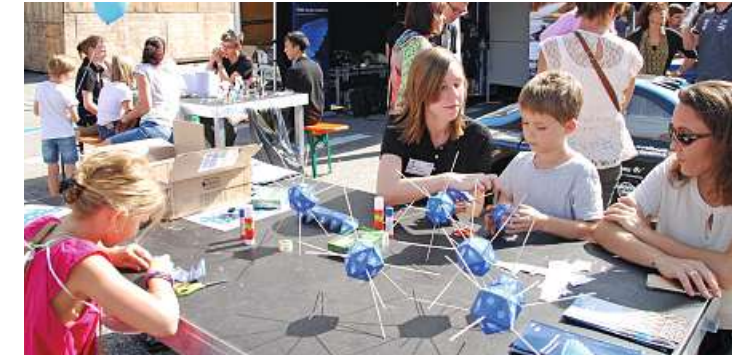
In the meantime, some team members are now scattered in different parts of the world. But nevertheless, we hope that our work can



be kept alive by the people remaining at TUM or the TUM: Junge Akademie. It is certainly a very meaningful project for scientists, society and also the university. Hopefully, we were not only able to impart knowledge during the organized four days but also to give new insights and fun to all participants. We would, therefore, be delighted if we could continue to contribute to the preservation of our vision in the future.

Acknowledgement

We would like to offer our special thanks to our mentors and tutors who always supported us. They helped us back on track when we got carried away with a fixed idea and kept us on the correct path of scientific work. They provided us with their experience in organization and planning and established crucial contacts.



In addition, we wish to acknowledge the help provided by the office of the Junge Akademie and all other volunteers who made the implementation of StreetScience possible in the first place.

We would like to express our very great appreciation to all professors, chairs and student initiatives that took up the challenge of StreetScience and sacrificed their free time to support us and the Junge Akademie. Dr. Marc Dennis Weitze, Prof. Dr. Anette Noschka-Roos, Prof. Dr. Doris Lewalter, and Andrea Geipel all provided us with very valuable information concerning the scientific background and possible approaches for the scientific evaluation of our project.

We would further like to thank TUM for financing our vision. ■

Science Communication

ABSTRACT Science is of lasting public relevance. Universities need to communicate their findings to the public facilitating a fact-based debate and fulfil their responsibility to society. In transferring knowledge about complex problems to the broad public not only the truth of the message but also the perception of the communicator impacts reception. An informed strategy of science communication and awareness of the audience crucially shape its success.

GOALS
We aim at the identification of those elements which are instrumental for success or failure in the transfer of expert knowledge to the major public and subsequently helping in improving this process. Further we would like to inspire on-going discourse within the university community about its duty to the public.

OUTCOME AND DISCUSSION
In order to single out the aspects which are either obstructive or supportive in science communication we plan to interview entities of the public ("the recipient") and experts who create knowledge or are in charge of the university's strategy. ("the sender"). Using these insights we hope to modify or redesign methods. A field study will be used to examine whether they work as expected.

HYPOTHESIS
The communication of knowledge out of a university into society can be improved by applying audience-aware methods.

OCTOBER 2017

MEMBERS Danilo Hackner, Henry Lindner, Jara Meier, Felix Niemeier, Konrad Weiss
TUTORS Martina Gschwendtner, Tobias Stahl
MENTORS Prof. Dr. Ernst Mayr, Prof. Dr. Peter Russer

inspired by
TUM: Junge Akademie

POSTER 1: At the beginning of our project, we clearly had to narrow down our framework topic "Management and Communication of Knowledge". We concentrated on science communication from the university into society in order to undertake a project that was useful for both sides, because we saw the potential for improving the current methods by which the university presents itself to the public as a whole. At that time, it was not yet clear how we wanted to establish an improved form of science communication.

StreetScience

Public Engagement at the Streetlife festival

150 Jahre
culture of
excellence

ABSTRACT
Sharing knowledge about the principles, activities and outcomes of science with the public through direct interaction between the two parties involved is generally summarized in the term Public Engagement. This is implemented using different methodology. For most formats, a decision by the public to get informed (visit a museum, read articles, etc.) is necessary. To overcome this barrier, we bring science onto the Streetlife festival Munich, in form of a booth, devoted to interaction and hands-on-experiences.

HYPOTHESIS
At open, non-scientific events, public engagement through direct interaction and hands on experience creates a mutual benefit for scientists and visitors.

RESEARCH PROCESS
Concretising the idea had severe impact on the researched literature. The topic was shifted from scientific communication in general towards public engagement. Here knowledge and instructions are available and can be integrated in our specific project at the Streetlife festival.

Science Communication mostly happens indirectly with the media as intermediary. Veritable/True/Real direct communication between scientists and the open public is rare and happens in a context warded by scientists (museums, science festivals, open lectures).

EVALUATION METHODS
Scientist (Qualitative method: Interview or Questionnaire): Pre-event: Scientific and demographic background, previous PE activities, expectations. Post-event: Personal benefit, wish to participate again...
Process Categorisation through observation.
Public Presence in numbers, number and relative popularity of different information material, number of later visits on an informative website, small online questionnaire.

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JANUARY 2018

MEMBERS Danilo Hackner, Henry Lindner, Jara Meier, Felix Niemeier, Konrad Weiss
TUTORS Martina Gschwendtner, Tobias Stahl
MENTORS Prof. Dr. em. Ernst Mayr, Prof. Dr. em. Peter Russer

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POSTER 2: In the course of extensive scientific research, we came across the concept of "Public Engagement" which inspired us. We chose the Streetlife Festival as the place for our science communication as we hypothesized that this event and its opportunities for direct communication between visitor and scientist would benefit them both. In order to test our claim, we brought to life StreetScience, the concept of a stand for science communication embeddable into a leisure-oriented festival. At this point, our project's task shifted from theoretical research to practical format creation, organizational work, communication, and evaluatory research.

150 Jahre
culture of
excellence

StreetScience

REALIZATION AND RESEARCH

We want to proof, that public Engagement in a context not warded by scientist attracts another proportion of society, than typical events for science communication and is able to create interest and thus has a detectable impact on the visitors. StreetScience meets these special requirements by being situated on the Streetlife Festival Munich and offering a diverse type of topics and formats, hence enabling us to test our hypotheses.

The test was performed through interrogation by questionnaire of the visitors in terms of their sociodemographic data, including the age, gender, type of employment and academic background. A secondary part of the questionnaire determined whether our audience visits other events or venues and consumes media that communicates science to determine if a large portion of our audience cannot be reached by conventional forms of science communication.

IMPRESSIONS OF STREETSCIENCE MAY 2018

Qualitative statements of visitors ...

"Thank you so much! For the first time it was fun to study mathematics."

"I think this idea is great, so much so that I'm here for the second time today! Interesting presentations – Thank you."

"I think it's great that the TUM brings their hands-on research closer to people, not just in the lab, where ordinary people never get! Keep it up."

