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**IDEAS AND EXPERIENCES FROM UNIVERSITY - INDUSTRY COLLABORATION.
Hackathons, Code Camps and citizen participation.**



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Hackathons, Code Camps and citizen participation.

TYyli project work findings report

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**IDEAS AND EXPERIENCES FROM UNIVERSITY - INDUSTRY COLLABORATION.
Hackathons, Code Camps and citizen participation.**

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This report is a collection of lessons learned during TYYLI project at LUT. The content of the work was to study different ways university could collaborate more efficiently with industry and municipalities, e.g. by utilizing hackathons and studying more similar events role in this collaboration and by explaining the good experiences we have had.

1. ACADEMIC VIEW TO HACKATHONS, AUTHENTIC PARTICIPANTS EXPERIENCE FROM UNIVERSITY – INDUSTRY HACKATHON COLLABORATION & TEACHERS VIEWPOINT TO THE COLLABORATION

As a part of the TYYLI project work, it has been our joy to study hackathons (Porrás et al. 2018), as it is said that they are lively collaboration tools and quite new models for educational efforts. Educational events like hackathons, code camps and capstone courses (Palacin-Silva et al. 2017) naturally teach participants some of the newest 21st century “work life survival skills” and at the same time highly activate students’ abilities, plus give them practical knowledge how to operate and collaborate (Rantala and Happonen 2012) with companies. Especially, the students’ activity level in hackathons is generally something that highly differs from the typical classroom learning models. The hackathon events themselves do have their roots coming from the technical fields, more precisely from the software development industry (Karlsen & Løvlie 2017, 226), but nowadays they are expanding beyond the field of software development and moving toward other applicability areas such as medical sector, civic engagement, culture and so on (Aungst 2015, 59). Now as these hackathons are becoming ever more popular, they also have grown to be more fine-tuned in learning and, actually, allow to accelerate the speed of learning up practical skills, like how to apply new tools and techniques to given challenges (Karlsen & Løvlie 2017, 224). As at LUT we also have rich experience of running hackathon events, which in our case are Code Camps, we have shared this experience of the wide range of good learning outcomes and joy of learning reported by the students. This empirical evidence of hackathons to be efficient teaching tools makes them, surely, additionally, an interesting academic topic to study too. And in fact, according to a search on amount of

written materials on this matter, we found that there are more than 20 000 records related to the topic.

Within the projects goal setting of trying to understand the events practical side in deeper manner, we also analyzed some of the several hackathons / Code Camp events organized at LUT (e.g. OCTO3, CGI and Finnish game jam events). The part of this process was collection of reflection data from the students and participants, but also some interviews were done with the event participants. The participation actions have been also studied as observation studies (from distance, not directly participating to actions) and, furthermore, one action research participatory study was also made in 2017, which is now reported as a part of this TYYLI project report. It is an actual and authentic experience from the participating point of view, revealing the intensity and joy of learning the event gave for the participant. This report comes from the DigiKaappaus 2017 code camp event, which in fact have ended up cultivating the participants' future in the way toward meeting that took the participant into the master thesis process with the company as it is explained in the following.

Authentic experience from actual Code Camp event

This is a view into an engaging intensive learning event, explaining (among others) to other TYYLI project educational unit participants, how inspiring a true contact to real life challenges can truly be. As indicated, this story is part of the TYYLI project with the goal to enhance the working life connections in University studies. With the ongoing development of Code Camps like studying events in Lappeenranta University of Technology (LUT), we are putting our effort to try to promote the working life skills, e.g. group work and teamwork skills, enhancing the communication within a team and for example, by revealing the students' skills to participating companies, hopefully promoting some possibilities for employment too. When the students' skills are revealed to the possible future employer directly and he/she is getting positive feedback for the work, we hope we can also improve our students' readiness to enter into the work life. Also by giving

students a real-life challenge, in which they innovate new solutions and work in direct contact with the companies, they shall learn the ways presentative from a work life typically communicate. But now, let's take a short dive into the reality of participating in code camp event ☺.

