Team and Community Building of Students of Business Informatics: Influence Factors in Blended Environments

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ABSTRACT
For students as well as professionals in business informatics the ability to work in teams and to be part of a supporting network are major success factors. This observation appears to be just one instance of a more general goal, namely the fostering of meta-cognitive skills and attitudes in new curricula. In our research and educational practice we aim to contribute to this goal by investigating and implementing the key factors that allow students to become more capable of working in teams. In this paper we report on our initial investigations, the methods used, and observations made on teamwork in settings that blend face-to-face and online elements. The results confirm that positive personal relationships, attitudes and context-related factors in a motivating atmosphere appear to be pivotal to good team and group effort. A situated use of transparent, usable online elements has the potential to make cooperation and communication broader and more effective.

Keywords
Teamwork, business informatics, blended learning, networking, soft skills, research methods, self-evaluation

INTRODUCTION
Recent strategies within the European Union – compare for example the EAEA (European Association for the Education of Adults, 2004) statement of key competencies – call for more emphasis on the development of skills and attitudes. In a more specialized context, our study on the requirements on business informatics graduates (Motschnig-Pitrik, 2002) precisely confirmed this claim: Social competence headed the list of requirements that 35 managers found most important, immediately followed by the "capability to work in teams." It is the latter, more special – and yet still very general – issue that is the focus of interest of our investigation. Due to the potential relationship and high importance of networking, community building, and computer-mediated communication we consider these issues along with their interdependences.

The general goal of our research is to find theories and specify factors that have an influence on improving the students' capabilities to work in teams (Johnson & Johnson, 2006) in the context of a blended environment, i.e., an environment in which they can communicate person-to-person as well as online. In other words, our research questions include the following:

1. What can we do in an academic, technology-enhanced environment to promote students' team competencies? More specifically: How do factors like particular interventions, interpersonal attitudes of facilitators, the learning platform, blended networks, explicit knowledge, and course design influence learning and cooperation in teams (Wosnitza & Volet, 2005) as well as participation in student communities and networks?

2. A tightly related, consequent question is: How can we confirm that our means to further or cultivate teamwork ability in students are effective and sustainable?

3. Yet a third group of questions arises in the context of the notion of professional and learning communities (for definitions please consult the paper by Logar, Schrittesser & Wenninger in this symposium): In how far can teams form crystallization points for the establishment of professional communities that outgrow the size of focused, smaller teams? Do teams act as initiators of such communities? Do such communities provide contexts for the forming of teams that work on focused tasks?

The aim of this paper is to describe our context and proceeding within that context, share problems and approaches of research design, and share experiences as well as initial results. We present first results about how students of business informatics experience teamwork in their studies. In addition we propose factors leading to a good course atmosphere and promoting interactions between students. These analyses can serve as a profound basis for understanding the factors of team competence and networking in teamwork-oriented environments.

They will allow going into deeper research about the central research questions regarding team competencies and networking.

We have employed a mix of quantitative and qualitative methods as well as an Action Research (Susman & Evered, 1978) in order to support our search of solutions in a multi-facetted and truly socio-technical environment. Thereby we encountered several challenging problems and, in particular, limitations of individual methods, which are addressed below. One major source of experience and data was a blended learning course on *Project Management Soft Skills* in which the development of soft skills in the application context of project management was the primary objective. Note that the capability to work in teams is one particular soft skill. Interestingly, online survey showed that a vast majority of students expected to improve their cooperation in teams, so basically it was them who set the focus of last year's course instance on topics such as teamwork, team learning and conflict resolution in teams. We used this opportunity to collect empirical data, which form a major source of input for this paper, with other sources being online questionnaires collected in this and other courses.

The paper is structured as follows. The next Section describes the research context, discusses methods, and briefly describes the blended learning courses and students' network considered. The third Section describes specific research questions, methods, initial findings and interprets the results. The final Section summarizes the paper and identifies questions for further research as well as international cooperation.

RESEARCH CONTEXT

Courses

The studies of business informatics at the University of Vienna are highly group-oriented in comparison to other studies. In several seminars and laboratory courses students have to intensively work collaboratively in teams, for example to perform programming tasks, to develop web applications, or to design business plans and manage projects. Usually students have to work in several courses in teams during a semester. They also interconnect over an online business informatics forum in which they can share whatever they want.

