Wiki Based Collaborative Learning in Interuniversity Scenarios

Elisabeth Katzlinger[2] and Michael A. Herzog[1]
[1]Department of Economics, Magdeburg-Stendal University of Applied Sciences, Germany
[2]Department of Data Processing in Social Sciences, Economics and Business, Johannes Kepler University Linz, Austria
michael.herzog@hs-magdeburg.de
elisabeth.katzlinger@jku.at

Abstract: In business education advanced collaboration skills and media literacy are important for surviving in a globalized business where virtual communication between enterprises is part of the day-by-day business. To transform these global working situations into higher education, a learning scenario between two universities in Germany and Austria was created where students worked together in virtual interregional learning groups. This article reports about a study of an interuniversity collaborative learning scenario within the subject of e-business. Participating students collaborated virtually and documented a shared case study in a Wiki. When working together, learners used different synchronous and asynchronous tools for close virtual collaboration around a Wiki toolset such as forum, chat, video conferencing and other social media. Students applied given case studies (e.g. from Harvard Business Review) or they worked out a business case from their own experience, which covered a range of upcoming e-business topics. In an attending evaluation study with around 460 participants from two universities, 259 questionnaires were evaluated. It reveals several substantive effects like

- Tremendous influence of interregional group work for media competencies
- Hidden social aspects and conflict potential
- Scenario design and different media usage
- Teaching effort vs. learning outcome of such a scenario
- Learning impact for different student groups depending on gender, employment, graduation or online-moderation.

The findings of this study reveal several interesting aspects concerning media usage and show how students benefited from Wiki work in this virtual learning scenario.
Keywords: Wiki learning, collaborative learning, virtual collaboration, cross teaching, business education

1. Introduction

Throughout recent years, the media didactics discussion has mainly been dominated by constructivist approaches. In these approaches, the conceptualization of knowledge plays a central role. Knowledge is thereby not regarded as the immediate result of a knowledge transfer within a learning process, but constructed by the learners themselves. Constructivism puts the learner into the center of theory construction and supersedes the idea of a possible external controllability of learning. Special focus is thereby placed on the collaboration of learners within learning communities (Papchristos et al 2010). Especially business students have to be able to work well in teams and therefore courses should include critical elements that encourage teamwork and group skills.

To learn with the aid of Web 2.0 services – such as Wikis or Weblogs – can be associated with constructivist learning, as it supports an active construction of knowledge as well as a self-regulated learning process. Through interaction, joint learning and learning from each other become possible. Especially Wikis open up new possibilities concerning learning and a collaborative construction of knowledge (Cress et al 2008). In this connection various recent studies could confirm certain benefits for learners. (Zdravkova et al 2012; Wang et al 2013; Heng 2012; Huang et al 2013; Laru et al. 2012).

The basic idea of collaborative learning is that knowledge is not regarded as static content but rather as a constructive process. Through dialogue different contents are extended and refined jointly and subsequently interlinked with each other. Collaborative learning facilitates a joint knowledge construction on the one hand, but on the other hand demands a lot from the learners. In collaborative learning students have a need for assistance in the form of productive and structured interaction. The importance of structured and guided collaboration is essential for an online team to be successful, as documented in various studies (De Smet et al. 2008).

Collaboration is characterized by a common goal. All participants involved have to share an interest in this common goal – in the present case the development of a Wiki documentation of an e-business case study –

even if conflicts may occur on the way. In order to achieve this common goal, all participants contribute their knowledge, skills and hours of work. The equal status of all actors is the basis for collaboration in this connection. The rights, duties and tasks dynamically arise from the working process. (Schmalz 2007) A further basic idea of constructivist learning approaches is situational learning. Gräsel et al (1997) particularly emphasize active learning, which is situational as well as context-bound and facilitates a self-regulated learning process.

The article at hand focuses on Wikis as supporting tools for the learning process. In 1996 Ward Cunningham coined the term "Wiki" for HTML documents that are developed and edited via a web browser. In order to do so, no programming skills are needed. All that is necessary is a web browser and Internet access. The basic idea behind a Wiki is the collaborative work on hypertexts that can be read but also modified by everyone. To put it another way: a Wiki is a tool for collaborative publishing.

In order to be able to reconstruct what has been modified Wikis have a revision control system and also allow access to previous versions. At certain views a discussion may be opened, which means that the quality of individual publications results from a "Wisdom of Crowds" (O´Reilly 2005). Within the context of learning this means that a learning group may work jointly on the solution of a certain task and thus gain new insights.

Globalized economy is characterized by virtual communication. The communication partners are often located at different places and – due to the different time zones they live in - communicate at different points of time. To facilitate communication and collaboration between partners who work in different places at different schedules and even in different time zones, tools of web 2.0 are adequate means to support such work processes. Especially working together by means of a Wiki and similar collaborative Web-Tools ease asynchronous communication processes because all group members can trace changes, view the history of their colleagues' work, and communicate about it. Hence the requirements that are put on economic science students concerning communication and media competencies get higher and higher, which is why learning scenarios that facilitate these competencies find their way into e-business education.

Working, as well as learning with others requires certain collaborative skills such as receiving and giving feedback, accepting one's commitments, contributing to a fair division of tasks, the co-creation of a good collaborative atmosphere and taking over responsibility. Many of these values can be trained and applied when developing Wiki-based learning.

Wikis are also used as tools for knowledge management in business and can be used, for example, for project documentations. In this context the advantages of Wikis are that knowledge may be documented easily on the one hand and that it can be easily accessed by means of a search function on the other hand. Thus it is an important goal of e-business education to make students familiar with the application of the tool Wiki (Erpenbeck et al 2013). Especially in the academic environment, Wikis are often used as collaborative learning tools (Hug 2010).

n recent years Wikis have got evermore hypermedia integration functions like graphics, images, and video support (Blankinship 2007, Seidl 2012). Social Media tools – like an advanced discussion section within a Wiki – allow direct linking of several communication opportunities to the content. Semantic Wikis open with new kinds of analytics and supervising tools, enhancing the observation of group working processes, e.g. organizing genomic knowledge, coding software or tracking environmental data (Gil 2013). Supporting simplified mobile access to Wikis has become a further challenge in the current development. The integration and reconfiguration of all these technologies in a web environment will open Wikis to multidimensional collaboration tools.