... and speakers

"This is certainly a one-time thing, that scientists go to the streets and stand at the front door and says: Hello people, this is who we are." Prof. Dr. Edgar Biemer, Emeritus of Excellence

"It's wonderful to have the general public to be curious about what we are doing and it's actual our duty to communicate it to the general public." Prof. Dr. Gordon Cheng, Director Chair for Cognitive Systems

SOCIDEMOGRAPHIC COMPARISON

First results of the sociodemographic data, based on 480 questionnaires of StreetScience May 2018, show that we did not reach an audience more representative for the population in Munich regarding the age than a venue dedicated to science communication: Die Münchner Wissenschaftstage. StreetScience having a strong tendency toward younger, and the other to older visitors, but still covering most of the age spectrum. However, the analyses of the academic background showed that our audience has a lesser scientific background than at the Münchner Wissenschaftstage. Younger people may have a higher scientific knowledge and interest but still on the way to gain respective degrees. Without raw data, effects of age in this comparison with younger visitors at StreetScience could not be eliminated. A question about other events for science communication revealed, that over three-quarter of the audience have not visited the Münchner Wissenschaftstage within the last two years. Over half of the visitors stated to have not visited a open-door day at a university. Overall it is determined that we reached a differently composed audience than other formats of science communication.

NEXT STEPS

May 2018
StreetScience I

September 2018
StreetScience II

2019
StreetScience

- Sociodemographic data
- Qualitative feedback for improvement of the event
- Sociodemographic data
- Situational Interest
- Implement sustainability

SEPTEMBER 2018

MEMBERS: Donato Hackner, Henry Lindner, Jara Meier, Felix Niemew, Konrad Weiss

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POSTER 3: And so StreetScience took place both in May and in September at Munich's largest street festival. This required the commitment and dedication of our entire team. Each one of us had his or her own personal field of responsibility though without losing track of the big picture. Thanks to numerous external supporters and many sleepless nights, our event was certainly a success. Our concept was scientifically evaluated by a visitor survey, which should help to test the further hypotheses we had developed in the meantime. ■

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Reaching the Unreachable?!

StreetScience: Embedding science communication in cultural events

Science communication is a vital element of scientific culture and even more relevant in these days of a more critical society. To reach people who are deemed outside of the range of other events we created a format of science communication embedded in a non-scientific event, the Streetlife Festival in Munich. The event attracted different visitors than the compared conventional formats of science communication. Additionally, the event created a similar amount of 'Situational Interest' as an exhibition at the Deutsches Museum. The museum's validated scale was adapted and included in the questionnaire to have a comparable metric. In total, an event was created that bears the possibility to be implemented by other institutions at other venues.

"This is certainly a one-time thing, that scientists go to the streets and stand at the front door and says: Hello people, this is who we are." Prof. Dr. Edgar Biemer, Emeritus of Excellence

"It's wonderful to have the general public to be curious about what we are doing and it's actual our duty to communicate it to the general public." Prof. Dr. Gordon Cheng, Director Chair for Cognitive Systems

Fig. 1: Age distribution of visitors from StreetScience (n=472) in comparison to the Munichian Wissenschaftstage and the population of Munich.

Fig. 2: Visitor types of StreetScience regarding the impact of advertisements (n=365).

Fig. 3: Composition of the audience regarding their qualifications, based on the German school system (n=375).

Fig. 4: Situational interest (n=365).

"Situational Interest" is developed in a concrete learning environment. It can be subdivided into two aspects: The Catch-component describes when a person's interest is aroused and directed toward an issue. The Hold-component describes the longer lasting and stabilized "Situational Interest", where a person wants to deal with a certain issue, learn more about it and perceives it as meaningful.

The generally positive feedback from visitors and speakers suggests that the tested format "StreetScience" is suitable for science communication in public places. The initial hypothesis assuming that StreetScience addresses the sociodemographic average of Munich could be falsified. Nevertheless, it was shown that the employed format is a relevant complement to existing venues in Munich. A younger audience than at the Münchner Wissenschaftstage was addressed.

StreetScience is a unique scientific program among a variety of offerings ranging from food to entertainment and political interest. It is thus not expected by the general visitor. For this reason, the evaluation asked by which means visitors were attracted to stop and engage. The findings presented in Fig. 2 suggest that the format is able to attract a significant share of visitors without means of advertisement. To measure the quality of our format we slightly modified an established twelve item, five-point Likert scale for "Situational Interest". The results suggest that the generated interest is comparable to studies undertaken at the Deutsches Museum.

As we claim that science should be communicated broadly into the public by many scientists, we need StreetScience to be more than a two in a lifetime event. Therefore, our future goal is to establish StreetScience as an ongoing format carried by TUM.

OCTOBER 2018

MEMBERS: Donato Hackner, Henry Lindner, Jara Meier, Felix Niemew, Konrad Weiss

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POSTER 4: After both iterations of StreetScience had been completed, the scientific evaluation of our collected data was carried out by statistical methods. For this purpose, we had intensive consultations with numerous experts from TUM as well as the Deutsches Museum. Our results suggest that we were unable to reproduce the average population accurately. Nevertheless, we reached a much younger audience than comparable events and we generated similar "Situational Interest" as recorded at a comparable museum exhibition. In the future, therefore, we hope that our concept will be continued. ■

Symposium of the Year 2017/I

Symposium Year 2017/I 136



Symposium Year 2017/I

Every year, the scholarship holders of the TUM: Junge Akademie celebrate their finalized projects and present them to an audience. This year's annual conference, however, was replaced by a different format. Instead of simply presenting the final results of each team, much more emphasis was placed on the processes by which the projects were completed. Effectively, then, the TUM: Junge Akademie organized an event similar to a scientific symposium, with the key theme here being "The Creative Spark." This event took place during TUM's open day on Oktober 13, 2018.

The symposium began with an exhibition of the final posters of year 2017/I as well as posters of year 2017/II showing their current status. This exhibition was accessible to everybody who was currently visiting TUM. Later that afternoon, Prof. Dr.-Ing. Gerhard Müller opened the internal part of the symposium for which prior registration was necessary. Subsequently, each team of year 2017/I gave a short presentation on different topics within the scope of the overall theme "The Creative Spark," e.g. "Wir wollen das ganz anders machen." – Über die Erfassung der Ausgangslage. The idea of these talks was to use the experience gained within the different projects to show how to cope with problems when accomplishing creative tasks. After the presentations, the audience had the chance to discuss the teams' findings over

a cup of coffee. Following a brief summary of the discussion, Prof. Krause (Hochschule für Film und Fernsehen) continued the input on "creativity" with a keynote presentation about his thoughts on creative work and how he challenges his students in this context. This talk laid the foundation for a subsequent panel discussion in which, besides Prof. Robert Krause himself, Prof. Dr. Oliver Alexy (TUM School of Management), Prof. Dr.-Ing. Klaus Diepold (TUM Electrical and Computer Engineering) and Andreas Vogler (Architect) took part. In the course of this, two scholars of the TUM: Junge Akademie volunteered to be moderators and successfully guided the discussion. Finally, Prof. Dr.-Ing. Gerhard Müller closed the symposium with acknowledgements.

We think that the evening and the new format of the annual conference of the TUM: Junge Akademie was a success. The presentations and discussions contained interesting and valuable information that is important to any project. We therefore want to again express our deepest gratitude to everybody who made this year's symposium possible and hope that similar events will take place in the future.

