

Innovation for Sustainability – An Intercultural and Interdisciplinary Summer Course Based on the Method of Research-Lead Learning

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This version: September, 2016

Abstract

During the summer course „Innovation for Sustainability“ (IfS) students from different cultural and academic backgrounds convene and are faced with the challenge to engage creatively with current social, economic and environmental problems and questions in heterogeneous research teams.

Four years of experience with conducting this format demonstrate in an appealing manner that the didactical method of research-based learning is suitable for summer schools. A summer school can motivate students and expose them to intensive learning experiences while the method of research-based learning enhances cognitive skills through their engagement with relevant contents. Its intercultural setting provides students with opportunities to acquire pivotal extracurricular skills for their future practical business careers.

The gap between theory and practical business is bridged by actively involving companies and trainers into the summer school. An intensive exchange of experiences in an international environment is guaranteed as the group consists of members of different cultural backgrounds and nationalities.

1 Introduction

Summer schools are efficient vehicles for conveying teaching and learning content (Matsudaira, 2008, Cooper et al., 2000). They act as a motivational resource and enable intensive learning experiences. Frequently, university goals can be achieved through summer schools e.g. by linking regional and international issues or by embracing social and political aspects in the training. However, summer schools are often offered without an underlying educational concept.

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In this essay, I propose research-based learning as a suitable educational concept for summer schools (also refer to Huber, 2009, and Wildt, 2009). My judgment is based on designing and conducting the study tour „Innovation for Sustainability“ (IfS), a blend of summer course, excursions, seminar and international exchange program at Nürtingen-Geislingen University (NGU). The tour was innovated and realized for the first time in the summer of 2013 and was repeated in each subsequent year, thus adding up to four years of experience with IfS.

In IfS, students are enabled to conduct research on how companies in key industries currently use product or process innovations so as to be able to deal directly or indirectly with challenges posed by e.g. climate change, exit from nuclear and fossil-fuel energy, or demographic change, or the refugee crisis, to name only a few.

In IfS, students discover and identify a problem and articulate it as a valid business question in such a way that a business leader would value the subsequent research and results. They take a global stance to the issue of sustainability development and learn how firms operationalize sustainability in the real world and work successfully in a collaborative and multi-cultural fashion. Students are coached to apply current analytical tools such as descriptive statistics or structured interviews, text or web page analysis, etc. They can move in a cross cultural setting and they learn to demonstrate respect for diversity, helping behaviors, acting warmly and supportively. They understand the importance of the social and political environment in doing sustainable business and identify stakeholders in the business environment

Grouped in culturally diverse research teams, students acquire intercultural competencies as they analyze specialist problems within a certain scope together. In order to successfully tackle these problems and manage their tasks, it is indispensable for them to discuss their different ideas and potential solutions. All of this happens across different national backgrounds and using English as the common language. This implies that the educational situation emulates real working conditions that could be found in a multinational enterprise or any company with cross-border activities and value chains, subsidiaries abroad or foreign owners.

Eight company visits to firms such as Daimler AG, a mobility firm, Bosch, a technology firm and car supplier, Storopack, a protective packaging firm, Kärcher, cleaning technology, Kreissparkasse, a local savings bank, all of which are based in the university's region Neckar-Alb; visits to governmental bodies like the European Parliament in Strasbourg, France; as well as tours to sustainable dwelling districts, such as the French Quarter in Tübingen or Bahnstadt, Heidelberg, the world's largest passive housing district, are provided to give ample opportunity to collect the necessary empirical evidence needed for the research tasks.

Being sequentially housed in three different cities avoids long travelling times. Using NGU-owned vans and public transportation to get around, does not only cut down trans-

portation costs but also helps to keep CO₂ emissions as low as possible. This is consistent with the core idea of IfS.

Students come from different university degree programs offered at NGU and at NGU's partner universities in Mexico and the US. The tour regularly involves 18 students, thereof 6 students from Portland State University (PSU), 6 students from Universidad Panamericana (UP), Campus Guadalajara, Mexico, as well as 6 students from NGU. Further, IfS's faculty consists of an interdisciplinary team from these three participating universities. Christian Arndt, an economist from NGU, has created the tour and is its academic coordinator. Jeanne Enders, a psychologist from PSU, is co-teacher and partner in the academic team. Isabella Friege (NGU) is tour manager. Lectures are partly delivered by researchers from the Coordination Center for the Environment and the Economy (CCEE) at NGU (see www.hfwu.de/KoWU).

For the students, the awarding of credits is a further incentive to participate and engage intensively. For the successful completion of the course students are rewarded six ECTS (European Credit Transfer System) credits. With both cooperating entities (UP and PSU) an agreement on an own "home" credits award has been agreed.

The teaching commitment of the academic coordinator is reckoned by the faculty as part of the teaching load. Organizing fees, hotel expenses, some meals, transportation costs and other study tour related expenses cannot be taken out of the general university budget. Consequently, a study tour fee has to be imposed.

An exemplary detailed program of the most current issue of IfS in the summer of 2016 can be found in the appendix.