First of all, I would like to say, that “...One of the important appreciation sources for me, in the Finnish University education system, is the fact that you do not just dully study the existing theory on a subject X, but rather in here we are taught to apply this knowledge into the practice too. Many times, this is done with various examinations & reviews of current practices & cases, participation in real business projects working with real companies to solve their hot topic issues via industrial visits, hackathon & boot camp and code camp events.



So, this is my story as a participant, a story that I would like to share, namely, how I meet and get connected to my future thesis company studying at LUT. My master's thesis journey started with visiting the DigiKaappaus Code Camp promoted by our university and organized in collaboration with Finnish companies (among which my future thesis company ☺). This code camp was held in Imatra in Holiday Club Saimaa spa hotel, which literally gave a breath of fresh air for participants of this Code Camp event. Participant who were set to solve tasks by completely changing the working atmosphere towards better future. The event location and hotel environment & services were very nicely organized, also in searching for the inspiration, participants were able to enjoy the nature walking and wandering around (if they would like choose to do so). In the beginning of the Code Camp, the case company communicated us three different business issues to work with and they also gave us freedom to decide how we would approach these given challenges and

how we would like to express our ideas with the help of notes, stickers, posters, Power Point / Prezi presentations and so on. After a day of brainstorming, our team was selected to present our view of the project we were working on in front of the big audience of numerous Finnish companies' representatives. The case company later on explained for the participant students that our work was the most commercially believable and most "mature" as concept, which were their number one reasons for selecting us to step into front of the big audience, which, in turn, was actually a true gasp inducing. Afterwards, I was invited to an interview with my future thesis company where the actual thesis topic was presented to me by the company CEO and Chief Sales & marketing Officer. This thesis topic was exciting for me since it was not intensively studied in research and also a very little touched in my studying program. Additionally, this topic required my thesis to become interdisciplinary because of the combination of both business and technology sides. As a person who likes challenges, I took it on board immediately. However, at this point my positive surprises actually did not end at all. As a part of my master's thesis, I was given an opportunity to do industrial visits to my thesis case company's client serving points and business operations sites. That is what I like in the Finnish university and companies' collaboration. These visits allowed me to understand my case company's business better that, in turn, significantly assist me to get to know studied business cases and become highly involved into the topic of warehouse management business. Therefore, I was really happy and excited with the chance I got. Influentially, after each industrial visit done my case company supervisor asked me to write a paper with my development ideas for a certain site regarding my thesis field. It was like a sharp intake of breath as traditional literature review and studies to thesis topics and/or watching practical videos of the topics to demonstrate warehouse technologies is completely something else, than a real possibility to visit actual work site. These actual visits gave me possibility to see the actions with my own eyes and ask questions I was truly interested in and so on. With the help of these visits, I was able to improve my thesis and made it more oriented towards real life warehouse management systems challenges and, at the same time to apply it to multiple usage cases and find new application areas for it.

All in all, for me a code camp is definitely an event where all students should participate. I see these as opportunities to be able to achieve a valuable experience and such an entertaining adventure to realities of true business life challenges, which students will not participate in any “typical” course. In event like this, you are given a real problem and a truly short time slot to solve it (I see a life true analog to with the logistics definition, which says about having the right thing, at the right place, at the right time, in here). I have learned that it is crucial to be extremely time-efficient in Code Camps since every second is highly valued and any action you take, might be the one that counts the most. Indeed, for me it seems that these two days spent in Imatra were some kind of pusher and a booster. I arrived there so motivated and was ready to other (life changing) challenges after it too.

Event organizers and teachers’ viewpoint into the Code Camp event

Now as looking at these events from the facilitators and university & company collaboration work point of the view, the experience of the participants is the reality we are aiming at with these events. The story shows the sort of experience and results we (at LUT) strive to achieve with the company & university collaborative events like this one seemed to be for this participating student. We at LUT work hard to be able to build events that intrigues the mind of young student, something that offers new opportunities in life, something that challenges the skills and maybe even shows new areas of expertise for them. We pursuit to help participants to learn new things and even maybe find something about their personalities too. At the best they are able to discover skills, they already had inside of them, but which were still hidden and not in use. By giving the students this sort of challenging setting, which pushes them forward with some positive and safe environment and time stress, it seems that they are able to take a step in next level of knowledge and skills.