Hadjerrouit (2012) characterizes the pedagogical issues of Wiki-based learning and instruction as follows:

- Motivation: The basic learning principle involved is that success is more predictably motivating than failure. However, no technique will produce sustained motivation unless the goals are realistic for the learner. The motivation increases when the Wiki is inherently enjoyable and contains information that is of high value for the student.

- Collaboration: Wikis are used to facilitate communication and collaboration. The first step of collaboration is when a student comments on the work of other authors. In the next step of collaboration one author modifies the posts of the other participants of the article.
- Discussion: Basically the Wiki has a discussion page where the authors can discuss their collaboration and tasks as well as reflect on critical issues of the cooperated work
- Assessment: The student´s contribution is part of the evaluation of the Wiki work. The individual participation and the group process are important factors for the achievement of the collaboration process.
- Peer review: The collaborative activities within the group benefit from the feedback of the group members and of others.

Using these rich media environments in an effective way requires a high level of expertise in media literacy. To train university students in media and social competencies needed today for virtual collaboration was one of the reasons and decisive factors for creating the following learning setting.

2. Learning setting

The elaboration of business case studies was applied as a learning method within the course-scenarios at two different institutions of higher education. The interregional collaboration of these two institutions arose from an ERASMUS teacher exchange between the Johannes Kepler University Linz and Magdeburg-Stendal University of Applied Sciences.

Not least because of the narrow resources the development of the learning setting aimed at various different goals at the same time. The strengths of both participating institutions should be used within this learning setting. While the German university has an emphasis on IT, the Austrian university focuses more on business sciences. The collaboration between these two institutions should not only be furthered on the part of the teaching staff but also on the part of the students. The exchange was financed by the European ERASMUS Teaching Program.

In addition to that, the learning scenario should meet academic demands. In order to achieve this, the case study method was chosen, whereby the case should be worked on jointly in a group by means of a Wiki. The Wiki was realized in the learning management system Moodle that is used in both institutions. The enrollment of students of the other institution to Moodle turned out an organizational problem because both institutions accept only students of the own institution on the learning management system. Thus an evaluation version of Moodle was installed to accept students of the other institution.

For the collaboration within the individual learning groups, different communication media were offered to the students (see figure 1). In the learning management system each learning group had a forum and a chat room. Beside the LMS the students had the possibility to use an Adobe Connect room for video conferencing. Furthermore students were allowed to additionally use other media if they wanted to. However, these additional communication media are not considered in the paper at hand.

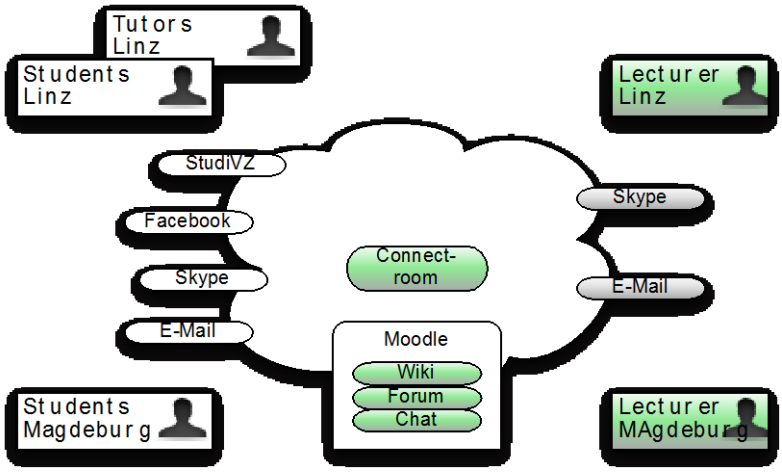

Figure 1: Cross teaching scenario

The case study approach has been chosen as a learning setting (the case method is also known as case study method, Harvard method or case study approach, see. Lasch et al. 2008, p. 5; Matzler et al. 2006, p. 241). The introduced case studies describe operational situations from the topic area e-business, each containing a decision problem. For example, some case studies were taken out of the Harvard Business Review, such as "The Dark Side of Customer Analytics" (Davenport et al 2007) or "Open Source: Suicide or Salvation" (Scott et al 2008).

Throughout three terms (winter term 2009, summer term 2012 and summer term 2013) overall more than 460 students were organized into regional and interregional learning groups of four to six students. For this survey we analysed the questionnaires of 259 students. The interregional groups were usually composed of two Austrian and four German students at the maximum. Significantly more students attended the courses at the German institution, which is why the learning groups were composed of this unequal ratio of German and Austrian students. Some of the learning groups even consisted only of students from the German University. Therefore some of the findings in our survey were evaluated in terms of regional and interregional learning groups. The students formed the respective groups via a Moodle choice module. Subsequently each learning group received the task to work either on one of the seven predefined case studies or on a self-chosen business case relevant to e-business. The result of the four to six weeks of collaboration had to be documented in a Wiki and presented in a short talk at both locations. The learning group prepared a handout for their colleagues, as well as a presentation, which was then presented by them at both universities. After the presentation the students and the teacher discussed the findings of the case study. For the assessment of the course the Wiki, the presentation and the discussion were graded separately, which explains why one group could receive different grades.

3. Preconditions for the implementation of the solution

Approximately half of the learning groups were supported by students of the specialization field e-learning at the JKU Linz, who acted as moderators. These students previously attended a course "e-tutoring", in which they learned how to manage and accompany virtual learning groups (Katzlinger-Felhofer et al 2010). The lecturer of the JKU Linz instructed them. The task of these moderators was to support the learning groups concerning organizational matters.