The remainder of this paper is organized as follows: In section 2, I introduce the learning goals and the conceptual design of IfS. I show that the concept is derived from NGU's mission statement, general curricular requirements and educational goals. In section 3, I lay out the idea of research-based learning and document the pivotal research cycle. Didactical inputs and student assignments are explained. Section 4 reviews the course as a whole, especially its compatibility and adequacy with the research-based learning concept imbedded in a summer school format. This is being done from a student's and an instructor's perspective. Section 5 summarizes the most important findings.

2 Learning Objectives

The learning objectives of IfS derive immediately from NGU's most important policy goals. These include NGU's commitment to sustainability and its striving to extend international academic relations.

2.1 University Goals as a Framework for the Program

To contribute to sustainable development is core of NGU's self-concept. (NGU, 2011, p. 3). The following requirements are claimed by the president:

1. „On our way to sustainability NGU takes on the role of a pioneer. All stakeholders within the organization and outside shall be included in this process.“ (ibid.)
2. „As our name implies, we link economic topics and ecology in research teaching and transfer.“ (ibid.)
3. „Our students learn how to think and act in a sustainable manner when dealing with current questions and issues.“ (ibid.)

Implementing these goals requires a commitment to educate future managers such that they are not only aware of the importance of sustainability but fully comprehend its scope. Furthermore, it is necessary to transfer the research results and the acquired knowledge to the society as a whole (HfWU 2011, p. 3).

This implies that both, stakeholders from within the university as well as from outside need to be included in the conceptual design of IfS. In addition, a research focus linking economic and environmental topics has to be established and lastly, current sustainability topics must be allowed for.

Beyond that, NGU enriches its international exchange program through IfS, as IfS is targeted towards students of select partner universities, including those who are not able to spend time in Germany during the regular semester period. IfS offers an interesting and efficient alternative, namely a shorter, more condensed stay abroad during the semester break.

2.2 Major Learning Objectives

IfS is built around 8 major learning objectives. Students shall be able to ...

1. discover and identify a problem and articulate it as a valid business question in such a way that a business leader would value the subsequent research and results.
2. take a global stance - unified but leveraging unique perspectives - to the issue of business sustainability
3. describe how firms operationalize sustainability in the real world
4. work successfully in a collaborative, multi-cultural fashion both face to face and virtually.
5. apply current analytical tools (those students already know) to the research results - examples: descriptive statistics, exploratory data analyses, structured interviews, text or web page analysis, etc.

6. contribute to a positive and curious environment in a cross cultural setting (examples: interacting regularly with a member of the class, demonstrating respect for differences, helping behaviors, acting warmly and supportively)
7. understand the importance of the social and political environment in doing sustainable business
8. identify stakeholders in the business environment

The learning objectives of IfS comprise the active acquisition of current and sustainability-related knowledge pertaining to business and economics. On an interdisciplinary level, they include practical skills and competencies. In research-based learning it is possible to link these two levels of learning.

2.3 Remarks on Academic Knowledge and Competencies

The students learn to properly use sustainability terminology in English. They understand „Sustainable Development“ according to the definition of the Brundtland Commission (World Commission on Environment and Development, 1987). They are aware of how significant intergenerational and intragenerational equity is in this context, and they realize that the concept of fairness in relationships between and among children, youth, adults and senior citizens are an important topic in any given culture. The participants will also be aware of how different cultures perceive sustainability and that the grasp of sustainability is strongly influenced by the cultural environment a person grows up in. In a further step, they will be enabled to understand and manage these different perceptions of sustainability in their professional life.

In addition to that, the students will realize that innovation and sustainability don't contradict each other, but that sustainable development actually presupposes innovation and synergies exist. They are able to identify economic, social and environmental challenges that organizations face on a corporate and departmental levels and can develop and assess creative proposals to alleviate the challenges and eventually solve complex issues.

The students will then do research to identify and understand strategies that global players are currently developing so as to deal with the challenges posed by the demographic shift, social inequality, scarcity of resources and global warming.

There is ample opportunity to practice the critical handling of information. Students are asked to question the usage and misuse of the term “sustainability”, which is commonly associated with a much broader meaning than referred to in academic discourse. The students learn how to link sustainability topics and practical issues and they can practice communicating these matters to potential colleagues or customers in a classroom setting.

Another implication is the acquisition of methods to scrutinize strategies for sustainable development from a global player's perspective. They learn to evaluate and review the

effectiveness and efficiency of strategies, how they are being implemented and which results they produce.

Eventually, the students have a chance to broaden and deepen their knowledge on methodology, quantitative research and the scientific documentation thereof.

Summarizing, students will prepare for their future, that is to ask, how they can, as future leaders and decision takers in firms, be a step ahead for the tackling of challenges from demographic change, social inequality, scarcity of commodities and global warming. They experience the challenges of managing intercultural and international projects and intercultural communication and learn to pose the right questions and answer them systematically.

One attribute that cannot be valued highly enough is that the participants are exposed to intercultural communication and intercultural management in a manner that is not possible in a conventional classroom setting. Skills are being enriched and enhanced regarding self-management, group management and project management, as the challenges discussed are real, hands-on problems. At the same time, these problems are being addressed within a culturally heterogeneous group that consists of members from various backgrounds. Target-oriented communication in such an environment is especially challenging and can therefore be much more rewarding and educational than traditional lectures or study groups work can be.

