INCREASING SOCIAL AWARENESS AND SOCIAL PRESENCE ON BACKSTAGE, A BACKCHANNEL FOR LARGE CLASS LECTURES

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Bachelorarbeit
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Abgabe am  30. Mai 2012
First, I want to express my gratitude to Prof. Dr. François Bry for offering this interesting thesis to me. The creative advice he gave always supported and motivated me.
I would also like to thank my supervisor Alexander Pohl for guiding me throughout this thesis. Enthusiastically he always drove my work forward with is advice and inspiring brainstorming sessions. He answered questions promptly and was always available when I needed support.
A special thanks goes to my family, for their love, patience and support and especially for my father’s editing assistance.
In conclusion, I want to thank my friends Marlene and Max, who wrote their thesis simultaneously to mine, for their humor and for lending me an ear whenever I had a problem.
Erklärung

Hiermit versichere ich, dass ich die vorliegende Arbeit selbständig verfasst habe und keine anderen als die angegebenen Hilfsmittel verwendet habe.

M’unchen, den 30. Mai 2012

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Students attending large lectures in today’s universities encounter problems like an impersonal atmosphere, difficulty of individual participation and collaboration as well as shyness and passivity among the audience. The use of digital backchannels can increase interaction by providing awareness, which is defined as the understanding of the activities of others that provides a context for one’s own activity. An increase and improvement of the provided awareness in backchannels is considered as beneficial as it helps students to develop a shared sense of community, which has an impact on learning and interaction. An impersonal atmosphere in mediated communication can be counteracted by increasing social presence, meaning the extent to which a person is perceived as real in the medium. This thesis explores ways of increasing and improving social presence and social awareness on Backstage, a digital backchannel for large class lectures. Amongst others, a concept is introduced that provides students with aggregated, topic-related information about themselves, the average user and fellow students. The student can see information about the amount of activity, the quality of contributions and the distribution of user-involvement on the backchannel. This way, a context can be built up that helps the students to contrast their own activity with that of their peers in order to draw conclusions about their behavior in the online environment. Backstage, enriched with the new concepts, is then compared to similar backchannel systems.
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Although teaching in small groups is generally seen as more effective than in large classes, many lectures in universities tend to have a large audience. Hundreds of students attending one lecture is a common picture in today’s lecture halls. The large number of students and the wide dimensions of a suitable lecture hall lead to a series of problems, described by Joel Geske [9]. He names five problems that can occur in large class lectures. First, the physical distance the students have to overcome in order to communicate in a comfortable way is too large [12]. It is almost impossible to discuss with students who are not sitting immediately next to oneself. Geske mentions the “impersonal atmosphere towards classmates and the instructor”. Moreover, students dislike to speak in front of the large audience, because of the “fear of saying something foolish”. Individual participation becomes difficult. Furthermore, the instructors "tend to be remote", or even "inaccessible". Lastly, the seating arrangement sets the student into the position as a spectator which implies a passive behavior. However, since sharing one’s ideas and responding to other’s reactions leads to a better understanding [3], it is desirable to encourage the students to participate actively in large lectures.

Nowadays, an additional problem has found its way into the lecture hall: students use their laptops during lectures. The access to the wireless networks causes a lot of distraction and demands the student’s attention, providing possibilities to play games, visit social networks or microblogs like Twitter\(^1\).

In order to overcome the physical distance between students, one solution could be the usage of such a microblog as a digital backchannel. A digital backchannel takes advantage of the wireless connectivity by enabling a conversation among the audience which is held in parallel to the instructor’s presentation. This can be used to share feedback with other students, ask questions or make comments without interrupting the lecture. Students who are uncomfortable with asking a question in public are more likely to do it within a backchannel [6].

\(^1\)http://www.twitter.com
Mediated Discourse (CMD), interaction among students can be increased as well as social barriers can be lowered. It encourages all students to participate in the discourse, even those who are rather shy or self-conscious about mistakes they make. Moreover, participation in CMD is more balanced, meaning that not the same students, that dominate the regular classroom discourse also dominate the CMD [14]. Interaction between learners is perceived motivating and stimulating [17]. Also, it has an impact on learning [20].

To sum up, backchannels not only facilitate collaboration but also may contribute to awareness which plays a central role in building a shared sense of community.

1.1 Social Awareness

Social awareness describes "an understanding of the activities of others, which provides a context for your own activity" [4]. The following simple scenario from the face-to-face environment tries to explain social awareness in some of its aspects: A student who finds herself new at university has only little awareness of who is also new and if she meets her fellow students the first time, she barely knows them, meaning she has a low awareness of their personalities. In order to overcome social difficulties at the start of a study, a common practice at the university is to organize a day where new students get to know each other in a playful manner, guided by students in higher semesters, usually known as freshman day. The fact that students with the same background were brought together may have provided the awareness of a common ground to start from, facilitating communication by giving a context. Personal experiences both as participant as well as tutor have shown that the new students were rather shy at first. The more information students had about one another, the more awareness was provided and the more social barriers fell. Noticing common interests or behaviors strengthened community and lowered the distance between one another. Playing games turned out to be a useful support as it encouraged the shy students to start communication.