Especially at the beginning of the collaboration the moderators were in demand, as they arranged the first virtual appointments or helped the learning groups to choose their topics. The moderators merely helped the learning group to organize their work together; however, they did not support them with problems concerning the content of the case study. Due to the fact that learners were located at different places the effort of coordination was much higher than in common (regional) learning groups, as e.g. informal on-campus coordination meetings were not possible. This is one of the reasons why the online tutors' assistance was so important for the group work, which is also shown in the findings. One of a moderator's tasks is to lead the group by means of asking questions. The "technique of asking" was trained in the course and became a helpful tool in order to assist co-operative learning processes in learning chats, forums etc. The online-tutor thereby summarizes posts and focuses on specific topics. This is particularly important as it can be observed that users frequently wander from one topic to another during learning chats. Other skills that are important for leading a discussion also proved to be of help for the online-tutors.

The first step on the way to solve the given task was to choose either one of the predefined case studies or to find an adequate topic for a self-chosen business case, which already turned out to be a difficult task for some groups. The lecturers provided a structure for the work on the case and students were encouraged to make their own investigations on the case and to consider the respective situation (e.g. legally) in Austria and Germany, too. The result of the case study was documented in a Wiki. Both institutions work with the learning management system Moodle but in different versions and with different user policies. A separated Moodle course only for collaboration activities was created and within this course, the activity Wiki was used for the documentation of the case study. This resulted in an extra workload for all participants but showed that information systems integration problems are still not unusual in global organizations.

The here-described study is connected with the investigation of further ICT supported learning settings, like a game based and a peer review based scenario with overall more than 500 participants (Herzog and Katzlinger 2012).

4. Findings and transferable results

Concerning demographic data, the two groups differ from each other regarding average age and percentage of women, as becomes apparent from table 1. These two aspects can be interpreted by the different positions the two courses have within the curriculum. At the Austrian University also graduate students, who are in their third or fourth year, attend the course and, in addition to that, it is also attended by many students with the major business informatics, which is chosen less often by female students. At the German University the students are in their second year and there are significantly more female students.

	Male Number	Age	Female Number	Age	Total Number	Age
Linz	37	25,3	18	23,7	55	24,8
Magdeburg/Stendal	124	24,8	80	23,5	204	24,3
Total	161	24,9	98	23,5	**259**	24,4

Table 1: Average age and gender ratio

Concerning Internet usage there are certain differences between undergraduate and graduate students. As becomes apparent from figure 2, in general the Internet is mainly used for information retrieving and surfing, communication (e-mail) and social media. Active Internet usage (e.g. content generation) is of second rank for both of the groups. The undergraduate students use the Internet more often for surfing, Social Media and music streaming and download, the graduate students use the Internet more often for communication like video conference or VoIP on the one hand, and on the other hand they often have their own homepage or blog. More graduate than undergraduate students use the Internet for online banking, software download and reading Wikis and Blogs; the high rate of working students in this group may be the reason therefor. In professional life media competency is on demand.

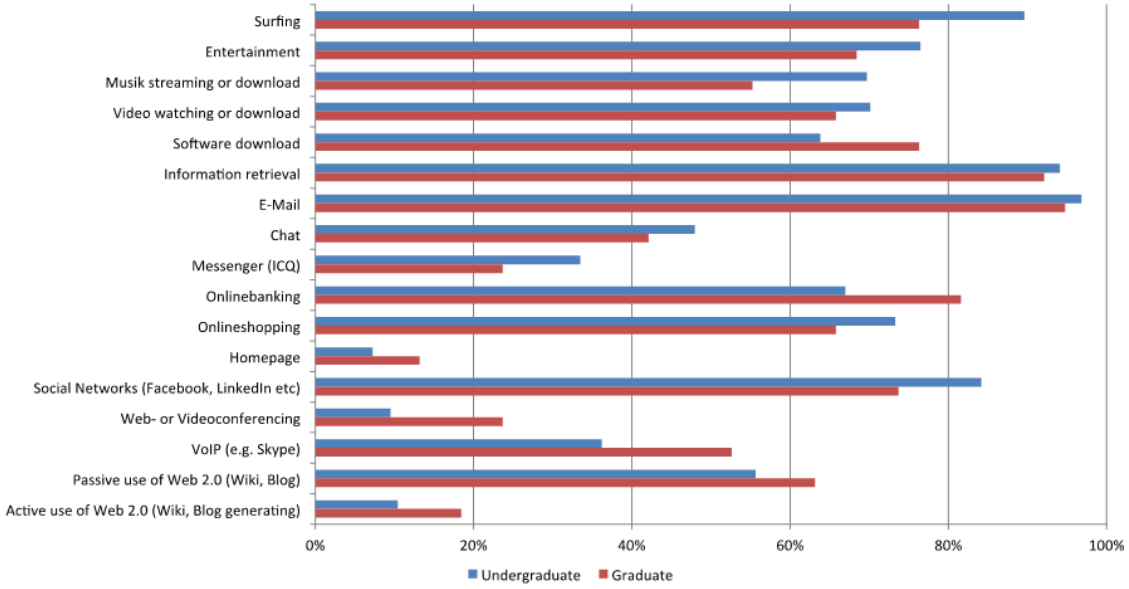

Figure 2: Internet usage (n=259)

Although there are no striking differences concerning the average time spent online between the students from the two different universities, there is a significant difference between male and female students. In the group of students who spend more than 20 hours a week online there are significantly less women than men (figure 3); one third of the female students spend less than 10 hours a week in the Internet as compared to only one fifth of the male students; more than 40 % of the male students spend more than 20 hours a week in the Internet.

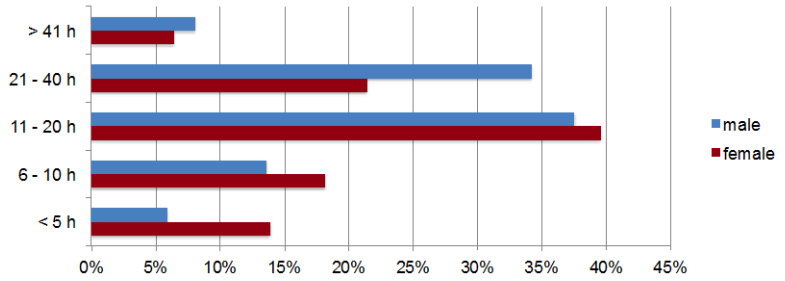

Figure 3: Hours per week spent online (n=259)

What is additionally striking when comparing the two groups is that the percentage of working students is significantly higher in Linz (only 16,4% are non-working students) than in Magdeburg-Stendal (46,6% are non-working students), see figure 4. The study programmes in both institutions are not especially developed for part time students but for full time students.