3 Implementation of Research-Based-Learning as Didactical Concept in IfS

In this chapter I argue that Research-Based-Learning is an optimal didactical concept for pursuing learning objectives in the area of Sustainable Development and support policy goals at the university level at the same time. I lay out the general concept of Research-Based-Learning and explain the importance of the so-called Research Cycle. A successful implementation of Research-Based-Learning calls for a well-balanced recipe of inputs, especially in the case of a summer school. Further, the complex product of a research-paper is rendered easier to digest for students if the whole project is broken down to incremental steps of deliverables. These deliverables have to be graded in a coherent way.

3.1 Research-Based Learning

*“Tell me and I forget,
teach me and I may remember,
involve me and I learn.”*

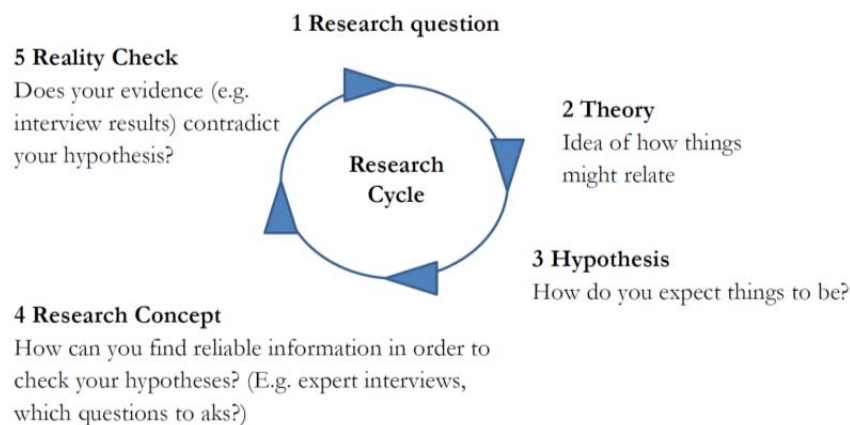
— Benjamin Franklin

The concept of Research-Based Learning is well suited to involve, activate, and motivate students in a reliable way. Research-Based-Learning “involves a process of framing questions, using reliable methods to find answers, and then weighing the relevance of the answers and the significance of the questions.” (Clark, 1997). This definition clearly shows the essential activities that students have to undertake in the process of Research-Based-Learning. Approaching the research object from different angles ensures that the students engage fully and understand deeper. It also helps to conflate teaching methodological skills and content.

3.2 The Research-Cycle

Figure 1 depicts the most important steps of the research process. The notion of research-cycle hints at its cyclical nature.

Figure 1: The Research Cycle in IfS



Source: Own elaboration

The following steps should be taken subsequently by the students, but each step may be honed by reruns through the research cycle.

Surfacing the Research Question

The first step of the research cycle consists of inventing, defining and honing an own research question within the interculturally mixed group of five students. Typically, a first difficulty for group consists in overcoming the freedom of choice. At this point, the fact that the students had already to share their thoughts about national challenges to sustainable development at home during the kick-off presentation (see next sub-chapter) helps to unleash the required flow of creativity. A second challenge is the selection of one of possibly different research ideas within the group. Therefore, it is important to point out to the students that it is deleterious to retain too much ownership over one's own ideas in order to facilitate the conversion process towards a common research question. Challenged by freedom, though, students are constrained in their choice of research questions in IfS. Students should try to focus on research questions that are fit to be answered with the evidence from the firm visits. Students should decide upon their research question in the first two days of the "on-site" period. Typically it is helpful to carve up this main research question into subsidiary questions. Note, that the formulation of the research question is also one of the graded deliverables in IfS.

Theory

The next step is theory – to share and extend existing knowledge and thoughts about how the things that are important for the research question might relate. A good first step is to graphically sketch relationships such as causes, impacts, stakeholders, etc. and describe the business environment. One example for a contribution to the theoretical part of the paper could be to describe the importance of synergies between the classical three dimensions of sustainable development. This argument for the importance of synergies in the theoretical part will legitimate and call for a focus on synergies also in the empirical part of the paper. Note that the required graphical sketch might be used as a figure in the body of the final research paper. In IfS, this step should be finished by the end of the first week.

Hypothesis

Students should formulate a testable hypothesis on the grounds of the theoretical considerations.

Research Concept

It is important to describe a consistent research concept. Students shall graphically sketch the process with which they want to find possible answers to the research question, or stated differently and how they want to try to impeach their hypothesis. This might work e.g. through semi-structured interviews with company representatives during the firm visits.

The students can supplement their existing knowledge in terms of research methodology with the help of the academic coordinator and they can then apply their acquired skills using relevant software. Ideally, the students should identify the need for more information and demand it from the instructors or other educational sources.

Reality check

The last step of the research cycle consists of finding, describing and analyzing adequate evidence that has been collected during the firm visits or that stems from further inquiries or from use of secondary data. Students should be reminded regularly to get rid of unrelated or unreliable information.