The inputs for our empirical data stem from students who attended at least one of three courses that all were facilitated or at least co-facilitated by one of the authors (Renate Motschnig): *Soft Skills*, *Communication and New Media* and *Organizational Development*. The didactic baseline of these courses was based on a humanistic approach, namely Person-Centred education as developed by the American psychologist Carl Rogers (1983). All four courses used CEWebS (Cooperative Environment Web Services, Mangler & Derntl, 2004), an open-source, web service based online environment that is designed for usability, flexibility, and ease of use. Furthermore, all courses had explicitly-stated learning goals located on three levels: intellect, skills, and personality, although with different emphasis. While the intellectual level is somehow addressed in any educational setting, *Project Management Soft Skills* had a particular focus on skills, *Communication and New Media* focused most on attitudes and skills, and *Organizational Development* intended to address all three levels approximately equally.

The major source of data for this paper was last year's course on *Project Management Soft Skills*, in which 21 students participated. In cooperatively elaborating the course goals during an initial workshop and then asking students to post their personal learning/development goals for this course, 15 out of 19 students included some team cooperation/building/leadership aspect in their personal goal profile. This offered us a great possibility to make teamwork a focal theme of this course instance and to collect data for this paper. It also shows that there is significant motivation among business informatics students to improve their capability to work in teams.

Methodological background

"How can we confirm the effectiveness of our means to further or cultivate students' capability to work in teams?" This question poses a substantial challenge on research design. Although initially we wanted to apply a classical control group design, we came to realize that this would lead to problems which we would hardly be able to work around. For instance, there are numerous influential factors like individual personalities and competencies of team members, team composition, course design, the personality of the instructor, use of online media, interest in the project theme, time available in relationship with tasks/projects from other courses, etc., many of which appear to be dependent. Consequently, we compared different flexible research paradigms (Figl, Derntl, & Motschnig, 2005) including Action Research, Design-based Research and various forms of participatory evaluation in the context of technology-enhanced learning. The results showed that all paradigms included some relevant aspects and instruments for researching such complex environments, although none fitted perfectly. As a result we chose to employ a mix of methods which is as reliable as possible by including a multitude of perspectives. As means of collecting data online reaction sheets, enquiries and questionnaires with

open as well as closed answering format, were employed. In addition we made a face-to-face group discussion which was recorded and transcribed for analysis. We consider this proceeding as justified in so far as there are no critical decisions to be made on the basis of our research. Especially for the specific research questions and surveys presented in this paper this should work well, because they are exploratory – trying to explore the students' perception of teamwork and the basis of networking in courses – and less hypothesis-driven. Therefore the initial research strategy is to rely primarily on the students' and facilitators' estimates on what factors promote positive team attitudes and good teamwork in order to inform our action. We view this initial research in blended environments as a necessary step towards more theoretical investigations.

Research questions

The general aim of the research reported here was to enhance the understanding of the environmental factors for team competence and networking in the business informatics studies. In this endeavour we examined the following research questions about teamwork in (blended) study environments:

- How do students experience teamwork in their studies?
- Is work fairly distributed among team members?
- Which characteristics of good team mates are important for students?
- Which role do face-to-face and online communication play in teamwork situations?

The further research questions aim to find out about factors that contribute to a "good" course atmosphere and promoting interactions between students:

- In courses such as *Communication and New Media* or *Organizational Development*, which emphasized communication and person-centred attitudes, we explored why it was easier for students to work in teams and to establish positive interactions with students.
- Going deeper into analysis of factors influencing a good atmosphere, we investigated the influence of prior acquaintance among students on the course atmosphere in *Project Management Soft Skills*.

ANALYSIS AND INTERPRETATION

Teamwork in the Business informatics studies

In the *Project Management Soft Skills* course 9 students did 20 minutes group discussion. 4 turned out to be in favour, the other 5 against doing teamwork during the business informatics studies. Table 1 summarizes the arguments brought up pro and contra teamwork. In general the students of the group against teamwork mainly referred to negative personal experiences and the main argument of the group in favour of teamwork was that similar problems and conflicts are likely to arise in real work life, so it would be helpful to experience this already during the studies.