Verena Eireiner and Simon Rehwald

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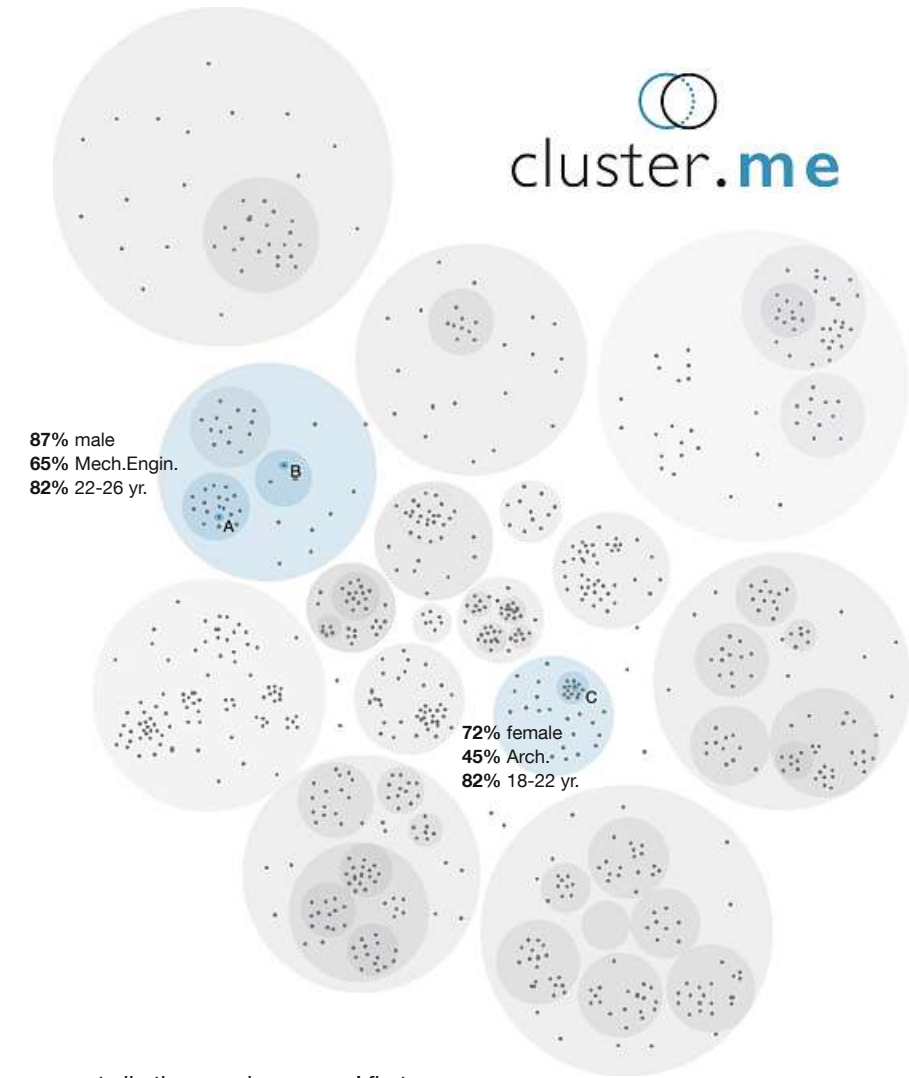
ClusterME

Online search engines like Google are tools that most of us use in our everyday life to gain information. However, even though it might be implied that those tools provide us with a neutrally and objectively chosen selection of search results on a certain topic, there is a bias within every single search we do. This can easily be experienced when two people search for the same term and get different results or a different order of results on the first page of Google. The underlying principle by which Google “chooses” the top ranked results for a person is unknown to the public, but it is very likely that not only the popularity of the shown pages plays a role but also the personal search history of the respective person. This leads to the assumption that a group of people with a similar search history in a certain field (which could be based on a similar lifestyle or similar attitudes) will get similar search results in this field. In short, search engine users will find themselves in “clusters,” being provided with the same information other members of the cluster are provided with. This might be unproblematic in everyday life, but becomes relevant as soon as people try to base their opinions or decisions on supposedly neutral information.

The goal of ClusterME is twofold: To offer a tool to the public that makes people aware of this phenomenon, and to provide us with a means of investigating the phenomenon further. Therefore we programmed an online tool that is able to visualize the effect of clustering. For a certain search item the user’s first page of Google results will be represented by a dot within a cloud of dots that

represent all other previous users’ first pages of search results. The distance between two dots indicates the level of dissimilarity. Within this cloud of dots there might appear areas with higher or lower density of dots. Areas with a certain minimum of density are then defined as clusters. By going through the selection of search items that we included in the tool, the user will realize that he or she might find him- or herself in-

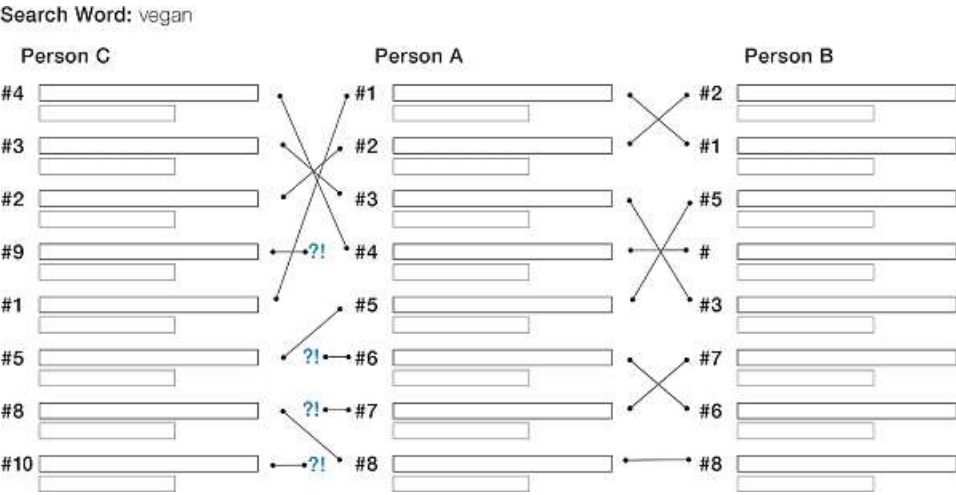
side or outside certain clusters, depending on the searched item. The next step will be to find out how the respective clusters can be described. Therefore every user has to fill in a questionnaire at the beginning to collect demographic, non-personal data, such as age, sex, diet and faculty. When clicking on a cluster, a



descriptive analysis will be given to the user (e.g. “80% of the people in this cluster are female”). Also, he or she has the option to see the first page of search results of a representative member of this cluster. This way, the user has the chance to change his or her perspective in order to become aware of the bias. We will also use the data to make our own descriptive analyses to find out if certain parameters are correlated with the clustering. In order to have a

more homogeneous subset of users from the start, we will focus our investigations on university students only.

After having used the tool, the user will have the option to be provided with more information on the topic and with recommendations on how to avoid being influenced by the bias. This information section will be based on our research on the topic, including interviews with experts.



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- Oct – Dez
solving technical problems of the tool Cluster.ME
testings, trials, fails, corrections
- Oct – Jan
solving open questions
refining questionnaire
clarifying legal protection
design of webpage
- Jan – Feb
starting marketing campaign
ads, posters, note on TUM app
- Mar – Apr
launch of ClusterME web
recruiting students in lecture hall
and on campus
- May – Jun
analysis of data throuht evaluation
- July
review after project completion

CredibiliTUM – Wherein lies the decisive grain of credibility

Résumé

Panel discussions play an especially important role in the context of modern knowledge transfer and expressions of opinion on socially relevant topics. Social controversies arise time and again in our society and animated organized discussions about such topics quickly make people think about them. Taking part in such discussions, one subconsciously forms an opinion through the influence of various established parameters or one seeks to form one’s own opinion after considering different viewpoints on the topics in question. The credibility of the panel’s participants plays a significant role that should not be neglected. Ultimately, everyone chooses the option that seems most plausible and trustworthy.