This observation from a private surrounding might also be applied to the learning environment inside the lecture hall. During lectures, students usually have a low awareness of the other’s thoughts, concerning the lecture material. Students who have questions may be hesitating because they think, they are the only ones who did not understand the issue. Having awareness of the questions or thoughts of other students might lower the doubts and therefore lead to an increase of participation. Seeing that others have problems as well, noticing other students with the same remarks or helping others could create, similar as in the private surrounding, a common ground and therefore lower the social distance between the students.

In fact, research has shown that awareness has a positive effect on communication and interaction while helping the students to develop a shared sense of community [5], which is crucial to learning and interaction within the Computer Mediated Discourse [7]. Hence, it is critical to find a way, just like the playful approach in the first scenario, to encourage students to participate in the classroom, leading to disclosure of information which is an important part of social awareness [22].
1.1 Social Awareness

According to Rittenbruch [21], social awareness can be distinguished into active and passive awareness. The latter means the user-information which is automatically gathered by the system, then correlated and distributed to the other users. In contrary to the active awareness, it does, at first glance, not require an active disclosure of information by others. It focuses on information that emerges unintentionally, e.g. by simply attending a lecture.

Active awareness is defined as including "information that people actively share with others." It is created by intentional communication, which occurs when "people deliberately direct the attention of others in order to create awareness" [24]. E.g. a student who asks a question in a backchannel creates awareness actively. If the backchannel system she is working on displays her online status or the amount of messages she posted, we consider it a matter of passive awareness. The system displays it usually in a rather unobtrusive way whereas a question that is asked is supposed to catch the other’s attention promptly. Likewise, raising a hand in order to ask a question on the frontchannel, thereby disrupting the instructor’s discourse, falls into the category of active awareness. In some cases, one may see active awareness as basis for passive awareness. In the example above, the user’s amount of messages is a result of intentional communication and therefore based on active awareness.

1.1.1 Social Awareness in Digital Backchannels

The awareness that is provided by the digital backchannel is usually of an active, rather cluttered nature. The student only has a glance at the current activity on the backchannel and little opportunity to build up a meaningful context for the own activities. Measuring the quantity and quality of the own activity and comparing them to others seems to be a difficult, distracting task when using conventional backchannels. Additionally, it bears the risk of drawing wrong conclusions about oneself caused by the use of a rather subjective basis.

An additional problem with conventional digital backchannels is the nature of computer mediated communication (CMC): "all CMC environments could be viewed as less personal and less socially emotional than [Face to Face] environments because of the constraints of perceived cues in the interaction" [16]. The problem might come up, that students have the feeling of exposing information to an impersonal system, unaware of the listeners’ reaction, which may be similar to the impression of a communication with a machine instead of a real person.

Backstage is used in the environment of a lecture hall, where the communication partners are, in fact, co-present. However, due to fact that the student is a small part of a large group, a state of detachment might be reached, in which the student is "physically present but not fully or actively 'here'" [13]. Combined with the earlier mentioned "impersonal atmosphere" [9] within large lectures, this could lead to an uncomfortable feeling among students which may cause an avoidance of social interaction, loss of argumentativeness, and to a constraint in their interactions with other students [2].

In order to reach the goal of increasing interaction, including the student’s satisfac-
A factor which influences the social climate in a medium is the "Social Presence", which is described more detailed in the following section.

1.2 Social Presence

One of the first definitions of social presence, by Short, Williams, and Christie [25], defines it as the “degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships” (p. 65) Since then, various kinds of other, more simple definitions have come up. E.g. social presence has been described as “the feeling that others are involved in the communication process” [32], or “the degree to which a person is perceived as a ‘real person’ in mediated communication” [11].

Since there are advantages of the electronic conversation compared to the face-to-face environment, why is it then desirable to bring the communication medium closer to the ‘real’ conversation? Social presence has an impact on the perception of a medium. It is supposed "to create a level of comfort in which people feel at ease around the instructor and the other participants” [1].

An environment with a high level of social presence is perceived as warm, collegial and approachable. The students feel affiliated to each other and have a sense of solidarity with the group. They are encouraged to view the quality of the lecture as more valuable. It supports critical thinking in a community and makes the group activity appealing, engaging, and intrinsically rewarding [23].

In turn, an environment with too little social presence is seen as impersonal, which causes that less information is shared with others [15].