In addition to challenge / task to be solved, we try to take great care about the actual event place too. The location should be a fair and level plain field where companies and/or municipalities can meet and greet the students (in this case, the location was sort of 3rd

party location to everyone: students, facilitators and companies). Even plain field, seem to give the company personnel a time and space to show their “human side” out of their company titles, which seemed to be extremely important barrier dropper for students to use lot of time to approach the company personnel and get more deeply invested inside the given task. Overall, TYYLI project has given us a lot to think. For example, how to improve these events even further, to be more engaging, to offer wider view into team work and intensity of challenging deadlines that in the end reward you with high amount of learning something new and also help you to learn about team dynamics. In the end, we have defined it as our new goal for the future, to produce more golden stories like the one just openly described as part of this report and offer the possibility to wider participant group of students to shine and show their potential, to go even further and maybe then produce some stories of diamonds too ;-)

2. COMPANY EXPECTATIONS FROM YOUNG RECRUITS

For this report, we have investigated backgrounds for the realities to what companies are expecting from young recruits”. As the short summary, we would like to open up some of our findings. For example, nowadays students are more and more self knowledgeable about their skills and about the fact whet they are wanted in the work life. They know what to ask, but, on another hand, they sometimes lack the talent to think and plan far into the future (years into the future). Companies have been expressing to us that even when the students are mostly highly talented with the technical skills, they could have been more trained with some additional social work life skills. Moreover, the companies have reported that many students are not familiar with the concept of personal branding. Students know everything positive about them which is a plus, but they could have promote themselves little bit more. In the end, the current situation in job markets seems to be mostly really good for young students, as Finnish higher education institutes are limiting the amount of students accepted to many different study programs, which enerates the current graduates job marget situation where there is more demand than availability of highly skilled young to be professionals. All in all, this will most likely mean, that the companies need to start to think really wisely, what they offer for the people they try to recruit to get the best ones for their company and not to loose them out to some one else.

3. INVOLVING CITIZENS TO COLLABORATE WITH UNIVERSITY RESEARCH AND DEVELOPMENT WORK

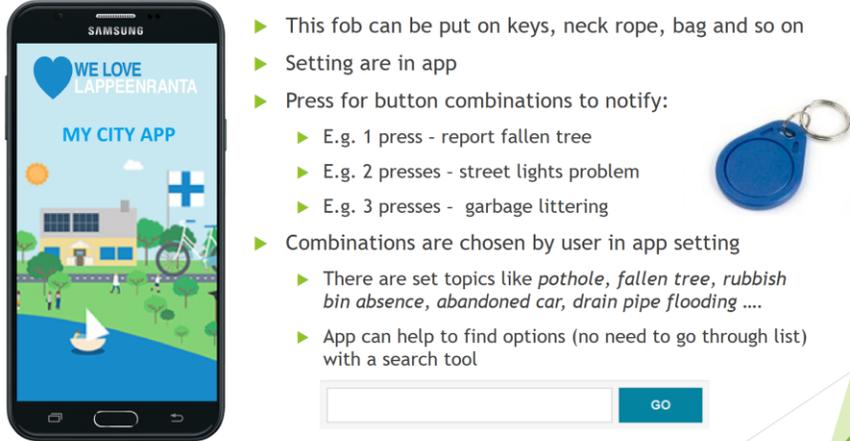
As a part of the LUT TYYLI information and knowledge gathering activities, our own university students were asked to consider how University research could be connected to the daily life and to local municipality work. The point of view was to ask, how to allow citizens to get closer to research work and how to give people an ability and / or a possibility to get more familiar with the task of data collection, data analysis and actions taken by researchers and city personnel to build better society for everyone.