But how do you establish this form of credibility? Which personal indicators play a special role when trying to present oneself authentically and credibly in a discussion? Would it not be more appropriate to form one’s own opinion based on an understanding of these potential influencing factors? And above all: to be better aware of the methods that influence us subconsciously?

This is why our project is increasingly concerned with which personal indicators influence the credibility of a discussant and how, as a participant in such discussion rounds, one can be clear in

advance about the possibility of subconscious influences on one’s opinions and credibility. Or also how one can perhaps exert a greater influence as a discussant oneself?

Our project differentiates itself from the other projects of our year 2017 / II as it does not explore the umbrella topic “truth and lies” in a digital environment, but instead focuses on the analogue aspect of life. Our project engages in a variety of different panel discussions to find out what makes their main actors seem more credible.

After intense discussions, we extracted the following research question: Which personal indicators influence the credibility of the panelists from the audience’s point of view within different panel discussions?

To clarify the concept of “personal indicators,” we subdivided this term into three categories by using the MECE principle:

- 1) Outer Appearance
- 2) Way of Presenting (facial expression, gestures, voice and vocal range)
- 3) Track Record / Personal Background

Our hypothesis is that these three subcategories of personal indicators influence the credibility of the panelists from the audience’s viewpoint within a diverse set of panel discussions with different emphases.

It will help to clarify the process of our project’s development to explain that, to begin with, the members of our team were part of the group ClusterMe. During the first Interim Evaluation, we decided, as mentioned before, to choose a topic which does not only focus on the digital world, but also connects the overall topic of “truth and lies” to the analogue world. So, we decided to form our own group. Initially, we considered two options: arranging a theatrical piece about truth and lies, and organizing a controversial panel discussion. We decided to go for the latter option but then, following further discussions and exchange with our mentors and tutors, we realized that it would be even more expedient not to organize one’s own panel discussions, but to analyze a variety of existing panel discussion formats.

We are motivated to explore this challenging and exciting field of truth and lies in the analogue world.

The next steps are based on an extensive literature research on the subject. Our goal is to carry out a study of the diverse pool of panel discussions by the end of January. After that, we will evaluate the results in detail. Assuming that our study generates representative results, we want to translate the findings into a theatrical play or performance.

Our vision is to find out more about personal indicators and their effects on credibility, as they have a significant impact on our daily life. Whether we listen to a lecture in university, discuss political issues at dinner or have to present research findings in front of a large audience, credibility always plays an important part in our perception of daily life. So, we are hoping to contribute to a better understanding of how credibility is triggered in our minds. ■

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SchaschLEAK

Background

In our modern society, lies play an increasingly important role. Advances in communication media have made it possible to spread lies easier and faster. As a result, this leads to a more complicated process of distinguishing between truth and falsity. This applies to all possible fields, including economic processes. In particular, the advertising industry plays a crucial role in this field. Commercials praise products in every imaginable way. Often, however, commercials include statements which are simply untrue.

Abstract

Our objective is to empower consumers to gain a sharpened view on common methods used by advertisers. In addition, we want to enable them to distinguish between truth and lies about products. This process should ultimately lead to consumers obtaining an increased sense of power over their own purchasing behavior to protect themselves from being manipulated by ever more sophisticated methods used in advertisements.

Hypothesis

An increase in consumers’ knowledge about common practices used by advertisers changes their purchasing behavior.

Current progress

So far we have created posters and flyers showing slightly modified famous advertisements, as well as a website called “schaschleak.de.” Furthermore, we have written a screenplay for a movie and have planned its making. A very important part of our work so far has been the creation of a project plan with milestones and deadlines. Alongside the project, we have been improving team spirit by, for example, organizing a team Christmas party.

Future plans

In the future, we want to evaluate the reaction of students to our posters and flyers by the means of an online survey, embedded in our website. As a second step we want to craft the movie which highlights frequently used techniques in advertisements. The crafted movie is to be shown in the “TU Kino.” Afterwards, we want to evaluate the reaction of students to the movie by an online survey. Not only do we want to do an online survey about the movie, but we also want to carry out interviews with TUM students about the movie in order to obtain personal feedback and to discuss the subject matter with them further. With the help of the feedback we hope to get from the students, we want to make additional, improved movies. Eventually, we want to circulate our movies further afield, beyond just the “TU Kino.”

Details about our movie-project:

Why did we decide to make a video about TUM Muesli?

We want to create a short movie which features the advertisement of TUM Muesli. Our aim is to show how advertisements can influence feelings about a product. To do this, we will include several techniques used by professional advertisement makers in our movie. We have chosen TUM Muesli as product-to-be-advertised because it is a standard product without any special features. Therefore, there exists no quality difference to other similar mueslis. As a result, it should be very clear from the movie what techniques are being used. As mentioned above, we want to show this advertisement-movie in the “TU Kino” as this provides an effective way of reaching a lot of people.

How will we film the movie?

We have already fixed a date for filming the movie. This was not as easy as thought at first. As location for filming, we need the TUM library. This means that we can only film very early in the morning or very late as we mustn’t interrupt other students. The movie will feature two young students, who are very tired in the morning although they must study in the library because of the “Prüfungsphase.” In order to overcome their tiredness, they just eat TUM Muesli and all of a sudden they will be fresh and can focus on learning. It is very important to stress how easy it is to project a positive light onto nearly every single product, independent of its real uniqueness. ■

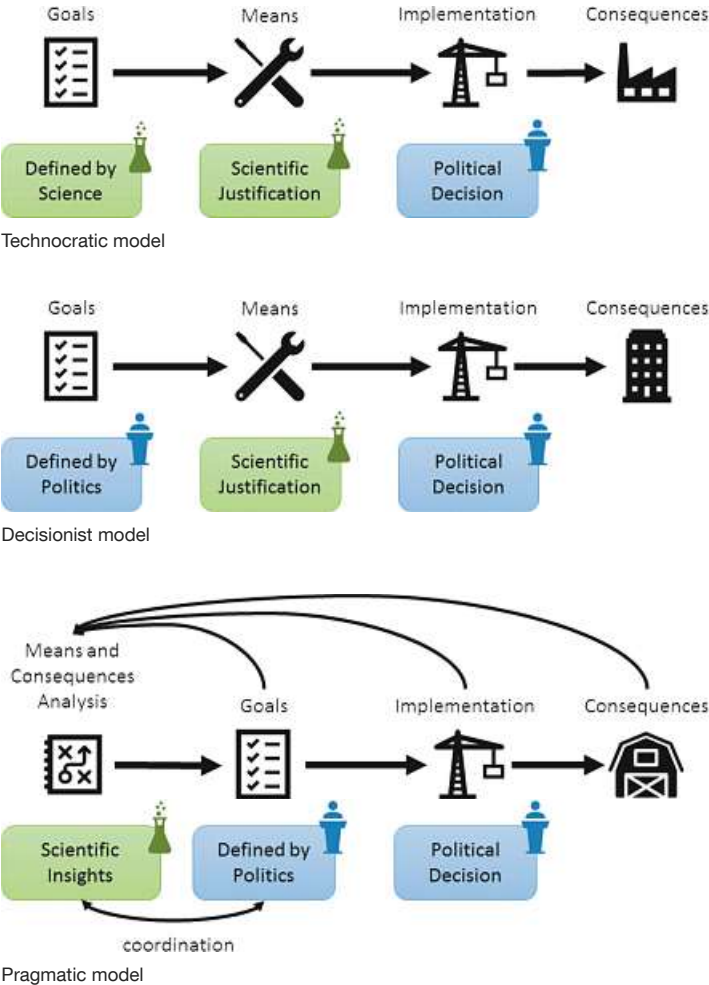
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SciCom