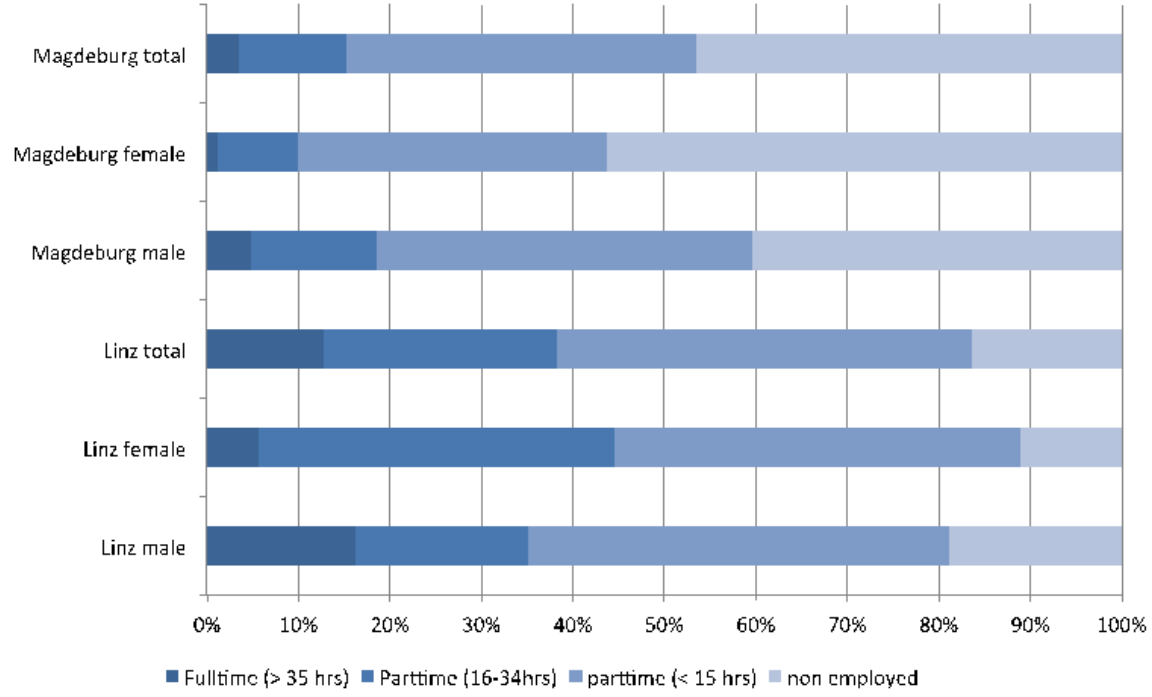

Figure 4: Hours of employment (n=259)

In this survey students ranked three different learning and teaching methods (case study, game based learning, peer review) used in the courses on a scale from poor to very good. They ranked the case study method in virtual learning groups high and thereby especially acknowledged it as a method to enhance media competencies (figure 5). To practice virtual communication was one of the learning targets in the learning scenario that students ranked high as well. Virtual collaboration within the learning group was an important factor for their personal learning outcome. To work on the case study and the Wiki was a time-consuming work for students so the cost-benefit ratio and enjoyment were rated lower.

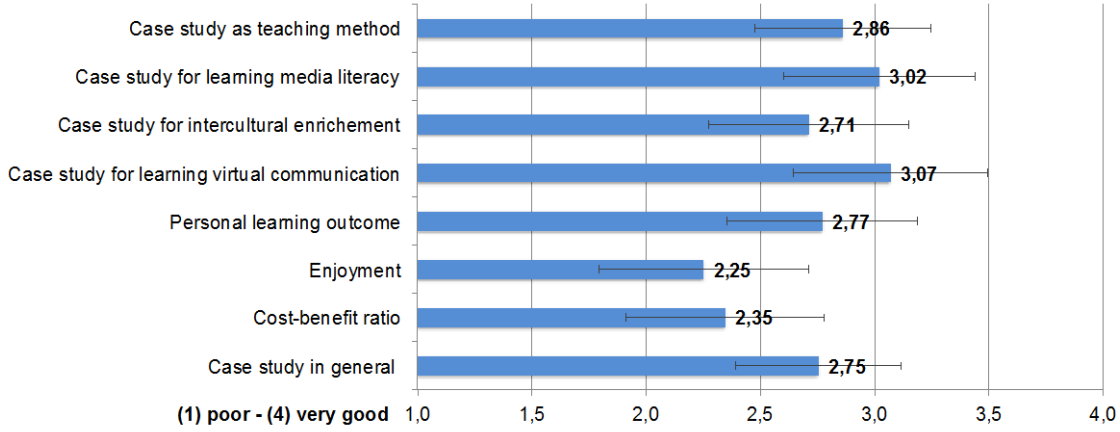

Figure 5: Ranking of case study as teaching method (n=202)

About one third of learning groups in the study were regional groups and included no participants from the other institution. The comparison of the interregional groups (with only virtual communication) and regional learning groups shows that the work in interregional groups is more intensive as they need more time for particular processing steps. An interesting aspect thereby is that the duration of the steps of forming of the group, which are more social phases, differed hardly (figure 6) between the regional and interregional groups investigated for this study. The collaboration with the Wiki and beside the Wiki, the phases where students had to work out the content, lasted longer in the interregional groups and the results presented in the presentations and on the Wikis were often better than in the regional groups. Interregional partners force the motivation to dive deeper into collaboration tools, to spend more time and to perform strongly.