3.3 The Implementation of the Research-Cycle into a Summer School with a Limited Time Frame

The runs and reruns through the research cycle and the completion of the research itself take time and reflection. This poses a special challenge towards organizing a summer school program, when by definition time is scarce and constrained.

In IfS, this challenge is solved by splitting the workload into an “on-site” phase, that spans the two weeks at NGU and vicinity, and a “post-site” phase, that begins when students have returned back home in the mid of September and will last until the end of November. This extension allows the students to stride through the research cycle of a research-lead classroom project despite the limited “on-site” period of only two weeks.

During the “on-site” phase students are guided and coached closely by the faculty in person. The company visits and lectures take place. Students are offered the opportunity to work in groups at the same time and in the same place and be closely marshaled by the coaches.

During the “post-site” phase students keep working in the same groups as before on finishing their paper, but are now urged to meet virtually with the help of digital means such as Skype, google hangouts or Gotomeeting. Group work may be realized locally dispersed and in different time zones – social networks proved to be an excellent means of communication during this phase.

3.4 Type, Function and Weight of Didactical Inputs in IfS

During the previous considerations the most important types of didactical inputs into IfS have surfaced already. Nevertheless, Figure 2 gives a more systematic overview over the didactical inputs, their function and weight.

Lectures

Lectures are held by the members of the IfS faculty, other NGU professors, as well as regional practitioners and sustainability experts. They convey the necessary information and guidance to the students. They familiarize students with the concept of IfS, with its deliverables and methodologies. One lecture is given by a professional project management expert and helps the students organize their work during the “post-site” phase. The lectures consume roughly 15% of the total IfS “on-site” time.

The lectures are also used to prepare and supplement the fieldwork when necessary and have been used in the past e.g. to teach fundamentals of Agricultural Economics, Intercultural Management, Renewable Energy, Urban Planning, etc. prior to company visits, when this knowledge was not expected to be shared by the participants. Also, case studies that showcase “real” sustainability research at NGU, are implemented regularly.

Figure 2: Overview over IfS’s Didactical Components

Type of Input	Function	Estimated share of total program time
Lectures	Necessary information and guidance	~15%
Coached Study Group Sessions	Time to formulate questions and documentation, debriefing experiences from company visits	~25%
Firm visits as Field Work	Evidence and room for immediate inquiries	~40%
Touristical Events and Museums	Group Building, Society, Economic & Business environment	~15%
Joint Lunches and Dinners	Communication, fun	~10%

Source: Own elaboration

Most interestingly, some of the lecturing materials, e.g. concepts of sustainable development and ethical foundations, are designed to be re-used by the students in their theoretical and methodological parts of the papers and are shared with an online learning platform.

Coached Study Group Sessions

Most of the research work is planned, designed and conducted by the students themselves during the coached study group sessions. These are covering roughly a quarter of the total time spent during the “on-site” phase in IfS.

These study group sessions are scheduled officially in the program (see the appendix). They typically take place in the MLab, a special modern room provided by NGU that is designed for facilitating innovative collaboration and empirical research.²

Working sessions typically take place in the afternoons. All IfS participants are encouraged to evaluate each other’s work-in-progress continuously, and interact between the groups, so there’s a high degree of self-regulation (Peer Reviewing) in addition to the regular supervision provided by the academic coordinator.

² The MLab (see www.hfwu.de/MLab) has been designed and is directed by the author.

Further, each company visit is followed by a debriefing exercise, where students are urged to share their impressions from the company visits in a systematic and recurring way.

Firm visits as Field Work

The firm visits give opportunity to collect primary data in form of any evidence and create room for immediate inquiries. Further, these visits are the most important ingredient to IfS: about 40% of the total “on-site” time is reserved for these visits. They also form the most interesting and sensational part of IfS. Regularly, it is a unique experience to get in contact with firm representatives, sustainability officers or senior managers. The IfS organizing committee regularly sets up these company visits and lectures prior to the “on-site” phase. So the grounds are already prepared for the interviews and discussions with the company representatives and lecturers.

Touristic Events, Museums Joint Lunches and Dinners

Several touristic events, such as visits to the city of Munich or the college towns of Heidelberg or Tübingen allow the students to tap into the rich body of European history and societal context. Joint lunches and dinners facilitate the exchange of soft skills, and the experience of intercultural differences. About 25% of the total time is used for this purpose.

Group dynamics are a key factor given that there are only two weeks of physically being together. These activities encourage communication, which in turn helps to build mutual trust and identification within the group. Another effect of these activities is that the better the team members know each other, the harder it is for an individual to withdraw and become a ‘free-rider’ when it comes to the actual research work. The very first activity on the day of arrival is a reception and an informal dinner with all participants; an important contribution to group building is a visit to a rope garden during the first weekend of IfS; the very last activity after the two weeks of hard work is a more formal farewell dinner. The students typically spend their lunch breaks together and on several days lunch is provided. Some group activities include sight-seeing in three different cities: Nürtingen, Munich and Stuttgart, while others are indirectly tied to the overall IfS topic. Some examples of the latter are the German Museum in Munich or the Mercedes Museum in Stuttgart. E.g. during an exhibition explaining the Stuttgart-Ulm rail project and the controversial new Stuttgart central station, the students get to know a highly disputed project involving many aspects of sustainable development. A regular Segway tour through the city of Stuttgart was probably one of the students’ favorite activities during the attendance period.