Our project aims to examine the significance of scientific advice in the political decision making process. There are three systems which describe how the process of scientific policy advice can work: the technocratic model, the decisionist model, and the pragmatic model (see figure). This last model is the one typically applied in German politics and also the one we are investigating by talking to the involved stakeholders viz. politicians, scientists and NGOs to learn more about the practicalities. The scope was restricted to the local level in and around Munich. The preliminary findings offer a first impression of issues:

- 1. In local Munich politics, the scientific advice process is less formalized, and plays a less significant role than on the Landtag or higher levels. Money and time constraints, combined with the reduced specialization of local politicians due to their volunteer status are the underlying reason.
- 2. Consulting scientists are not always aware of the complex administrative process, preventing them from providing their advice at the most suitable time.
- 3. Paid scientific consultants may be hesitant to provide parties that they consult with advice that differs from the party's opinion.
- 4. NGOs do not directly conduct scientific research and often use student interns to prepare reports.

In order to increase the role of scientific evidence in local politics, we aim to develop an app/web-tool to network local politicians with young scientists who can consult on projects and provide scientific insights.



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Our industrial partner

Our industrial partner 150

Facts & Figures PIXIDA

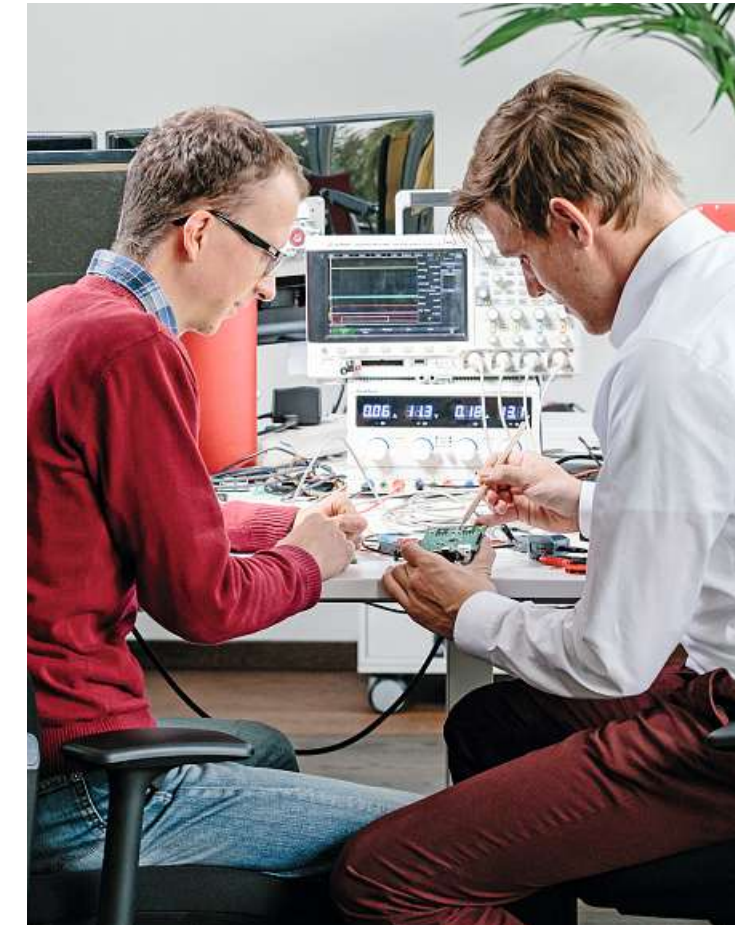
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PIXIDA's unique corporate culture is based on an employee-oriented leadership. This led to 8 employer and economic awards for PIXIDA.



Cooperation TUM: Junge Akademie

Since 2016 PIXIDA GmbH is a cooperation partner of TUM: Junge Akademie. Together with excellent and passionate students our experts in Digitalization, Internet of Things (IoT) and Mobility were delighted to exchange knowledge on challenging and complex social issues.

Digitalization and urbanization are fundamentally changing our society and requiring new technical approaches. Smart City and IoT are important fields of activity at PIXIDA. IoT enables new processes to gain and analyze data for social benefits.

In 2017 we organized a workshop at PIXIDA's Headquarter in Munich raising the question "How to use data to shape smart urban environment?". We started our event with short keynotes by our Data experts on the topics of IoT, Data Analytics and Cloud. In different workshops we visualized and discussed several IoT- and Data Analytics-Solutions and dealt with questions such as "How to gain higher added value from collecting data in cities" or "How one could visualize Data".

In a further collaboration in 2018 our technical experts from Business Unit Software Development advised an ambitious project to strengthen Munich resident's participation in political processes. Muc.me is a web-platform by students of TUM: Junge Akademie and allows especially young citizens to engage in their local community. On muc.me they can anonymously contribute their ideas to district committees by e-mail.

We would like to thank all students for their high degree of social commitment and performance!

Let's continue our exciting and constructive cooperation in the future!



TUM: Junge Akademie

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“TUM: Junge Akademie is the launchpad to develop your own ideas and bring them into live in a supportive and familial surrounding. You are allowed to make mistakes and can test your abilities in various disciplines, which concern your academic profession as well as your personal development.”

Stefan Röhl, Year of 2014,
Electrical and Computer Engineering



“TUM: Junge Akademie offers space for engagement in socially relevant areas, and thus supports personal growth and further flourishing of young, prosperous talents. TUM: JA kick-started my career and opened doors beyond my imagination.”

Alexander Biederer, Year of 2016,
Informatics



“I particularly appreciate the work on a topic which is relevant for society together with an intercultural and interdisciplinary team. Especially, the experience to answer a research question by using scientific methods is certainly an excellent preparation for my bachelor and master thesis.”

Sabrina Schwarzmeier, Year of 2018,
TUM School of Education



“Especially for engineers, recognizing social implications of academic and technological advancement is crucial. TUM: Junge Akademie teaches this in a creative way by challenging members to explore issues outside our own field of study.”

Justus Wolf, Year of 2016,
Munich School of Engineering



The Academy

The TUM: Junge Akademie is TUM's scholarship program for exceptionally talented and dedicated students with a special affinity for research and teaching. 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 scholarship holders 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 the scholarship holder 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 scholarship holders. Together with their mentors and tutors an appropriate methodology to test the assumption of the group is designed and applied. To empower our members' per-

sonal development, we offer them workshops, interdisciplinary exchange and cultural activities. We bring together Alumni and Newbies to build a pool where everyone 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 students 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 the scholarship holders to take responsibility for others by, for example, serving on the Board of Members or the Advisory Board.

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 scholarship holders' 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. Bernd Redmann and the President of the University of Television and Film Munich, Prof. 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 scholarship holders 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 student representatives of the TUM: Junge Akademie. ■

Members of the Advisory Board 2018:

Director:

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

Scholarship holders:

Alexander Biederer (from October 2017 to October 2018)
Julian Biendarra (from April 2017 to October 2018)
Carl Ebbinghaus (until October 2017)
Beate Ursula Lang
Dr. Matthias Lehner
Philipp Rinner (from April 2017 to October 2018)
Jonas Ruchti (from October 2018)
Sabrina Schwarzmeier (from October 2018)
Konrad Weiß (from October 2017)

Professors:

Prof. Dr. Sonja Berensmeier (from April 2018),
TUM Department of Mechanical Engineering
Prof. Dr.-Ing. Klaus Diepold,
TUM Department of Electrical and Computer Engineering
Prof. Dr. Jürgen Geist (until April 2018),
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. Bernd Redmann, University of Music and
Performing Arts Munich
Prof. Bettina Reitz, University of Television and Film Munich

Board of Members

The Board of Members synthesizes and represents the scholarship holders' 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 scholarship holders take action to implement these changes.