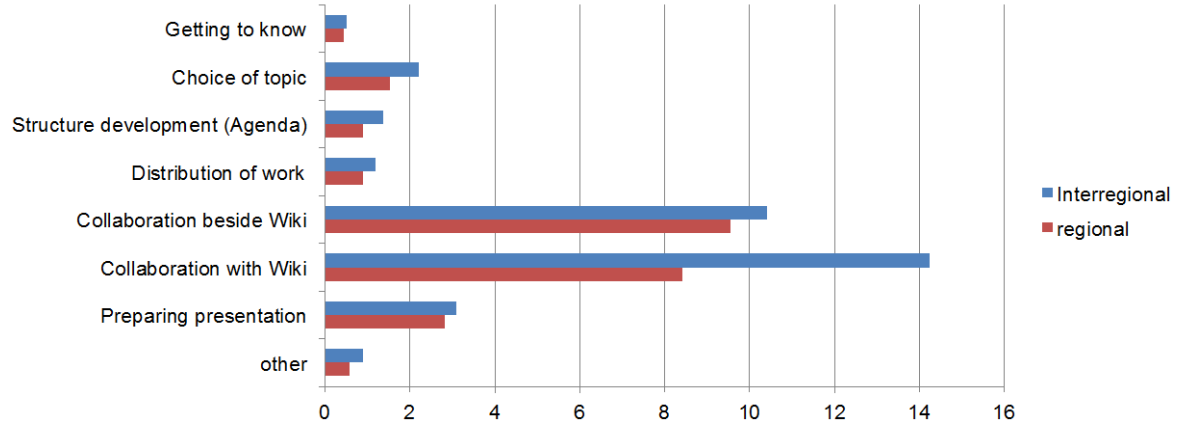

Figure 6: Phases of teamwork (average duration in days, n=197)

Students used different media for communication and collaboration. Teachers offered several media for students in the learning management system like a videoconference room, forum and chat. Social Media is a common communication channel between students today; in the cohorts investigated here it is used by 83,5% of the students (n=249). Surprisingly Social Media is not the preferred channel for collaboration in a professional context; they are used more for leisure and friendship activities. Concerning the case study projects students rated face-to-face communication highest in both cohorts. They rated audio communication, chat, forum, Wiki and email as very useful or useful (figure 7). In comparison, graduate students seem to appreciate the advantages of e-mail and audio-/video communication more than undergrads. From today's perspective this could be interpreted as greater working experience in the elder group which is probably connected with higher media literacy. But it could also be regarded as a changing effect in the media use of the younger generation who was influenced earlier by social media and mobile Internet gadgets.

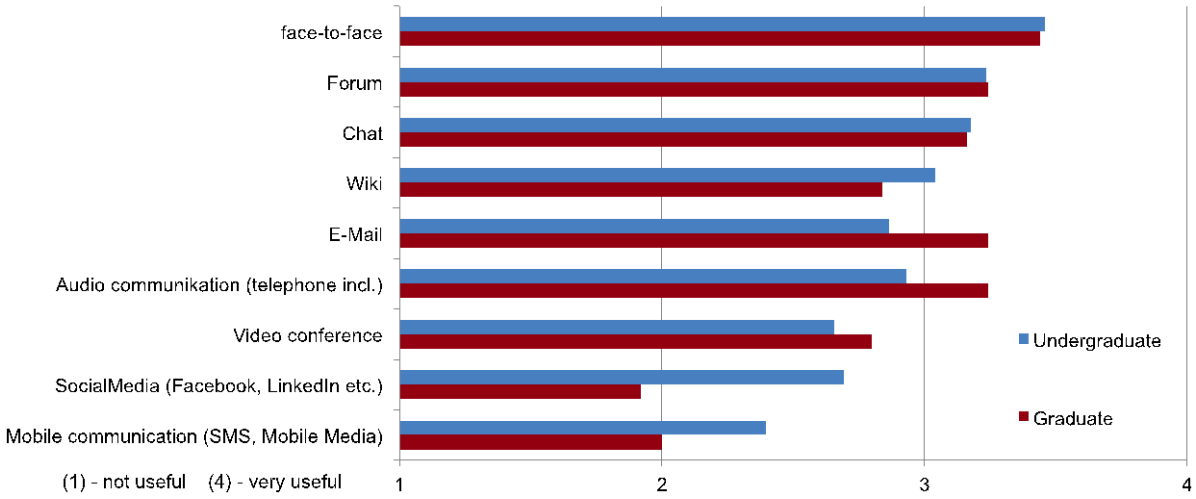

Figure 7: Rating of used media (n=200)

In the individual comments students reported about their personal mix of the different media they used for communication within the learning group.

> *„I'd rate video conferencing with a concurrent use of Google docs best, as it allowed us to talk simultaneously without any time lag, so we could work out the core points really together."*
>
> *"For us audio communication via Skype was very important as well. We used it to discuss the outline and who should work on which issues. The Wiki allowed us to follow the progress of this work; therefore it is useful, too."*
>
> *"Email, Wiki and forum ease communication but can be really time-consuming, because you always have to wait for answers. Chat is a very good alternative, although the typing is quite time-consuming as well. Direct contact still is the fastest and most effective way of communication to solve problems or manage difficulties."*

As shown above, interregional collaboration demands greater media use and students are motivated to train their media competencies. Figure 8 shows the average time (in hours) the students used the different media. In interregional groups the use of media is more intensive and time consuming, not only for video or audio communication but also for working on the presentation, the text or the wiki.