3.5 Assignments, Deliverables and Grading within IfS

Figure 3 shows the type and weight of the assignments and deliverables in IfS.

Figure 3: Type and weight of deliverables in IfS

Deliverable	Type of Grading	Credits (Share of Total)
Individual kick-off presentation	indiv	pass/fail
Formulation of research questions	group	10 %
Participating in joint debriefings	indiv	10%
Visual representation of the research object	group	15%
Description of the business environment	group	10%
A "Research Paper "Pitch"	group	15%
The final research paper	group	40%
Sum		100%

Source: Own elaboration

Altogether seven different assignments need to be delivered in IfS.

Individual kick-off presentation

The individual kick-off presentation is mandatory to pass yet is not being graded formally. Its main purpose is to compel each student to speak out loudly in front of the whole group. Thereby, every student is given the opportunity to present her- or himself, even though they might not have dared to do so from the beginning.

With this presentation, the students produced their first preliminary results already in the preparatory phase. It is important to understand, that although the keynote presentation is held at the very beginning of the attendance period, it is not an impromptu presentation, but the result of the work in the previous phase. At the first plenary each student introduced himself and his individual perception of „Sustainable Development“ in light of their own regional and cultural background. Part of the task was also to come up with ideas and raise provisional research questions that were considered important at that point in time, as already mentioned above.

Formulation of research questions

The group-specific research question, itself an integral part of the research-cycle, is a deliverable and will be graded. It needs to be finished before the firm visits start.

Participating in joint debriefings

An active participation in the joint debriefings is required.

Visual representation of the research object

A visual representation that the students will use in the theoretical or methodological part of their paper has to be developed. It is graded and shall be immediately re-used as part of the whole research paper.

Description of the business environment

A description of the business environment that includes a thorough description of all stakeholders is required and may be re-used in the paper.

A “Research Paper “Pitch”

From the very beginning the students need to learn to structure their actions and processes and work at a pace that is still manageable for all. Yet in the research paper pitch the teams defend their research questions, they share their research goals, their course of action and possibly even first results with the whole group. Plans of actions and drafts are being critically discussed by the IfS faculty, feed-back is provided. An evaluation session follows the poster presentations and is also part of this final plenary.

The final research paper

In the “post-site” phase the students devise and write their actual research papers based on the drafts, outline suggestions and topic-related ideas that were presented at the end of the contact weeks. Three issues of IfS have proved so far since 2013 that students managed to raise fascinating, practical and at the same time current questions and that they were able to examine these critically and from different perspectives. The quality and the timely manner in which these reports were produced, demonstrated that the students brilliantly mastered the challenges of working in culturally heterogeneous teams. The essays showed the extent and depths of the issues raised in the particular research areas. The research topics were manifold: To only give some examples, one team discussed to what degree businesses can contribute to sustainability and identified opportunities and limits to corporate actions in this field. Another team examined the risk management of small businesses with a strong focus on sustainability and screened the different types of risks that founders of such businesses have to face. A third team analyzed how exactly innovation can be generated in a sustainable environment. The core question here was: What triggers innovation? The team looked at customer demands, ideas from within the companies and at legal requirements. Another team focused on the financial side and took a close look at the feasibility of revenue and profit maximization for companies, which have committed to sustainability. In Box 1 in the appendix the research questions and research results of the first issue of IfS in the year 2013 is outlined based on the abstracts presented in the research papers.

4 Preliminary Evaluation and Lessons Learned

4.1 Evaluation from the Students' Perspective

At the end of the “on-site” phase the students were asked to evaluate the program. The faculty documented the results, which serve as a valuable basis for a thorough assessment of the course from the students' perspective.

Overall, the students expressed contentedness and positive feelings regarding the course. The possibility to earn credits outside of the regular semester was appreciated very highly. The participants found IfS interesting and comprehensive. Especially the choice of companies was well received. There was agreement that through the company visits knowledge could be gained that could not have been attained in a classroom lecture. Moreover, the students were pleased with the size and the composition of the group; both were seen as ideal. Working so closely with people from different countries, and hence cultures, is seen as highly enriching. In addition to that, the keynote presentations are considered important. The students were praising the smooth organization of the tour. The program manager received raving reports and among the leisure activities the Segway tour was considered especially worthwhile. All in all the learning experience was perceived as a very positive one, as many of the activities as well as the environment as a whole were described as enjoyable and fun.

Critical voices addressed the density of the program during the attendance phase. There was grievance that the multitude of events during the two contact weeks was both mentally and also physically exhausting.

While the intercultural exchange was considered something very positive, difficulties of working in international groups were also encountered. Yet some participants proposed to include even more nationalities.

4.2 Evaluation from the Lecturers' Perspective

Since all students could complete the entire research cycle despite the relatively short contact time, IfS qualifies as research-based learning within the framework of a summer school course.