The Board of Members elects six student representatives in the Advisory Board. By this integration of the Board of Members into



the Advisory Board the scholarship holders are able to actively participate in the decision making process and can represent their interests.

All scholarship holders are invited to participate in the Board of Members meetings and give their opinions and ideas in order to help the TUM: Junge Akademie to evolve into scholarship program that empowers the scholarship holders' personal development. ■



Committed: Taskforces, Tutors, Mentors, Office

The statement “Members for members” is understood as a leitmotiv at the TUM: Junge Akademie. Scholarship holders 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 workshops on “scientific and journalistic writing”, which bolster the development of the participants’ skills concerning editorial work.

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 scholarship holders 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 scholarship holders in their commitment and work. ■



Taskforce Members

TUM: Junge Akademie provides a framework that allows its scholars 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 program throughout and beyond their active membership.

Starting with the application phase, we help inform potential candidates at a central info event. Interested students gain first insights into TUM: Junge Akademie and they can meet active members and alumni to get first hand experiences. We provide further support during the application process, e.g. by helping to sort out applications and holding a workshop for applicants during selection days.

After the application phase, 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.

In the last years, we worked together with the academy office to improve the conditions for members of TUM: Junge Akademie during 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. Our focus now lies on evaluating these changes as well as other components of the program, like the mentoring system or the structure of the Taskforces themselves.

Recent achievements of the Taskforce Members mainly concern the administrative IT infrastructure. By simplifying the data management for both the administration and the scholars, we ultimately aim at providing fast and reliable tools to structure data and also at achieving more clarity in storing and sharing relevant information throughout TUM: Junge Akademie.

Apart from recurring tasks and operational improvements, we strive to establish long-term contacts between active members and the growing number of alumni. Not only can alumni share with other members their experiences about projects inside and outside the program, but also might fresh ideas from the project teams inspire alumni in their professional life.

As always, 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. ■

Taskforce members

Dina AlAdawy
Severin Angerpointner
Thomas Bickel-Haase
Rishith Ellath Meethal
Sonja Fuchs
Christian Grätz
Friederike Groschupp
Bernhard Hafner
Hayden Liu Weng
Mohammad Mahfouz
Philip Petzoldt
Eva-Maria Schmid
Patrick Strobl
Veronika Bauer
Lea Sophie Seier
Maryam Tatari

Taskforce CAP

Contacts – Alliances – Partnerships. These three terms all frame the CAP Taskforce of the TUM: Junge Akademie as acting mostly in an external-facing capacity. However, these terms cannot be considered equal, not only due to their differing implications of formality – a contact is inherently less formal than an alliance – but also because only partnerships exist as formal structures. Consequently, most of our work is related to partnerships, but for more than just semantic reasons.

On a strategic level, Taskforce CAP has two goals it seeks to accomplish in managing the relations of the TUM: Junge Akademie to its external partners. These are (1) the material goal of securing funding for all activities not covered by the budget provided by TUM and (2) the immaterial goal of maintaining and building connections to institutions both within and outside of TUM. To accomplish both, a close coordination with the Management Office is essential, especially in the case of the former goal. In order to achieve funding goals, the TUM: Junge Akademie offers sponsoring partnerships to companies, who are in return provided with opportunities to contact our members. Maintaining contacts is more straightforward, because in practice many are kept up through institutionally assured interactions. That is, for example, Mentors are important contacts for the TUM: Junge Akademie, but keeping up regular exchange with them does not require intervention by the CAP Taskforce since the very purpose of their position already includes exchange with Akademie members and management. Conversely, maintaining contact with our current company partner, Pixida GmbH, is not easily accomplished through once a year meetings to organize the workshops, since they are too far apart. Additionally, the yearly workshop hosted at Pixida requires set-up, which is also provided by the CAP Taskforce.

Given this context on what Taskforce CAP is and does, the main task at hand for the Taskforce can be introduced. In our current situation with only one active partner company, funding goals



require either additional revenue streams or additional partners. Naturally, the first option we investigated was signing up more companies to become sponsors of the TUM: Junge Akademie since this is already an established structure. One of our early attempts at this was using contacts via alumni to pitch this prospect. Unfortunately, this was rarely successful, but the reasons why were not immediately apparent to us. An unusually open and honest talk with one such alumnus helped us clear up the reasoning behind what was a relatively consistent strings of declined offers. From a corporate perspective, the first issue is that small-scale sponsorships related to educational institutions do not have a fixed organisational layer to which they are associated – especially in large companies. In simpler terms – who should we even talk to? HR departments are commonly very interested in



recruitment opportunities but tend to shy away from the TUM: Junge Akademie's heterogeneous make-up. A specific complaint is that we have only a partial share of computer science students. Technical divisions may be interested in collaboration with certain project teams based on their chosen topic, but the low predictability of what projects will exist in the next cohort makes this, at best, a shaky foundation for a sponsorship. Compare this to the option of cooperating with faculties directly within project partnerships achieving both the goal of homogeneous student groups and predictable (and influenceable!) topics for them to work on. It is easy to see why partnering up with the TUM: Junge Akademie purely for recruitment or technical input focused reasons may not seem attractive.

But, one might add, "Isn't the TUM: Junge Akademie an institution that assembles the very best? Does that not offset some of the drawbacks?" and the answer, for many companies, is "No!" Thus, the motivation for cooperation must go deeper than that and require a strategic mindset not commonly found below the highest level of management. With regard to large companies, these may be considered to be out of reach for the Taskforce (a group of students). Small or medium size companies may present a more attractive target, but even then, cold-calling their management board seemed to us a daunting and inefficient use of our time.

In the face of this predicament, we came up with the idea of promoting the TUM: Junge Akademie as a competent and at-

tractive partner by means of organizing an event for students. By targeting this event at TUM students, and not just confining it to the TUM: Junge Akademie, we believe we can solve the perceived issue of not representing enough of the desired academic background. The event would also ideally have the students working on specific topics that are easily related to interests of specific companies. Fortunately, Alexander Biederer of the Event Taskforce had, at around the same time (the beginning of the past summer term 2018), developed the idea of hosting a hackathon (Hacking + Marathon) event at the TUM: Junge Akademie. This type of event, in which ad hoc teams work on broadly IT-related tasks during a non-stop workflow, unites all of our requirements. Because of the IT focus, they are usually focused on recruiting students of computer science or adjacent fields and commonly allow corporate sponsors to set up task descriptions. In summary, we decided not to promote the TUM: Junge Akademie itself, but rather our capabilities. The principal hope in terms of funding goals is to create an interest in transitioning to sponsorship due to the demonstration of our capability as an organization.

Now, having this goal in mind, the CAP Taskforce set about finding companies to partner us in this endeavor – with the hope that this would be an easier task than finding sponsors for the TUM: Junge Akademie itself and that such an event would be more successful than our previous attempts at attracting partners. Fortunately, we had already had set up cooperation with IKOM, which turned the career fair, from our perspective, into a sponsorship fair. Despite our fear that we might encounter misunderstanding or confusion, we were able to spark interest in numerous company representatives – subsequently ensuring funding for our event.