To get a reference point for this task, researchers themselves did the ideation firstly, to have the comparison point for the task and expectation, namely, what sort of idea to look up from students. The goal of the exercise was to find simple ways for people to participate in living environment monitoring tasks. Therefore, in this case it was decided that shared goal of the municipality and university for the development context would be in monitoring the environment we live in. This context was selected as we see our surrounding nature every day and as such, it is familiar to everyone. The key point for participating in general will be to give citizens the extremely simple way to notify municipalities about changes in their environment. All this development focuses on saving the taxpayers money. The work done by the city can be done faster and more efficient, when the city has more relevant data. At the same time, the whole society can get better feel to the nature around them, as the collected data shall be given out as open data. For example, people could participate into the studies of alien plant species by reporting them on different locations they see them. So, in the traditional model, only city people who work with gardening does this, in the participatory model, anyone in the city can participate to the mapping part.

So, as an example of academic persons view to this collaboration model, one ideology is shown in the figure 1. This idea presents a tool to be develop by our University researchers to be given for local citizens for participation purposes. With the example, the citizens can participate to actual implementation design idea generation and later on into the data collection part. Also, the similar tool could be used in university – company collaboration

to collect data for them too, like monitoring location of broken infrastructure elements in case of private areas security guards who have secondary duty to look up for limited access areas fences conditions.

Use your smart phone with special app + wireless location marking fob



- ▶ This fob can be put on keys, neck rope, bag and so on
- ▶ Setting are in app
- ▶ Press for button combinations to notify:
 - ▶ E.g. 1 press - report fallen tree
 - ▶ E.g. 2 presses - street lights problem
 - ▶ E.g. 3 presses - garbage littering
- ▶ Combinations are chosen by user in app setting
 - ▶ There are set topics like *pothole, fallen tree, rubbish bin absence, abandoned car, drain pipe flooding*
 - ▶ App can help to find options (no need to go through list) with a search tool

Figure 1: Researchers idea for location mapping of monitored elements in university - municipality solution collaboration development model

Currently (spring – summer 2018) we are building the actual field experience, and for now it seems that young people are really interested in this sort of the possibility to participate into the university research, but also in the work that happens with the city too. They say that with this sort of opportunity, students can have some outdoor sports activities / fun and at the same time learn new things by working with different University and city representatives and in the end, be able to do some good for the nature too.

So now we have stated the case concept setting, the view of researches into the topic, the ideal way young students preferred to see our experiment setting to evolve and other context related aspects. After this, it is time to look up how our own university students actually did see the value in this sort of collaboration. What might be the topics our citizens could or would likely want to participate into? For this data collection task, we show our

results as the collection table (table 1) of some of the most expressed ideas, given to us by the students.

Table 1: Ideas for monitoring concepts / targets given to us by the students, into the university - municipality collaboration context

Idea visions	Form of collaboration
Air quality measurement	Sensors given by city to be connected to activities people do in daily lives. Data for e.g. city but also could be given to local companies to help them to monitor air quality too.
Visual water quality	Inspecting the water quality by visually looking it. A simple but yet efficient way to communicate to the city, that the quality of the water is changing fast.
City infra reports	Tool to report potholes, dangerous street crossing places, damaged lights, paint problems and so on.
Unwanted phenomena reporting	E.g. reporting littering, damaging of objects and vandalism, animals that could be dangerous to people (wolves, bears, etc.)
Living condition and city environment measurements	An idea of measuring and reporting noise levels in city. For example, in play parks to kids, in areas near by commercial companies / industry areas, areas where people live and are nearby city streets.
Pollution measurements	A collaboration model, in which e.g. cars could have pollution measurement sensor in roof etc. By moving around the city, we could get some point data about different levels of pollutions.