The keynote presentation is crucial as a provisional result for the implementation of research-based learning in several respects. Exposure to the topic at a very early stage of the preparatory phase facilitates effective repetition and consolidation of newly acquired knowledge during the attendance phase. This in turn unifies the skills standard within the group, expedites the generation of research questions and leads directly to specialist discussions. The multitude of impulses during the keynote presentations has a very motivational effect on the students. Learning progress is visible immediately and active participation by all students is triggered from the beginning of the course. A personal introduction

linked with the topic eases the transition of an entering the research cycle, also with regards to group dynamics.

The time assigned to group work proves to be sufficient for the teams to prepare and collect information for their research papers.

The final presentation at the end of the attendance period encourages discourse and exchange of ideas between teams regarding the academic approach. At the same time it turned out to be an excellent opportunity for the academic coordinator to monitor and supervise the research concepts, which was helpful in easing the transition to the post-processing period.

Further, in any year the group of participants was made up of students who share a common interest in terms of the topic and – at the same time – came from different cultural backgrounds, as this is one of the highlights of the conceptual design of IfS.

With completion of the research papers the students demonstrated that they were able to fulfill the academic and also the interdisciplinary learning objectives. They were able to understand and compile the terminology related to sustainability; they discovered that there are indeed cultural differences in the perception of sustainability, they recognized the significance of sustainability and they critically discussed functional topics. In conclusion of their task, they used qualitative and quantitative methods to document their findings appropriately in an academic research paper.

The students' positive feedback with regard to the multicultural groups reinforces the importance of this aspect for a competence-centered education in line with actual challenges of a real life work place. These challenges were previously unknown to the students, yet they were able to use and enhance these newly acquired skills. Interdisciplinary skills and language proficiency were needed and practiced during the workday, but also „after hours“, during social activities. This being the reason why the two weeks for the local NGU students came very close to an actual stay abroad.

As already outlined above, IfS makes a considerable contribution to the implementation of NGU's mission statement. Looking back over the years one can state that it is possible to successfully (1) include stakeholders from within and outside of the university, (2) link economic and ecological topics in research, teaching and research transfer, (3) incorporate sustainability aspects when working on current business issues (4) display cultural diversity as an invaluable potential.

The students' motivation and curiosity that developed during the summer school - and especially the study tour IfS - positively influenced the work as a whole. It was commendable that there was never a problem with students being tardy or absent. One could even go a step further and claim that linking research-based learning with the summer school format facilitates the collaboration between students from different cultural backgrounds when solving real-life challenges of multinational enterprises in a classroom setting.

5 Summary

This paper has shown how the concept of research-based learning is easily compatible with the format of an intercultural, interdisciplinary summer school. „Innovation for Sustainability“ (IfS), a study tour offered regularly each year at Nürtingen-Geislingen university since the fall of 2013, proves the points made. Within the scope of IfS, students of different cultural backgrounds are grouped in well-composed interdisciplinary research teams and are being exposed to current social, economic and ecological constraints. The main task for them is to thoroughly analyze these challenges and consider courses of action. The study tour takes place in the Neckar-Alb region of Baden-Württemberg, an area where many world market leaders, so-called “hidden gems” are based. About eight visits to locally based, yet internationally extremely successful companies of different industries provided a sound basis for collecting relevant data that was used as empirical evidence indispensable in scientific research.

The work environment was built such to approximate real working conditions of multinational enterprises with value chains across national borders. The internationally composed groups were a crucial factor to simulate this surrounding typically found in a real-life working situation of MNEs.

The students managed to finish the whole research-cycle. The students documented in their research papers, that the learning objectives were reached. The quality and the timely manner in which these reports were produced demonstrated that the students brilliantly mastered the challenges of working in the culturally heterogeneous teams. The students’ curiosity and motivation that developed before and during the contact weeks could be translated into quality and efficiency of the papers. The combination of research-based learning and the summer school format allowed for an ideal mix of students from different countries to tackle challenges that are very similar to actual problems that MNEs currently face. The participants underlined the importance of this aspect for a skill-oriented and practical capability during the feedback session. Interdisciplinary skills, such as English language proficiency, were continually challenged and cultivated as the group not only worked together during the sessions, but also mingled in everyday situations and after hours. For NGU students this phase of the course came extremely close to a stay abroad, but in your own country.

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APPENDIX

Box 1: Overview over research results gained through IfS in the 2013/14 winter semester

Research abstract #1:

Companies' Contribution to Sustainable Development.

“Sustainability is a term which is used more and more often in our society. But what exactly does sustainability mean? To act and react sustainable there are different issues which should be considered. During the study tour “Innovation for Sustainability” different companies from different industries were interviewed and evaluated. The result is that the findings are different than expected before. Not every department of a company with a sustainable image is sustainable in the end. It is still a long way to adjust every department to act and react in a sustainable way.” (Aly, Martinez, Schneider und Trinh, 2013)

Research abstract #2:

Long and Short-Term Risks for Sustainable Innovation within Companies

“Recent literature has focused on sustainable innovation within firms. There are two views as to whether sustainability can contribute positively to innovation or not. One theory is that the implementation of sustainability comes at a high cost and therefore erodes a firm's profitability leading away from sustainable innovations. The other view is that sustainable development can increase a company's profitability and therefore foster sustainable innovation. However, sustainability comes with risks for companies, which differs greatly from firm to firm. We will examine the constraints that long-term and short-term risks can bring forward to prevent sustainable innovations within companies.” (Faltermeier, García und Reyes, 2013)

Research abstract #3:

Sustainable Behaviour in Businesses – Who has the Initiative?