Table 1: Arguments in favour of and against teamwork in the business informatics studies.

In favour of teamwork	*Against teamwork*
• Learn how it will be like in working life	
	• Often teamwork is too much "an end in itself" • Every course is done in teamwork
• Learn about coordination	• Coordination efforts take time • No real collaboration, work only gets divided into parts
• Learn about conflict management • Learn from conflicts • Learn going to the project-leader (course instructor) if conflicts arise	• More effort than doing alone if conflicts arise • You don't want to snitch on your colleagues in case of conflicts
• New colleagues in new projects are also normal in work life	• No real team learning occurs, because of new team every semester
	• Importance of ability to work alone • Not always possible to count on somebody else
• Learn to get involved in the teamwork	"Free-rider problem": • Students choose the easiest way (those work parts that

• Gain personal attitude to want to learn something	they are already able to do and don't learn something new) • Students "hide" behind team • Difficulty to achieve profound education • Learn more if forced to do it
• Learn letting others do their work • Learn to delegate	• Much to correct and re-do if others are less competent (or motivated) • Lower grades if colleagues are less competent
• Learn about relevant criteria regarding choosing team members	• Colleagues are chosen according to sympathy, already knowing each other, coincidence, rather than on competencies
• Possibility to ask others • Discuss several ways of solving a problem	

In the end of the discussion, students arrived at the solution that in the beginning of the studies it should be important that everybody obtains basic knowledge (e.g., programming) in the form of individual work. And as soon as students have this basic knowledge, teamwork should take over. This was agreed upon by the entire seminar group. One major argument that students reported was the "free-rider problem," meaning that some students don't contribute a proportional amount of workload and hide behind the group (Albanese & Van Fleet, 1985). Therefore the results correspond to other studies that showed for example that perceived workload and absence of a free-rider problem influence the attitude toward teamwork (Pfaff & Huddleston, 2003). The group discussion illustrates that initial experiences with and attitudes toward teamwork differed among students. However, students from Project Management Soft Skills were open enough to acknowledge both benefits and obstacles in the context of teamwork. This suggests that accompanying team projects with reflections on the team process and providing support in case of team conflicts might help to improve total learning outcome in team-based learning.

> **Conclusion**: *The strongest argument brought up in favour of teamwork is its relevance to situations in "real life." The arguments against teamwork during studies reveal a sense of distrust among students ("free-rider problem", team mates might hide behind the team; difficult with coordination and conflicts; etc.) However, teamwork is favourable by all when team members share basic subject knowledge.*

Distribution of work in small teams

In six different groups of *Project Management Soft Skills* and *Communication and New Media*, students were asked the following question in an online self-evaluation survey: "*Did I contribute more or less than average in my team? Why?*" In total 87 comments were written, of which 82 could be categorized (94%). Some students interpreted the question differently to the intended meaning. Instead of the small team in which they had to do their project work, they wrote about the whole course group – in the sense of all students of the course being a "big team" (11 nominations) and about small team exercises during the lab practice hours (5 nominations). Two students did not compare their effort with the other team members, but compared the team effort with other small teams. 64 statements were written about work in the small teams. As depicted in Figure 1, 44 students (69%) wrote that the work distribution was fair. Interestingly students preferred a judgment of the whole small team, for example they wrote that work was distributed fairly or that everybody contributed his part, or contributed the same (32 out of 44). Fewer students wrote in active form "I contributed an average share" (12 of 44). Only one student admitted that he contributed less than his team members, whereas 9 students wrote that they contributed more than their team colleagues. 6 students wrote that they reject to make a judgment about the partitioning. Across courses no differences could be found due to the small sample sizes (13-18 comments per course).