To make optimum use of the contacts the TUM: Junge Akademie already has, especially within TUM, we decided to put a unique spin on the hackathon. Task prompts will not only be provided by our sponsors, but also by researchers at TUM, thus incorporating our Academy's goal of promoting interest in science. This means broadening our target audience to all TUM students who have some programming skills and leads to our branding of the event as "Science Hack 2018" (with the hope of repeating it in future years).

At the time of writing, the state of the Science Hack is as follows. We have secured funding for it and have fixed a time and a place for it: 1-2 December, Magistrale, Faculty for Informatics and Mathematics. We are in the process of developing the task prompts as well as designing our marketing campaign directed towards motivating students to participate. Additionally, the precise schedule of the event is also being worked on.

Beyond the Science Hack, the future of the CAP Taskforce is unclear. Pixida have just renewed their partnership for another year and the organization of a workshop for Academy members in January is a parallel project to the Science Hack. Depending on the reception of our hackathon, repeating it yearly might well become a constant fixture. Alternatively, there is a chance that the TUM: Junge Akademie funding becomes secure enough for the CAP Taskforce to focus more on the first two letters of our name – Contacts and Alliances – thus potentially returning to a former idea of cooperation between student-organized groups from several members of the Euro-Tech Alliance. ■

Taskforce members

Justus Wolf
 Laura Schütz
 Konrad Weiß
 Julia Poliak
 Johannes von Stetten
 Matthias Passek
 Sebastian Leicher
 Himansku Panandikar
 Julian Trummer
 Michael Reichert
 Albulena Selmani
 Valentina Ustinova
 Ferdos Sililo-Simon
 Mehmet Ali Tas



Taskforce Event

The Event Taskforce strives to make the TUM: Junge Akademie fun, to allow scholars to build a stronger network and to broaden the scholars' horizons by enabling them to participate in interesting, enjoyable, and educational social events!

These range from culturally enriching events like visiting the opera with insightful visits behind the scenes, to challenging sport events like the annual sportfest, and from scientifically valuable events like a visit to the Leibnitz Supercomputing Centre, to social events like our running dinner and our "Stammtisch".

In addition to that, we organize the summer celebration and the annual conference of the TUM: Junge Akademie.

All these events are organized by scholars, for scholars, in order to keep the TUM: Junge Akademie fun!

Some Events the Taskforce organized last year:

Boxing Training

On May 16th, eight brave members of the TUM: Junge Akademie entered the boxing club Impact Fight Academy to receive their first boxing training. Under the supervision of an experienced boxing trainer they got to know the course of such a training and learned their first boxing techniques and punching sequences.

Photo Workshop, June 08th

Take the camera – activate flash – subject to the center – press the trigger! But how to take photos that are better than 90% of all snapshots?

In this very interactive workshop, scholars first experienced the (technical) basics then and how to use them creatively. Continuing with picture design, they tried out the "rule of thirds," different perspectives, using foreground ... Finally, they had a short introduction to picture processing.

Summer celebration, June 29th

"Every year, the TUM: Junge Akademie celebrates summer by gathering and enjoying delicious grilled food and cold beverages. This year the celebration was enriched with an enjoyable sports challenge, which had teams of scholars compete in different disciplines like Frisbee-Golf and sack races. At the end, two teams fought over prizes in a Bobby Car race.

Running Dinner, June 16th

After the great successes so far, on Saturday 17th November, the 7th Running Dinner of the TUM: Junge Akademie took place!

At the Running Dinner, the participants had a three-course menu (appetizer, main course and dessert) at three different places. In teams of two, the participants were responsible for preparing one of the three courses, while being the guests for the other two courses. Thus, during the event, the participants got to know twelve other people. To conclude the evening, all participants met in a bar after the dessert. ■

Taskforce Members

Alexander Biederer
Dominik Irber
Vadim Goryainov
Katherina Tropschuh
Jakob Scheffels
Bertram Fuchs
Kyra Kleine
Alina Minh
Philipp Scholl
Ramses Alejandro Grande Fraile
Victoria Tressel
Christos Gazanis
Gabriele Fruth
Luisa-Maria Kraus
Nicola Stadler



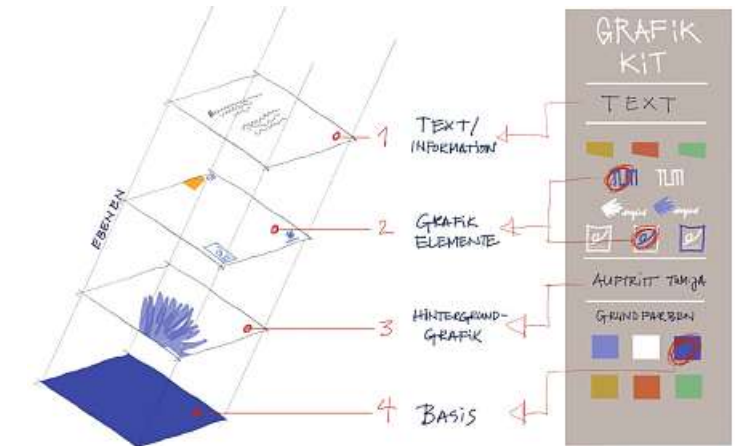
Taskforce Marketing

Our Taskforce strives to enhance the brand image and recognition of the TUM: Junge Akademie. Our targets lie both within our university, in relation to potential applicants, members and employees, as well as externally, in relation to current and potential corporate partners and the employers of our alumni. Moreover, our involvement includes support for scholars in their projects, whenever graphic materials, branding strategies, general tips and valuable contacts around project marketing are of interest. Finally, as much of our work is centered around events, such as “Fit for TUM” or “Tag der Initiativen” in Garching, we seek close collaboration with the Event Taskforce. The nature of our responsibilities requires that we work closely together with the TUM: Junge Akademie main office.

The specific projects we are involved in are of a very diverse nature, and depend on current needs just as much as on members' skills and interests to develop themselves and grow. Examples of successful past projects include

- Website restructuring for better clarity
- Marketing material, e.g., our new image movie, posters/flyers for publicity during the application periods and giveaways
- Public appearances of the TUM: Junge Akademie, e.g. the day of student initiatives (“Tag der Initiativen”) in Garching and information events for nominated applicants

For participation in our Taskforce, experience in graphics design, marketing strategies and event coordination are helpful, but absolutely not required. Much rather, we always seek for scholars enthusiastic about what we do, who believe that with the right public image and high-quality internal work, the TUM: Junge Akademie can be positioned as a prime student initiative in Munich. Moreover, members of this Taskforce are given the freedom to pursue their preferred projects, as well as to propose and assume responsibility for new ones. There are plenty of chances to grow personally as a member of this Taskforce!



In the past year, our largest projects were a new image movie and our concept for an easier way of collecting and distributing news about the projects of the TUM: Junge Akademie.

Image movie: Passion for Science

In order to make the TUM: Junge Akademie more visible in the public eye and to provide future scholars with a more detailed insight into the inner workings of the scholarship program, the Marketing Taskforce created image videos. The footage was collected during interviews with various volunteering students who received prepared questions before filming. With the assistance of Michael Obermeier from TUM ProLehre, the video material was cut into three different variants, all to be published on YouTube.