“The paper is about the various parties that are involved in the sustainable development of businesses. Many companies have a special effort towards sustainability, but who actually gives the impact for a sustainable behavior in companies? Is it the single customer wanting sustainable products, is the government the leading figure or do the companies start the process by adapting sustainable aspects to their business decisions? For a further integration of sustainable aspects in the daily life it is important to understand this process and to know which party sets an impulse. The whole analysis is based on interviews with company representatives from companies that are already active in the field of environmental friendly production.” (Meyer, Torres und Wolf, 2013)

Research abstract #4:

What Can Companies Do in order to Increase their Sales of Sustainable Products?

“LOHAS – the trend for a “Lifestyle of Health and Sustainability” shows that sustainability is an important issue in our daily lives. The topic is becoming inevitable to be competitive for companies interacting in a regional market as well as the international market. In order to address these problems we want to show in our paper what possibilities companies have to increase their number of sales on sustainable products. The most important point is the visibility of the brand. Secondly, eco-friendly packaging is also a crucial point for customers. Finally, in terms of energy it becomes solely about drastically reducing further greenhouse gas emissions.” (Heim, Kamohara und Nothdurft 2013)

Nürtingen-Geislingen University (NGU) and
the NGU Coordination Center for Sustainable Development (CCSD)



Program IfS Study Tour - Aug 21 (subject to minor changes)

Fri September 9	<p>Welcome to IfS Check-in at Hotel Pflum (http://www.hotel-pflum.de/) Steinengrabenstraße 6, D-72622 Nürtingen, ph: (+49) 07022 928</p> <p>6:30 pm Welcome Dinner: Restaurant Delphi, (http://delphi-nt.de/) Markt Str.6, D-72622 Nürtingen, ph.: +49 (0) 7022 60 28 000</p>
Sat September 10	<p>Kick-Off 9:00 - 12:30 noon Introduction to IfS – Learning Objectives, IfS-deliverables, and assignment to Study Groups Prof. Dr. Christian Arndt and Isabella Friege at NGU campus (http://goo.gl/maps/0A3YA)</p> <p>12:30 - 1:30 pm Lunch Break - Pizza Party</p> <p>1:30 - 3:30 pm Getting to know Nürtingen - Guided city tour in the picturesque medieval Old Town.</p> <p>3:30 – 6:30 pm Individual Kick-off Presentations as prepared upfront by the students</p>
Sun September 11	<p>Team-Building and Research Preparation 9:00 am- 1:00 pm Get to know your group beyond the classroom: <u>Team-Training</u> in a quality ropes course adventure park (http://www.abenteuerpark-schlosslichtenstein.de/)</p> <p>1:00 - 2:00 pm Lunch</p> <p>2:00 - 4:00 pm <u>Study Group Work</u>: Framing of Research Questions, Preparation of first Interview Questions at NGU's MLab</p>
Mon September 12	<p>Sustainable Heating and Cooling for Homes 8:30 am- 2:45 pm <u>Company Visit</u>: Bosch Thermotechnik GmbH in Wernau; this company represents the Thermotechnology division of the Bosch Group; leading supplier of heating products and hot water solutions in Europe</p> <p>3:00 pm Shuttle or train back to Nürtingen</p> <p>4:00 - 7:00 pm Debriefing, and Time for <u>Study Group Work</u> - meet and work on presentations</p>



Tue September 13

9:00 am- 1:45 pm

Followed by

4:00 pm

4:30 - 7:00 pm

Protective and Sustainable Packaging

Company Visit: STOROpack in Metzingen; this company is specialist packaging solutions and in the “interior cushioning” market.

Trip to Outlet City Metzingen (Hugo Boss, etc.) (optional)

Shuttle or train back to Nürtingen/Lunch

Debriefing, and Study Group Work

Wed September 14

9:00 am – 10.00

10:00 am – noon

12.00 – 1:00 pm

1:00 – 2:00 pm

2:00 – 4:00 pm

Let’s Work

Lecture: Sustainability Concepts as theoretical Background for our Research, Dr. Jochen Fehling (Coordination Center for Sustainable Development at NGU, [CCSD](#))

Study Group Work

Lunch

Study Group Work

Lecture: “Voluntary employee green behavior – employees who try to reduce the environmental footprint of their employer”, Anja Gräf, MSc (ISR and CCSD)

Thu September 15

10:00 - 12:30 am

12:30am - 1:30 pm

1:45pm - 3.30 pm

4:00 - 6:00 pm

Living, Mobility and Urban Planning in a quaint College Town

Sustainable Urban Quarters: The French Quarter Tübingen

Company Visits: Teil Auto (Car Sharing), and SON (Bicycle Dynamos)

Lunch Break at Gaststätte Loretto (Integrative Restaurant, Freundeskreis Mensch e.V.)