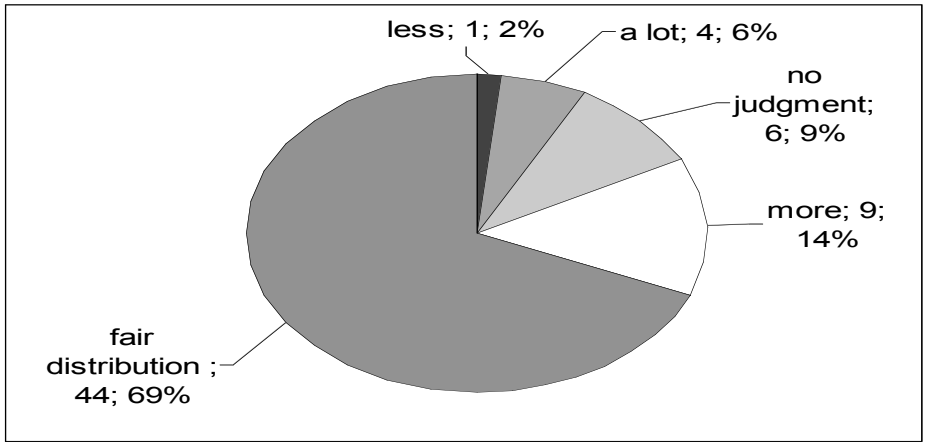

Figure 1: Work distribution in small teams. (N=64)

> **Conclusion**: *When asked about distribution of work among team members, most students reply that each team member contributed equally to the whole teamwork. Only a fraction actively states that they contributed less or more. Further studies among different courses and settings are required to confirm this.*

Qualities of a good team colleague

In the same course (*Project Management Soft Skills*) we also made a short online survey on "the five most important qualities of a good team colleague." 18 out of 21 students responded. There were about 45 different qualities enumerated as well as other descriptions how a good team colleague should behave. The qualities were organized into 11 quality clusters. The results show that reliability (including punctuality and sense of responsibility) was found most important by the students, it was mentioned 20 times. Engagement and goal orientation was mentioned 13 times. The next was conflict & critical faculty as well as cooperation & helpfulness (each 8 times). Several positive work-related attitudes were listed by the students (e.g. interest, working style). Communication aspects and sympathy & friendliness were both mentioned 7 times. The students also thought of motivation (6 nominations), social and teamwork skills in general (5 times) and openness (5 times) as very important.

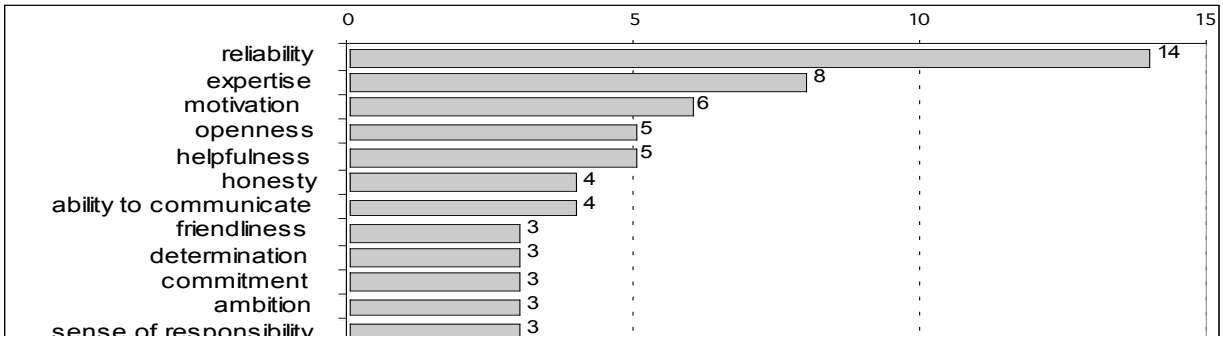

Figure 2: Qualities of a good team colleague. (N=18)

The qualities most often enumerated are shown in Figure 2 above. Taking only word-count as a measure, reliability was mentioned most often (14 nominations), expertise was mentioned 8 times, followed by openness and helpfulness (each 5 times). Honesty, communication abilities and friendliness were nominated 4 times and determination, commitment, ambition, sense of responsibility and punctuality 3 times. The following qualities were mentioned two times: interest, sense of responsibility, critical faculty, and ability to reach a compromise, stress resistance, cooperativeness, social skills and the ability to listen actively. These results show that personality features, motivation, and positive attitudes are at least as important as expertise. Any endeavour to improve the cooperation in teams and to develop team skills should take this into account.