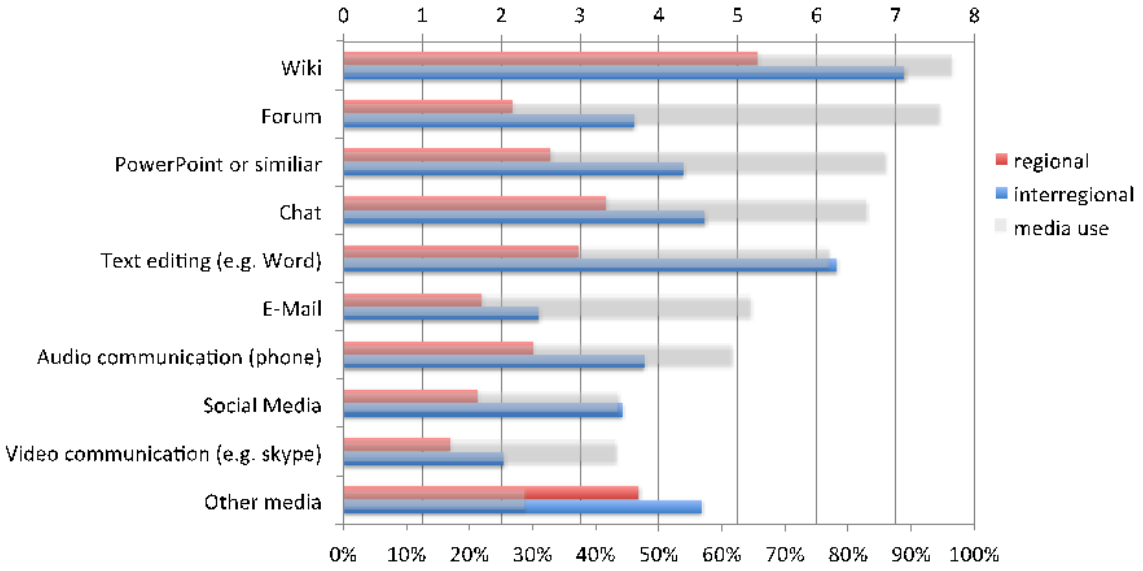

Figure 8: Use of media for case study (average time in hours/percentage of media use; n=123)

Students discussed the task and questions of the case study in their learning groups and documented the conclusions in a Wiki. 90% of students rated the Wiki as very useful or useful for this purpose. Figure 9 shows

that students who rated the Wiki as very useful worked more hours on the Wiki than others. The period of time that students worked on the Wiki differed between one and twelve hours, in the group of students who rated the Wiki as not so useful only one student invested ten hours in the Wiki, the others less than four hours.

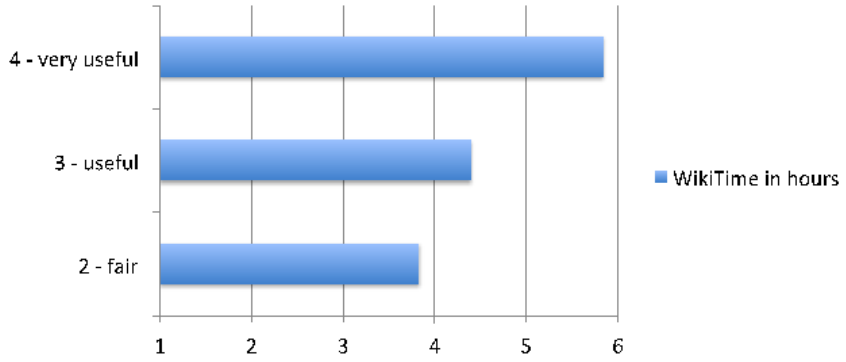

Figure 9: Average time working on the Wiki (n=199)

Especially those students, who worked in interregional learning groups rated the Wiki as a very useful tool for collaboration.

The high acceptance of the different media leads to increased utilization. The better students are familiarized with the Wiki, the higher their interest and utilization rate seems to be. This result allows arguing in favour of a better media competency training within higher education: the better students are familiarized with different media the more effective they will use them in practice.

> *"The Wiki is really good, because all group members have access to the whole communication which is not the case with emails or other media, where it can happen that some just do not get certain information."*
>
> *"The Wiki offered us the opportunity to keep track of our work. But as the Wiki often seemed to work against us, it was rather time-consuming to take care of the Wiki problems. To keep direct contact is still the best. And of course video conferencing is also very useful if you have to work with students from other countries. But as we had no other students in our group, it was not necessary for us to use it."*

Taking a look at the learning outcome using Wikis for the case study scenario, the interregional aspect indicates clear advantages (figure 10). Students, who worked in interregional teams scored more success points than their colleagues, who worked in local groups. This effect could also be enforced by the conclusion above (figure 10), that interregional groups invest more working time on Wikis and text work.

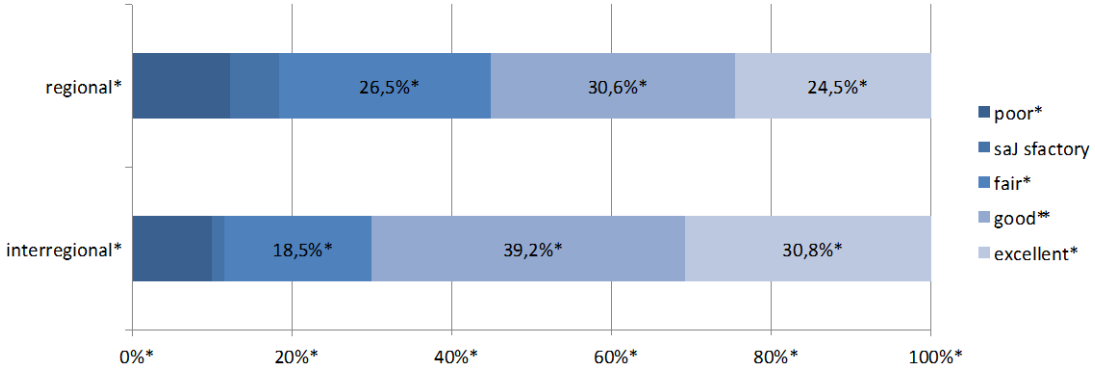

Figure 10: Learning outcome of case study in interregionality (n=179)

In this survey 100 students noted, that they were supported by e-tutors in moderated groups. 39 worked in unsupported groups. Even if the study was not designed to compare moderated and non-moderated groups, figure 11 could venture the hypothesis that working in moderated groups has an effect on the learning success. The supporting effect of E-tutoring - as it is also recognized here – was not discussed controversially so far.