Coffee and cookies at Arndt Family’s house in Tübingen

Punt Boating “Stocherkahn” on the Neckar River, historic district of Tübingen

Fri September 16

5:30 am

9:00 – 11:00 am

11:00 am – 5 pm

then

approx. 8:00 pm

Sustainability and Peace – the European Parliament

Bus ride to Strasbourg/France

Tour of the European Parliament

Explore Strasbourg on your own

Transfer to Heidelberg

Arrival and Check-in at Hotel Bayrischer Hof (www.bayrischer-hof-heidelberg.com/)

Rohrbacher Straße, D 69115 Heidelberg, ph. +49 6221 87288-0

Sat September 17

10:00 - 12:00 noon

12:00 - 1:30 pm

1:30 - 3:00 pm

after 3:00 pm

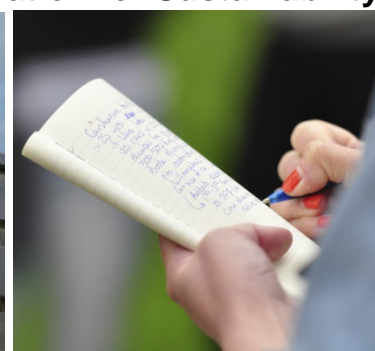
Heidelberg, Day 1 – Sustainable Quarters and History

Public Service and Administration: Bahnstadt Quarter (The biggest passive house district in the world!) and Innovation Park (HIP) – The Planning of a Hot Spot for firms in IT, Digital Media and “Industry 4.0”, Dr. Henning Krug, City of Heidelberg

Lunch

Medieval Castle Tour

Explore Heidelberg on your own



Sun September 18	Heidelberg, Day 2
12:00 am - 1:30 pm	Boat trip on the Neckar River
Afternoon	Shuttle back to Stuttgart/Nürtingen
Followed by	Check-in at Motel One in Stuttgart (http://www.motel-one.com/de/hotels/stuttgart/hotel-stuttgart/)
Mon September 19	Sustainable Mobility and Electric Drive from a Global Perspective I
9:00am – 3:00 pm	<u>Company Visit:</u> Daimler AG (Part I), research department and plant in Sindelfingen; Joint Daimler-IfS Workshop with Stefan Hoffmann (Senior Manager Research and Development, Daimler AG) – Task setting by Daimler
10:45 – 11:45 am	Introduction to creative processes (Dr. Jeanne Enders, PSU), at Daimler premises
12:00 – 1:00	Lunch
2:00 – 3:45 pm	Guided Tour Guided tour “Mercedes-Benz plant Sindelfingen”, Daimler’s biggest production plant worldwide with 37k employees, thereof 10k in R&D
5:00 - 6:30 pm	Guided city tour Stuttgart on Segway Personal Transporters (alternatively: walking tour)
Tue September 20	Sustainable Mobility and Electric Drive from a Global Perspective II
9:20 – 11:45 am	Mercedes Benz Museum, Stuttgart-Untertürkheim (www.mercedes-benz-classic.com) Guided Tour and individual walkabout
12:00 – 1:00 pm	Lunch Break
1:00 – 4:00 pm	<u>Company Visit:</u> Daimler AG (Part II) at Daimler Worldwide Headquarters in Stuttgart-Untertürkheim, Creative Process for Solving the Task from Day I, sketch or results and presentation to Stefan Hoffmann and his team
4:00 pm	Debriefing
Wed September 21	Preserving through Cleaning: One Example for Family Owned Companies in Germany
10:00 am- 1:45 pm	<u>Company Visit:</u> Alfred Kärcher GmbH & Co. KG in Winnenden (https://www.kaercher.com/us/) One of the largest manufacturers of cleaning equipment and family-owned company
3:00 - 4:00 pm	<u>Interactive Lecture:</u> Leadership for Sustainable Development and the Role of Ethics, Dr. Jochen Fehling
4:00 pm	Debriefing and <u>Study Group Work</u>

Thu September 22	Sustainable Finance and Sustainable Buildings
9:00 - 12:00 noon	<u>Company Visit</u> : Kreissparkasse Göppingen, one of the independent savings banks of the Savings Banks Finance Group in their new local Headquarter that has been Certificated as a sustainable building
1:00 - 2:00 pm	Lunch
2:00 - 5:00 pm	Debriefing, <u>Study Group Work</u>
Fri September 23	Presentations
10:15 - 12:00 noon	<u>Study Group Work</u> : Finalizing presentation
12:00 - 1:00 pm	Time for lunch
1:00 - 4:00 pm	Study Group Presentations and General Feedback
starting at 6:30 pm	<u>Farewell Dinner</u> at Weinstube Am Schlossberg , Schloßberg 1, 72622 Nürtingen ph. +49 (0) 7022 61168
Sat September 24	Good-Bye
	Transportation to Stuttgart Airport/Stuttgart train station