> **Conclusion**: *Team members consider reliability, involving assets like punctuality and a sense of responsibility, to be the most important quality of a good team mate.*

Online Media versus Presence Meetings for Teamwork and Networking

In another survey in *Project Management Soft Skills* we asked the students about the role of online and face-to-face communication regarding their teamwork and networks within the study. 16 out of 21 students wrote a comment about this topic. Seven students wrote that for them both communication media are important and that they would complement each other. In general students referred to e-mail, instant messaging (MSN Messenger, ICQ, etc.) and Internet telephony software ("Voice over IP," most prominent: Skype) as online communication. The qualities of these communication media were also compared and set into relation with presence meetings, these differences will be further examined in a follow-up study.

As general advantages of face-to-face meeting students mentioned that it was simply something different (4 nominations) that you can get to see others (2 nominations), experience their body language (2 nominations) and are that it's less distracting and stressful (3 nominations). Online media were found advantageous due to place-independency (8 nominations) and therefore time (4 nominations) and cost-saving (2 nominations).

Students wrote that in presence meetings it was easier for them having more social cues, like knowing if the other is paying attention, is motivated or how she/he is feeling like. Presence meetings are especially important for the forming of a team like getting to know each other and kick-off meetings (9 nominations). Furthermore presence meetings according to the students are important for project-strategic decision making, rough discrepancies, discussing complex topics or creative tasks. For friendships they are also inevitable. On the other side students appreciate online media for communicating with study colleagues at an international level (5 nominations). During the teamwork, online media are experienced as suitable for splitting and assigning tasks, content-related questions and coordination when complexity and plan variance aren't too high.

The personal preference of students ranged from "For me studying without online media would be unimaginable" and "I tried to avoid presence meetings," to "I prefer present meetings" and "Online media should have a supportive role and should not substitute f2f meetings."

> **Conclusion**: *Both face-to-face and online meetings embody beneficial features. Meeting online is independent of time/location and saves time, while meeting face-to-face supports important social aspects in interpersonal relationships and communication. Face-to-face meetings are especially important in the beginning of teamwork. Students tend to make informed choices based on their experience and the current situation on whether to meet face-to-face or online.*

Positive interactions and relationships

Regarding positive interactions among students and teamwork short surveys were done in *Communication and New Media* and *Organisational Development* (OD) as part of the online course evaluation questionnaire at the end of the term. This course *Communication and New Media* (group #1 consisted of about 5 days encounter groups, and group #2 of five structured half-day workshops and 1.5 day encounter groups) is described in more detail in the paper on encounter groups by Motschnig-Pitrik in this symposium. The course *Organisational Development* included 3 days of encounter groups. Students had to respond to the following questions on a Likert-rating scale and explain them in written form:

1. "Do you think it was easier in this course than in other courses of business informatics to establish positive interactions and relationships with other participants?"
2. "Do you think it was easier in this course than in other courses of business informatics to work in teams?"

In general the students found it slightly easier to establish positive interactions, and – with less difference – also easier to work in teams than in other courses (see Figure 3). In the group two of the course *Communication and New Media* the difference to a regular course was highest.