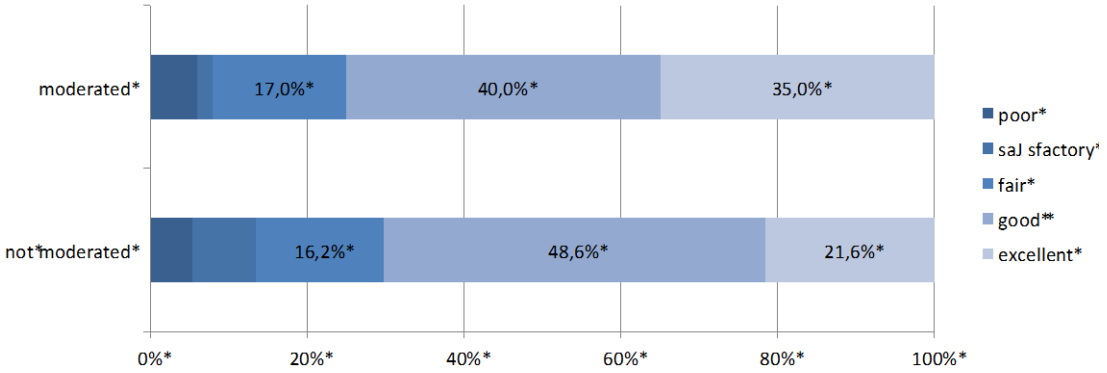

Figure 11: Learning outcome of case study with E-Tutoring (n=139)

Taking a look at the connection between the students' employment and their success points brought up an amazing result (see figure 12). Surprisingly fully employed students got the best grades but they were also affected by the highest failing rate. The reason for this strong division should be analysed in future investigation.

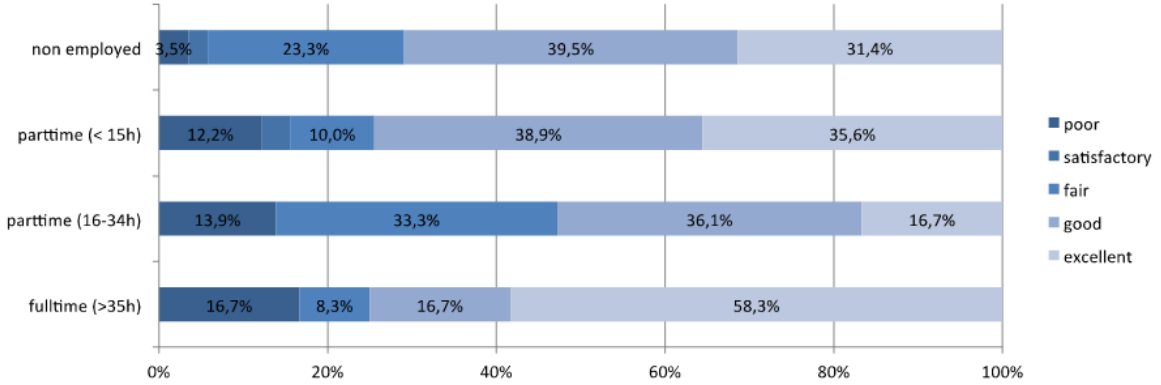

Figure 12: Learning outcome and employment of students (n=224)

5. Conclusion and outlook

The use of Wikis in training situations is described in literature for a variety of scenarios. This study looked behind the approach of using Wikis in interuniversity learning projects using the case study method. Developing professional as well as personal skills like media literacy can be addressed well by such a mostly learner controlled constructivist teaching scenario.

Collaborative learning with a Web 2.0 tool like a Wiki in combination with the case study method can be quite effective in higher education settings. The methodical design of a learning scenario and choosing an adequate media toolset is worth to be planned carefully. Especially the presentation and debriefing requires a personal reflection of the case study itself and virtual collaboration on it in several groups. However, this resulted in a highly professional and social learning outcome on the part of the individual students.

For students it is challenging to work together in interregional learning groups. They are used to work together in groups on campus. There face-to-face communication is the most preferred way of communication. The majority of students is not familiar with using a Wiki as a collaboration tool. Most learning groups worked together with other media and used the Wiki only in the last phase of the group work. The students had to learn the syntax of Moodle Wiki and surprisingly it was a challenge to them. From the perspective of teachers, the use of Wikis in university education enriches the teaching methods especially to improve the self-regulated learning process. With view history it is possible to influence the progress within learning groups and to see which persons are the main authors.

The interuniversity learning scenario provided students the opportunity to gain experience with virtual group work. Results of the survey reveal a number of interesting aspects. The more time-consuming and intensive

the collaboration of a group was the better results it achieved and the better it rated the case study as a learning method. The intensive collaboration was furthermore important for the learning outcome. Interregional groups did considerably better than regional groups, especially those interregional groups that were supported by an online moderator. This leads to the conclusion that being supported by tutors seems to be crucial for the learning success in virtual learning groups.

The case study method seems to be a suitable learning method for working students, as this group of students did noticeably better than other groups, despite their limited time budget, which is an aspect of great interest for further research.

Enhanced Wiki functionality for learning purposes will be welcome in future environments. This could be an enhanced Media support, synchronous and asynchronous video communication, video annotation, and semantic properties. In university environments plagiarism prevention is a widely discussed topic and there are already several tools available in learning management systems (e.g. Moodle) like the commercial Turnitin, the free Crot Checker for uploaded documents, or MOSS for texts and computer programming codes. In combination with Wikis this functions could give learners also a better sensitivity concerning academic oriented working in collaboration processes. On the other hand the recombination of digital media content for learning purposes is worth rethinking the role of authorship and copyright (cf. Gray et al 2008). However, this shall be discussed in another article.

References

Blankinship, E. and Mikhak, B. (2007) „Video-Wikis and Media Fluency“, *Proceedings of 6th International Conference on Interaction Design and Children*, pp 175–176

Breuer, F. and Schreier, M. (2010) Lehren und Lernen qualitativer Forschungsmethoden. In: Mey, G. and Mruck, K. (Hrsg.), *Handbuch Qualitative Forschung in der Psychologie*, VS Verlag für Sozialwissenschaften | Springer Fachmedien Wiesbaden.