From the TYyli project point of view, there is the great potential for work like this, with different work life actors and universities, as clearly the citizens would like to participate and are willing to put their own time into collaboration to activities like these. For future collaboration activities like this one, we would like to point out that the simplicity in the ideology that will be tried to implement for the citizens use, is clearly one key element for success. Moreover, “in the side” automated measurement (e.g. the device measures air

quality etc. without user inputs), the convenience was found intriguing by the people. The users thou would want to see the results and do prefer to have reports / ready made results visualized for them. It seems that this is sort of something for almost nothing is considered as a good deal by would be participants. In the models written above, the participants would give their free time, city and/or university responds and produce data-analysis and also data manipulation tools for the participants to use.

4. WORKING TOWARDS BETTER END RESULTS. AN EFFORT TO HELP STUDENTS TO EXPLAIN THEIR IDEAS MORE CLEARLY IN COLLABORATION EVENTS

In this part of TYYLI project, we have focused more on actual steps to be taken to help our students to be able to express their ideas in the way that is familiar to companies collaborating with universities. The idea was that when companies understand the ideas more deeply, they and students both feel that the collaboration with the university and companies produces more value to everyone. It is also a part of our work to make the Code Camps and Hackathon events in LUT better year by year and to follow the current research in this topic too. For example, the literature states that the main hackathons strength is in giving concise and clear project instructions and advisable toolkits (Aungst 2015, 60) to make its participants to concentrate on problem-solving utilizing made design constraints to for further presiding (Karlsen & Løvlie 2017, 227). For us it means that we need to give the students much support to “secondary goals” like making the presentation, so that they have the maximum time to focus on hackathon “primary goal” i.e. studying and applying new technologies into the given challenge contexts.

For this participant workflow support task, we have considered customer journey mapping guidance & instructions, business canvas model ideology support materials and also project team members presentation templates. A set of instruction and presentation templates are created in the form of Power Point and those are distributed among the students to provide them explicit and easy guidelines and stating point on presentation flow (the things to tell and an order to present them). The figure 2 in below, presents on the guideline instructions

given to students to a) prepare them to think their solution from a customer's point of view (to improve the solution they are building) and b) encourage students to make better presentation for the jury looking for end presentation.

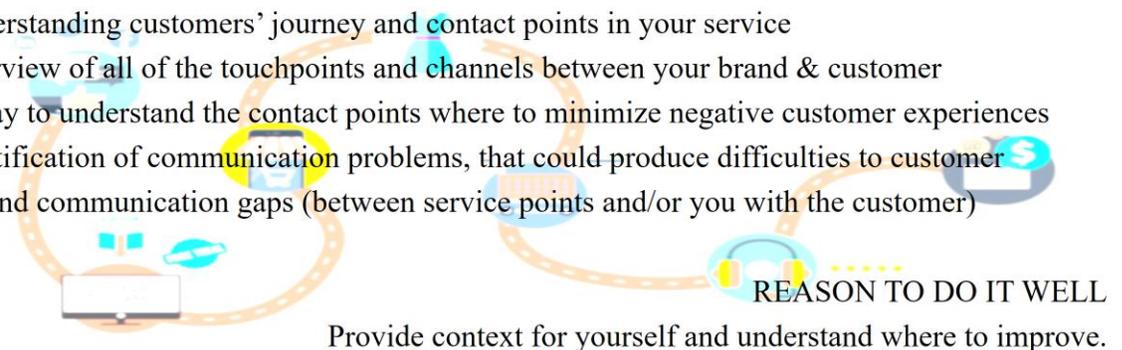
CUSTOMERS JOURNEY.....

FOR WHAT?

storytelling about the relationship a customer has with your business. It flows from the moment that your brand enters their awareness, through the in-store process and post sale

WHY?

- Understanding customers' journey and contact points in your service
- Overview of all of the touchpoints and channels between your brand & customer
- A way to understand the contact points where to minimize negative customer experiences
- Identification of communication problems, that could produce difficulties to customer
- To find communication gaps (between service points and/or you with the customer)



Lappeenranta University of Technology

Figure 2: Example from customer journey mapping instructions and explanation why to think these things as part of Code Camp event

As it can probably be figured out from the characterization given from hackathons earlier, they are not just an event for learning e.g. some new technologies. Hackathons also focus on teamwork and skills to present what participant have been learning, collaboration between the teams and inside the team, the efficiency of using outside information and so on. These are all crucial factors that are part of the “Code Camp spirit” and they all are important aspects of a well build event too.