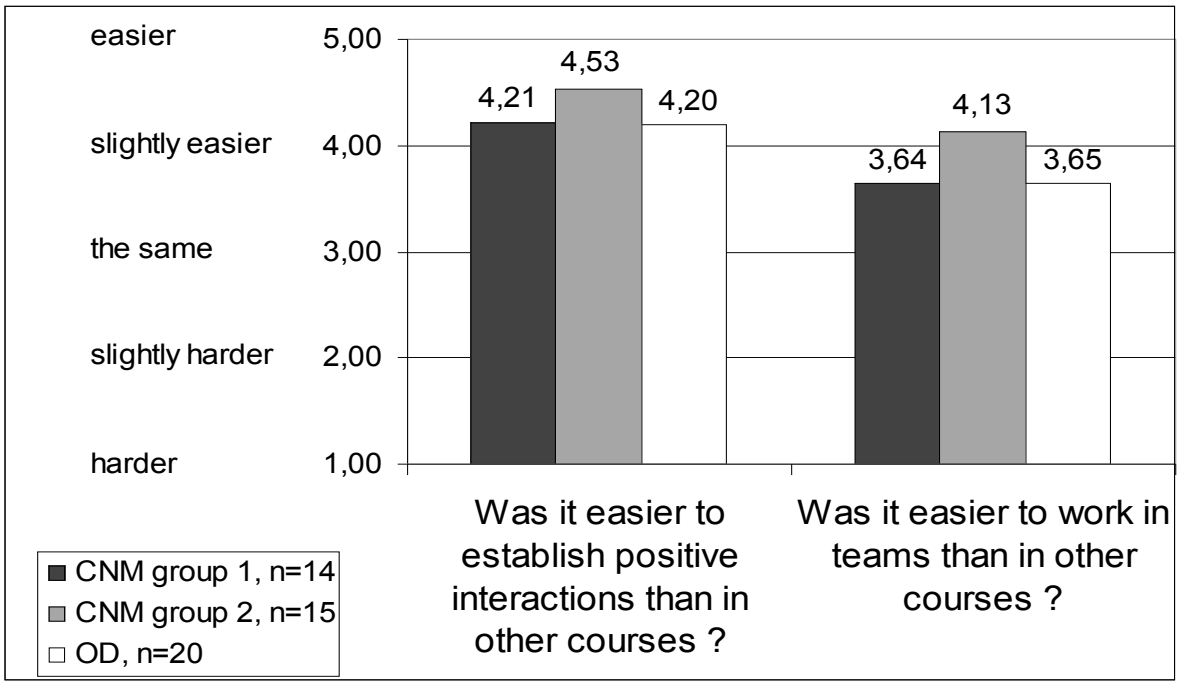

Figure 3: Positive interactions and teamwork in several courses.

For the evaluation of the written comments of the students, comments of group 1 and 2 of *Communication and New Media* were taken together because they were very similar with regard to content. The students found it easier to establish positive interactions and relationships with other participants in this course than in other courses. The main reason that was stated most often was the intensive communication in the large group as well as in the smaller teams. The high amount of conversation and dialogue was promoted by the course design and the facilitator. The course design was also mentioned twice as reason for the better interactions. Moreover there was also a truthful atmosphere in the group that was mentioned three times. Other reasons that were stated: the fact that everyone knew the names of the others (mentioned 2 times), the openness of the others due to the course design, enough room in class to get to know the others, time spent with the others during the breaks, conversion about themes that wouldn't be talked about in other courses, and the focus being on persons rather than topics.

In the *Organisational Development* course 9 comments were written on this topic. The comments included various reasons why interacting was easier, ranging from "I already knew everybody" to "going out to eat together in the breaks." One student wrote that interacting was a main target of the course, others wrote that the atmosphere was good, personal relationships were promoted, and that there was much discussion in the course units. Only one student found it more difficult to interact, because the course was held in English.

According to the teamwork question in *Communication and New Media*, 15 students (75%) wrote about teamwork aspects that were more positive than in other courses. Getting to know each other better than in other courses was a main reason for better teamwork. Two thought that teamwork was better, because they already had the possibility to get to know each other better before joining in a team together. Others mentioned that teamwork was better because they got to know each other better, developed a deeper relationship, had more confidence and therefore also didn't want to disappoint the others with an inferior contribution. Other important reasons for a better teamwork were the personal presence (2 nominations) – that students met the team members in the class – and the higher openness in communication (3 nominations) in the sense that they felt more open to talk about problems or own experiences. It was also mentioned that it was helpful how others tried to implement what was learned in class and that group and team development was a main goal of the course.

However, five of the twenty students (25%) who wrote a comment on this topic thought that teamwork wasn't specifically different in this course than in others. For example, one wrote that his team members were the same as in other courses or one mentioned that the team composition itself would be more important than the course. One student said that teamwork was easier in the workshops and more difficult at home than in other courses.

From participants in *Organisational Development* we only received 6 statements. Two meant that teamwork was similar to other courses, and one person stated that it was slightly more difficult, because motivation was lower.

Three wrote that teamwork was better, because there was time in the course units to work together or to communicate and that the course promoted teamwork abilities.