The first cut had to be delivered in time for the IAS Symposium 2018, so planning and filming had to be done on a tight schedule. In contrast to the two other, later cuts, which provided a scholar's view on the TUM: Junge Akademie, it highlighted the program itself, its past achievements and future possibilities.



The shorter video was designed to represent a compact overview of the experiences and hopes of current members concluded by a mission statement from Prof. Dr.-Ing. Müller. It serves as an eye-catcher and teaser-trailer for people using the website or social media of the TUM: Junge Akademie.

The longer cut features a more in-depth exploration of the students' motivation and their thoughts on their journey through the TUM: Junge Akademie program. This version gives a more detailed idea of what the program actually is and does and therefore is especially suitable for future scholarship applicants.

Project news: Simplifying the information flow

The TUM: Junge Akademie issues a regular newsletter to all active scholarship holders, alumni and partners. In the past, the summaries from the project groups' work were time-consumingly collected individually. A similar procedure was in place for Facebook posts about the projects.



We wanted to avoid these problems and proposed a scheme re-using content as much as possible: The teams would compose their own short and concise news posts and publish them directly to a "project news" section on our homepage. These can then be optionally cross-posted to Facebook or selected to be distributed via the TUM: Junge Akademie newsletter.

At the time of writing, we are testing this scheme with the projects of 17/II. They are supported by a guide line indicating each post's nature and purpose. Eventually, we hope to achieve a better quality of content with a process taking less time for everyone involved.

Future goals

As mentioned previously, our Taskforce is mainly concerned with short-term project work for upcoming events. For example, the planning for this year's "Science Hacks" marketing campaign is currently starting at the time of writing. Apart from this event-based work, our long-term goal is to standardize the TUM: Junge Akade-



mie's marketing materials. A corporate identity concept, accompanied by a set of tools, will hopefully not only improve the consistency of how the Academy presents itself, but also simplify the creation of marketing material for events, projects, and related activities. ■

Taskforce members

Jonas Ruchti (Taskforce leader)
 Vanessa Buchweitz
 Lukas Egerer
 Frederik Heetmeyer
 Daniel Eduardo Hernández Acacio
 Philipp Ekkehard Hölzenbein
 Daniel Körner
 Carlos Piedrafita Alvira
 Nelly Prechtl
 Nicolas Röhrle
 Lea Luka Sikau
 David Wei
 Patricia Sophia Wild



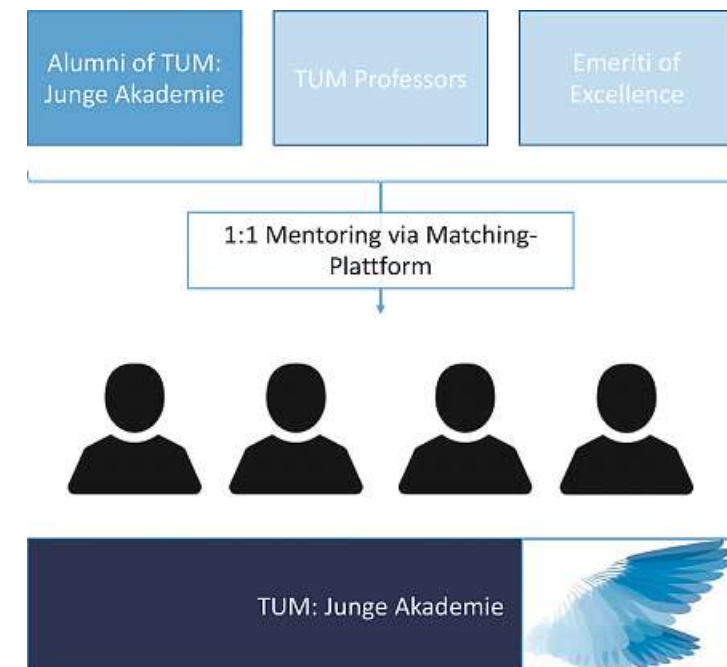
Taskforce Mentoring

The taskforce "Mentoring" wants to establish a mentoring program for current scholarship holders of TUM: Junge Akademie. The mentors will be alumni of the latter. We strongly believe that mentoring offers great benefits for both parties and it is a valuable part of the curriculum of TUM: Junge Akademie.

Currently, we are still in the planning phase, but the general concept is set: After reaching out to possible mentors, this winter, interested members of the year 2018 and alumni will be asked to hand in some details about themselves and their preferences regarding a mentor and mentee, respectively. For that, we will provide a survey which addresses both mentees and mentors with standard questions regarding the professional and personal life. This allows us to find tandems that fit to each other. For now, we focus on alumni, but will be extending the group of potential mentors with TUM professors and Emeriti of Excellence in the future. In contrast to the rather impersonal setting in lectures with hundreds of fellow students, our program thereby provides a means of initiating one-on-one contact between active members and alumni. Thus, individual advice and inspiration can be passed on from experienced alumni to younger students of the TUM: Junge Akademie. At the same time, mentees get a chance to keep in vivid contact with their Alma mater and can benefit from the next generation's knowledge and enthusiasm. Furthermore, mentees and mentors are matched across disciplines with the aim to increase interdisciplinary exchange. The actual matching shall happen in the beginning of 2019 so that the kickoff of the mentoring program can take place at the beginning of the next summer term, i.e. around April 2019. In our current concept, the program is planned to run for one year. During that time, mentor and mentee should meet at least three times. The frequency as well as location and topics discussed are set individually. Academic questions as well as personal topics are encouraged to be discussed. At the end of the program, there shall be a closing event, which is the kickoff event for the next year of mentor/mentee tandems.

We are looking forward to performing the next steps. Stay tuned!

Your Mentoring Taskforce



Taskforce members

Simon Rehwald
 Robin Weiß
 Jara Meier
 Kerstin Pfister
 Florian Tichy
 Jana von Trott zu Solz
 Marina Able
 Julian Albers
 Barbara Gleißl
 Thomas Just
 Sebastian Mair
 Janna Nikonov
 Sabrina Schwarzmeier
 Sebastian Siegel

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. 12](#)

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. 10](#)

Office

In order to assist the scholarship holders 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, Prof. Dr.-Ing. Gerhard Müller. In this regard, he is operatively supported by the office team that currently consists of the Managing Director, the Team Assistant and Student Assistants.

The Office Team

[Peter Finger](#), [Maria Hannecker](#), [Johanna Grießer](#),
[Lisa Hamm](#), [Nicola John](#), [Sweety Mohanty](#)

A different scholarship program

“TUM: Junge Akademie fosters your creative ideas and lets you test your own limits to discover new strengths and opportunities. I sincerely recommend this program to everyone who is seeking personal growth.”

[Artem Bliznyuk](#)

In addition to the invaluable experiences, learning and networking directly associated with the projects, the TUM: Junge Akademie also offers scholarship holders 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 Symposium a pleasant setting to meet and exchange views. The scholarship holders are integrated actively by the Event Taskforce in both the selection of eventformats 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 scholarship holders, alumni, friends and supporters.

Selection Days



Workshop with GE Europe



EatMe – I'm low Carbon



Hikingtour to Bodenschneidhaus



April May June July August September October November



Kick-off Year 2017/I



Workshop Integration through Democracy



Workshop "Ready Steady Go"



Kick-off Year 2017/II

Alumni2Newbies



SciCom in a Escape Room



MatchBOX Workshop



Running Dinner



December January February March April May June July



First Intermediate Evaluation



TUM running group



StreetScience@Streetlife



Closing Ceremonie Buddies for Refugees

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