Students guided in presentation making process can have more confidence in their verbal outputs, which in turn, should help everyone to understand more clearly what is the end goal student try to achieve, even in the beginning phases of their idea implementation. Also, this sort of approach, should encourage our students to develop useful work life skills as they study typical models in use in real business life environments. For example, every

company who uses rapid prototyping as a part of their design and development projects should also gain from creation of customer's journeys and applications of storytelling models. These tools are specially designed to help the entrepreneurs to realize more deeply the relationship a customer has with their business. The relationship should be considered from the beginning, the moment that company brand enters into customers awareness, up until the point the post-sale phase and ending of the product/service relationship to the customers.

Now in hackathons, the students are typically young from the 2nd to 5th year students, who might have little bit of work life experience, but not extensive long-time work history. Using this sort of help materials that "gently push" students to look their work form other people's perspective; it was possible to help the students to think and then understand who will be product and/or service customers. In addition, it helps students to understand what these customers expect and/or want and where and what sort of touchpoints and channels are used to communicate the service to possible users.

In this point, we have somewhat covered the methodology / technology part and also would be customer and their route (a.k.a. customer journey) they take to "step through" the services / solutions our students are designing. In addition to that, we also would like our students to consider the financial aspects of the project in hand, as this is the thing they typically face in work life too. For this we have selected the Business Model Canvas (BMC) tool for our students as basis for the help material, as it is widely used in business life. The part of the material we reveal to our students, about the BMC is presented in the figure 3.

WHY IS BUSINESS MODEL CANVAS NEEDED?

- ❑ It can guide & shapes business concept brainstorming & developing
 - ❑ customer value proposition is at the heart
- Great ideas are created by keeping the customer in mind and working backwards
 → Stay away from too technical mind set do not start from the product and hope for ready markets and customers to “eat up” your product

- Canvass Model is like a coin with two sides:
1. It considers what drives value and how you could reach your customers and build business by solving their needs
 2. what are the key elements that make point 1 possible

THEN JUST FOLLOW THE BUILDING BLOCKS. ONE NATURALLY LEADS TO NEXT

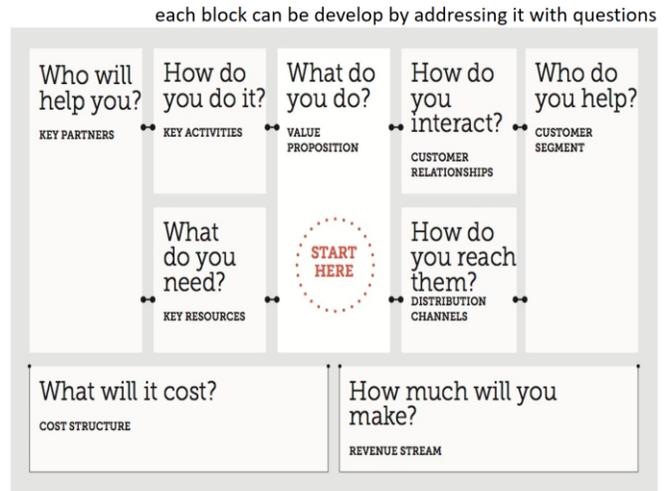


Figure 3: Instructions for students to work with BMC

In the BMC tool the main core elements of a business model presents in a form of a puzzle of business building blocks. These blocks show e.g. what drives the value designed to be served for the customers / users, how customers are reached, what are the support elements needed, where does the money come from and where it is needed to be invested. We have found out that when students work with these sort of tools, they improve their idea and its implementation too. Looking at the technology from other than just the tech point of view gives students’ holistic view into their ideas, which then improves the way their solution idea is expressed to outsiders, which is exactly the result we want to achieve.