> **Conclusion**: *In courses focusing on communication and interaction among participants, students tend to perceive working together in teams and establishing positive interactions easier than in other courses.*

Positive atmosphere and prior acquaintance

One general hypothesis underlying our work is that teams that succeed and groups of students choosing courses because of similar orientation or interest tend to lead to stronger connections between students, to the building of friendships, and consequently to a professional community. Note that these teams and groups typically originate in learning situations or, initially, in situations emanating from the need for general orientation. While the former work under more or less intense influence or control of staff members (instructors, facilitators, tutors), the prevalent characteristic of the latter often is that of being self-organized. They are just initiated and more or less supported by university administration.

Fortunately, initial evidence for the hypothesis mentioned above surfaced without prior planning. The context is as follows: One way of involving students into the course process and stimulating them to reflect on their experience in a course unit is to collect online reaction sheets. These are submitted on a dedicated online space, can be read by all participants, and are briefly discussed in the successive course unit. Unexpectedly, the initial reaction sheet of the course on *Project Management Soft Skills* brought evidence on the hypothesis that students who attend a course with focus on teamwork and group interaction tend to build stronger connections and apparently undergo a group process (Tuckmann, 1965). In the most recent instance of *Project Management Soft Skills* (i.e., winter term 2005), 17 out of 19 students knew one another from at least one previous course of the same course cluster (*Project Management*) and just 2 students knew no one. From the 17 reaction sheets submitted on time, 15 were written by students who already knew one another. From this 15, 12 independently made a positive remark on the fact that they knew one another and the positive atmosphere or feeling resulting from that. Hardly ever did students react so consistently on an issue that was independent of course content. One student wrote: "Right ahead I wish to mention that I like it that I know almost all participants. Consequently, I experience the atmosphere even as more pleasant than in other courses. […]" A female student commented: "I perceived the first unit as successful and pleasant. First, I was surprised to meet so many familiar faces. In my view this contributed to the positive climate throughout the whole block. Knowing one another caused some colleagues to be less shy and to express themselves more openly."

Interestingly, both new students positively acknowledged the organization and active participation in the course units. The student who responded late and had read the other reactions before mentioned that he "loved to see so many familiar faces."

> **Conclusion**: *Being already acquainted with other students at the beginning of a course is perceived as positive (Tuckmann, 1965) and is stressed in reactions. It also appears to play a major role in swiftly making students feel comfortable with the course atmosphere.*

DISCUSSION AND CONCLUSIONS

Recent studies as well as strategic documents in the European research area strengthen the position that teamwork ability is one of the key competencies required by individuals in today's working environments. Universities and other institutions of higher education have a responsibility to prepare future leaders, managers, and (co-)workers not only on the intellectual level, but equally on the level of social skills and attitudes. This kind of whole-person learning and development is what turns individual knowledge and skills into powerful "ingredients" or "tools" for fruitful team collaboration and cooperation.

This paper investigated aspects of teamwork among business informatics students at the University of Vienna. Particular research questions of interest included perception of teamwork among students in general, their team mates' work and important qualities, the role of communication online and face-to-face, and the role of the course atmosphere for positive team interactions. We employed group discussion, online reactions sheets, surveys, and questionnaires among students to gather the data required for qualitative and quantitative analysis.

We found that most students are aware of the fact that teamwork will play a major role in their later work life. However, during their studies many prefer to work on their own to stay independent of others (e.g., to avoid conflicts or free-rider problem). There was a consensus that teamwork works best when all team members have the basic technical knowledge and skills required for the teamwork task. When asked about distribution of work

among team members, most students reply that each team member contributed equally to the whole task. They seem reluctant both to tell on their team mates in case of inferior contributions and to emphasise their own overtime efforts. The most important quality of a team mate is his or her reliability, which could be the reason for many of the arguments brought up against teamwork in the course of the studies (e.g., it is “not always possible to count on somebody else”).

Regarding communication aspects, both face-to-face meetings and online encounters seem relevant to good teamwork. This supports the current emphasis on blended learning, which allows for choosing the most effective means of communication for each team task. Not surprisingly, teamwork is considered easier in course settings which focus on communication and interaction. In such settings students find it easier to establish positive interactions with their peers. Finally it turned out to be influential that students already know each other at the beginning of course in order to more quickly feel comfortable about the course.

Future research will focus on investigating the possibilities for promoting networking among students as well as enhancing teamwork settings and facilitating teamwork skills of students.

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