De Smet, M.; Van Keer, H. & Valcke, M. (2008) Blending asynchronous discussion groups and peer tutoring in higher education: An exploratory study of online peer tutoring behaviour, in: *Computers & Education*, Elsevier Ltd, pp. 207 – 223.

Cress, U., and Kimmerle, J. (2008) A systemic and cognitive view on collaborative knowledge building with wikis. *International Journal of Computer-Supported Collaborative Learning*, 3(2), pp 105–122.

Davenport, T. H. and Harris, J. G. (2007) The Dark Side of Customer Analytics. In*: Harvard Business Review*. Aug. 2007.

Ehlers, U. and Steinert, A. (2010) “Networked Learning in a Networked World”, [online], http://netzwerklernen.wikispaces.com/file/view/Ehlers_Steinert_NETWORKED+LEARNING+IN+A+NETWORKED+WORLD.doc.

Erpenbeck, J., and Sauter, W. (2013) Anforderungen an das betriebliche Lernen – heute und in der Zukunft. In J. Erpenbeck & W. Sauter (Eds.), *So werden wir lernen!* (pp. 45–106). Berlin, Heidelberg: Springer Berlin Heidelberg.

Gräsel, C.; Bruhn, J.; Mandl, H. and Fischer, F. (1997) Lernen mit Computernetzen aus konstruktivistischer Perspektive. *Unterrichtswissenschaft*, 25(1), pp 4-18.

Heng, L. T., & Marimuthu, R. (2012). Let's Wiki in Class. *Procedia - Social and Behavioral Sciences*, *67*, pp 269–274

Gil, Y., Knight, A., Zhang, K., Zhang, L. and Sethi, R. (2013) “An initial analysis of semantic wikis”, *Proceedings of the companion publication of the 2013 international conference on Intelligent user interfaces companion,* pp 109-110. ACM.

Gray, K., Thompson, C., Clerehan, R., Sheard, J., and Hamilton, M. (2008) “Web 2.0 authorship: Issues of referencing and citation for academic integrity”. *The Internet and Higher Education*, 11(2), pp 112-118.

Hadjerrouit, S. (2012). Pedagogical Criteria for Successful Use of Wikis as Collaborative Writing Tools in Teacher Education. 2012 3rd International Conference on e-Education, e-Business, e-Management and e-Learning. *IPEDR* vol.27, pp 11–15.

Herzog, M., Katzlinger, E. (2011). Influence of Learning Styles on the Acceptance of Game Based Learning in Higher Education: Experiences with a Role Playing Simulation Game. In: *Proceedings of 5th European Conference on Games Based Learning (ECGBL),* Athen, Academic Publishing Ltd. Reading.

Herzog, M., Katzlinger, E. (2012). Peer Review as an Activating Learning Method Within University Education. In: 11th European Conference on e-Learning ECEL-2012, University of Groningen, The Netherlands, 26-27 October 2012, pp. 274-282

Huang, W.-H. D., Hood, D. W., and Yoo, S. J. (2013) Gender divide and acceptance of collaborative Web 2.0 applications for learning in higher education. *The Internet and Higher Education*, *16*, pp 57–65.

Hugl, U. (2010) Work in Progress: Wiki-Einsatz als Blended Learning-Instrument in der universitären Lehre. In M. H. Breitner, F. Lehner, J. Staff, & U. Winand (Eds.), *E-Learning 2010. Aspekte der Betriebswirtschaftslehre und Informatik.* Heidelberg: Physica-Verlag Heidelberg, pp 215 – 228.

Laru, J., Näykki, P., and Järvelä, S. (2012) Supporting small-group learning using multiple Web 2.0 tools: A case study in the higher education context. *The Internet and Higher Education*, *15*(1), pp 29–38.

Lasch, R., Schulte, G. (2008) Die Fallstudie als didaktische Methode. *Quantitative Logistik-Fallstudien*. Gabler Verlag.

Katzlinger-Felhofer, E., Windischbauer, U. (2010) Train the trainer: moderation methods for online tutors. *International Journal of Information and Operations Management Education*. Vol. 3, No.4 pp. 337 - 348

Matzler, K., Bidmon, S. & Schwarz-Musch, A. (2006) Didaktische Aspekte der Arbeit mit Case Studies. In: Engelhardt-Nowitzki, C. *Ausbildung in der Logistik*. DUV, pp 241 – 274.

O´Reilley, T. (2005). What Is Web 2.0. [online] http://www.oreillynet.com/go/web2.

Seidel, N. (2012) „Collaborative hypervideo editing using MediaWiki“, *Proceedings of the Eighth Annual International Symposium on Wikis and Open Collaboration*, p 22, ACM.

Papachristos, D.; Alafodimos, N.; Arvanitis, K.; Vassilakis, K.; Kalogiannakis, M.; Kikilias, P. and Zafeiri, E. (2010) An Educational Model for Asynchronous E-Learning. A case study in Higher Technology Education. *iJAC* – Volume 3, Issue 1, February 2010, pp 32 – 36

Schmalz, J. S. (2007) Zwischen Kooperation und Kollaboration, zwischen Hierarchie und Heterarchie. Organisationsprinzipien und -strukturen von Wikis. *kommunikation@gesellschaft*, Jg. 8, Beitrag 5, http://www.soz.uni-frankfurt.de/K.G/B5_2007_Schmalz.pdf

Scott, W. & Kambil, A. (2008) Open Source: Salvation or Suicide? In: *Harvard Business Review*, April 2008.

Wang, J., Zou, B., Wang, D., and Xing, M. (2013) Students' perception of a wiki platform and the impact of wiki engagement on intercultural communication. *System.* Vol. 41(2), pp 245 - 256.

Zdravkova, K., Ivanović, M., and Putnik, Z. (2012). Experience of integrating web 2.0 technologies. *Educational Technology Research and Development*, *60*(2), pp 361–381.