Then, finally, in addition to practical tools / materials, we also have tested an evaluation help for improving the level of output, student would create in our hackathon courses. For example, as a part of two hackathons (OCTO3 & CGI) where students were developing IT solutions for challenges presented by the companies we organized sessions where students presented their projects to person outside the courses and outside of technology field. In the sessions, the student groups did explain their projects as they would do in real life for e.g. a company visitor, who does not have prior knowledge what sort of project different teams work for in the company / unit. This part of help offered for the students should help them to devote their attention in the final presentation to all needed aspects. On one hand,

students were able to improve their solutions “technical marvel” and novelty value, on another hand, the students were able to consider the business feasibility and reasons why user / customers would be interested about their solution in deeper level.

For this part of our university and company collaboration model improvement test, we also collected data from students, how did they feel about the option to get “outsiders view” into their work.

- *“...The talk with international course guest was an interesting thing. I enjoyed it. She gave us some suggestions about the application’s interface and some ideas about possible elements. In the end, we didn’t create most of the things that we talked about during our talk into our application though. This “show what you have done to an outsider” was really great in my opinion, since this way teams could get a viewpoint of someone who has never seen that team’s application before....”*
- *“...we received nice feedback from our visitor, who we gave a presentation about our project. Specially, the feedback helped us to focus more in the look and feel of the user interface and in fact in the final presentation we did get good feedback for the end result too 😊...”*

Now with the experience from our first tests, we are already discussing with the companies how to continue improving the results in the future. For example, we could add some sort of crash course elements inside the hackathon code camp courses. This would then help students to build wider view to the challenges students are solving in these courses, which would help students to prepare themselves to future work life challenges. For this goal we have performed study to the context, skills and study ways our student themselves would think to work out to give them the best possibility to learn in the course as much as possible. So, in the following list we show the things students did dream to be able to do and learn in new form of university – company collaboration hackathon events:

- ✓ Students would like to acquire & improve their web development skills.
- ✓ Do coding practice in innovative processes environment
- ✓ Gain valuable experience from working with new real multi-area projects or new approaches to existing problems, where one can apply acquired knowledge into innovative context

- ✓ Analyse the topology and to do parameter measurements to find good solutions
- ✓ Give a life for ideas you generate and then turn those into a successful start-ups
- ✓ Have a course to familiarize us with design features
- ✓ Use team work as working model in the course to help interaction with people
- ✓ Learn more from digital services and data visualization techniques
- ✓ Conduct interviews with real proposed customers
- ✓ Create software that would actually be marketable
- ✓ Work in teams such a way, that you would learn new skills form other group members
- ✓ Go through the whole innovation process from zero to prototype demonstration of the idea
- ✓ Have unique mentoring sessions and to get feedback from our work
- ✓ To be able to demonstrate you skills to companies involved to the events

After analysing courses work methods, we asked the students to vision context for a code camp they would to participate. We wanted to have their dreams about the context too, as we believe that when people can work for things they love to do, it helps people to achieve the best possible results they can do in life. The analysis of the questionnaires is presented in the table 2.

Table 2: student's answers to questionnaires about dream cap context

CONTEXT OF DREAM CAMP	IN DREAM CAMP WE WOULD DEVELOP ...
Smart Healthcare Website Development	Conceptual level solutions & program template for the health services website to enable users to book doctors' appointments on-line, to get video consultations, to store patients` health history additional support information, to save patients` and doctors` time and support convenient use of services for disabled people.
Finnish Sustainable Future Engagement	software concept/prototype of a software system that would improve sustainable behaviour in peoples daily actions engagements
Health Monitoring Tool for Grid	Dynamic & smart tool to monitor network health & detect possible network failures proactively & help consuming less power or to run the grids more efficiently based on found best practices

IoT Start-up	Idea innovation with tech experts of IoT to engineer a service in topics of Smart Industry & Cities, e-Health and Smart Energy
Future Service Innovation & Green Software	new software project from scratch and running it with this specific green/sustainable mind-set or already existing software product to redesign its sustainability and then measure its environmental effect
Smart Cities, Autonomous Cars, Block chains	solution for Smart Cities IoT structures (smart objects, smart homes, smart devices... etc.), autonomous cars, Block chains in insurance business.
Designing Service Agriculture	software & web services in agriculture e.g. crop selection according to soil, climate, season and etc. type based on previous year data

As the conclusion, we would like to say, that the topics that the students would like to “bring in the table” are all up to date. The abovementioned topics definitely meet some interests of the area expert companies and can end up developing modern solutions into interesting challenge contexts. In fact, we truly believe that students would be more willing and enthusiast to develop new solutions in this sort of challenges than in generic academic works.

5. STUDYING UNIVERSITY – COMPANY COLLABORATION OUTSIDE LUT CONTEXT

As a part of this project, we have compared our own approach to Code Camp style industry – university collaboration to the publicly published Industry Hack events to look for similarities and differences. For this work, we have analyzed total of 8 different implementations. What we have found surprising was the fact that there is nothing mentioned about challenges, surprises “in action” situations or trade of situations between different options. However, we have found the common points from the student expressions available, and these are now documented in the following table 3.

Table 3: Students expressions from outside LUT organized hackathon events

PARTICIPANTS' POINT OF VIEW	COMPANIES' POINT OF VIEW
<p>Excited with the opportunity to develop the topic idea using case company tools, machines, equipment, systems, inner/history/real time data access</p>	<p>For companies, public events like hackathons that open their doors to outsiders are good for marketing and build positive PR image for company activities</p>
<p>Great info provided by hackathon company regarding issues to solve gave nice kick start to the event</p>	<p>Understanding the latest technologies student have been studied and their possibilities for companies held hackathon events and new effective ways to test companies' own data sets, tools and other equipment and what can be built with the help of them</p>
<p>Feedbacks given from coaches and mentors was inspiring</p>	<p>R&D business ideas & prototypes generated in hackathons give new power to in-house innovation efforts also possibility for follow-up discussions with the students did lead to piloting to continue the idea implementation presented in the event towards a real-life solution</p>
<p>Special possibility for discussions & exchanging knowledge with companies' staff</p>	<p>Enhancing the company culture by embracing continuous learning and open ideation with outsiders</p>
<p>Continuing discussions with the hackathon winning teams above to e.g. start pilot projects and further work together with the company</p>	<p>Help in building and maintaining an external developer community of participant who later will going hackathons companies for further projects piloting & work.</p>

6. CONCLUSIONS

In the conclusion, it can be said that there is still a lot what university, teachers and also students can do to improve the university – company collaboration results for everyone who is part of the collaboration process. From our experience, university could promote these collaboration opportunities more widely into the direction of companies. Teachers have still many ways how to improve the collaboration too. For example, by providing students with more efficient tools for achieving the defined learning objective in the hackathon / code camp courses, the more time they will have on challenging themselves to great more and better results. Considering the company feedback, students could a) network more with students from other disciplines, b) prepare themselves before the events (e.g. studying the company who is the collaborating party for the event) and c) promote the results he/she achieves in the event more publicly inside the event and after it.

From the university point of view, there are also things that the companies themselves could do to improve the productivity of the collaboration work between the universities and companies. First of all, the goals a company sets for such collaboration should be stated as clearly as possible right in the start. Secondly, expectations a company has for the level of the students' work should be discussed openly before starting anything bigger as that should also set the assumption for the needed effort company should prepare itself to put as input for these collaboration projects. And, finally, companies could “tight their hands” little bit more with promises like “from this event, the best end result will be selected for next level effort for practical implementation project”. The last point has surfaced both from the student direction from the hackathon like events, but also from a big company – startup collaboration events too, which have similar setup than a student group – big company hackathon / code camp events that have been built within university collaboration setting. The reasoning behind this sort of promise setting was that by promising of continuing from a concept prototype to a collaborative implementation level, both a company and a university would naturally put more effort into the collaboration and this sort of incentive would produce better results for everyone.

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