Obviously, social presence is an important characteristic of an online environment. But how is social presence created and increased? There are some factors, that are critical for creating social presence in online distance learning courses, defined by Aragon [1]. He names strategies for building up social presence initiated by three factors: the course design, the instructor and the students. The course design, e.g. should include student profiles. Instructors should give students frequent feedback and should be accessible meaning that there ought to be a possibility to contact the instructor. Both instructor and participants should contribute to discussion boards, share personal stories and experiences, and use humor and emoticons. Most factors can be influenced by the participants themselves, but, as part of this thesis, ways of designing a digital backchannel in a way that encourages students and instructors to share the information needed to increase social presence, will be explored.

1.3 The relationship between social presence and social awareness

There is a close relationship between social presence and social awareness. As Ruth Rettie [19] explains, social presence implies social awareness. Still, social awareness
can occur without social presence. If, for example, a student reviews the activities on the backchannel, that are related to a past lecture, she gains awareness of her fellow students, because she reads their messages and therefore knows about their concerns, questions or remarks. However, she does not perceive social presence because the lecture is over and no one else is active on the backchannel. If though, the student attends a lecture, she perceives social presence through the physical presence of her fellow students and through the current activity on the backchannel, implying the awareness of the other students' activity of "being there".

As part of this thesis it is an important issue to find the right amount of social presence and awareness. Too little leads to an impersonal atmosphere within the medium and a missing sense of community. However the wrong balance may cause some advantages of CMC to get lost. As mentioned earlier, social cues are reduced in CMC. It has been found out that due to the reduced cues, group members that communicate through the computer are less aware of social distinctions which results in an increase equality of participation [31]. Thus it is expected that in turn, influence is more egalitarian as well [30]. Both are advantages one does not want to do without in Backchannel communication. Providing awareness of status information, e.g. the semester the Student is currently studying, might make her stereotyped and therefore influence the way other, more experienced students assess her messages. A way to avoid this stereotyping may be either hiding the status information or providing more information which superimposes the stereotype. This could be accomplished by an appraisal by the lecturer, who is a collectively accepted authority (see section 2.5). The appraisal will show that the student usually makes high quality posts despite her lower status. It is important to mention that there is no need for increasing social presence to a maximum level. First, a certain amount of social presence is already given by the fact that, while using a backchannel during a class, all participants are physically present. Secondly, too much social presence might be distracting the users, leading to a worse learning experience.

1.4 The Digital Backchannel Backstage

In order to use the positive effects of backchannel communication, Pohl et al. [18] developed an application, called Backstage, which is especially tailored for the usage in the lecture hall. Backstage has two operating modes, which are described concisely in the following:

1.4.1 Backstage’s Dashboard

The dashboard consists of a menubar, a microblog, as well as the lecture slides. The length of the microblog messages is restrained to 140 characters, making the participants write the messages in a compressed way, which makes it easier to read for the others.

Messages are either displayed to the public or privately to only certain users. Furthermore, messages can be sent anonymously, without displaying the author's
username.
When writing a message, students have to choose a predefined category, e.g. "Too fast" which indicates that the lecturer pace is too high or "Question", on which a question should be following. Although not meeting the common idea of usability, the order of choosing a category first and writing the message according to it is supposed to decrease the amount of off-topic posts [8]. If still, students use the backchannel as platform to perform their private conversations, there is the possibility for other students to tag the messages as "off topic". Furthermore, every message can be rated either positively or negatively, providing information for a message ranking to which the instructor has access. The lecturer has the possibility of conducting a quiz, in order to find out whether the students have understood the lecture’s contents. The results are integrated in the lecture slides and can be reviewed in the overview after the lecture.

1.4.2 Backstage’s Overview

The overview is the area which is supposed to be used in order to prepare for the lecture or to review lecture contents after the lecture. In the overview, new lectures can be defined on behalf of the lecturer or added if the user is a student. For each lecture session, the slides can be downloaded and quiz results can be reviewed.

1.4.3 Social Awareness on Backstage

The message ranking is one function of Backstage which increases awareness for the lecturer. If, for example, a student asks a question which other students find important to know the answer to, they rate it positively. The more positive ratings the question has, the higher it finds itself on the ranking. If the instructor has time to answer a question, it is made easy for her to sacrifice less time to find the question with the highest importance. The instructor is involved in the backchannel communication in order to increase her awareness of the opinions, questions and overall atmosphere among her audience. Aggregated information about the quantity of each category helps the instructor with this task.

If students find the lecture pace too fast, they will post a message with the related category. The instructor sees the overall amount of messages for each category on his dashboard. If the amount of "too fast" posts is high it is indicated that she should slow down. The instructor does not have to pay attention to the backchannel in order to notice that students find her pace too fast, she only has to take a glimpse at the feedback area on the dashboard, which can only be seen by the instructor. Aggregating, as done in the feedback panel as well as filtering within the message ranking is a possibility for reducing the cognitive load for the lecturer.

This thesis will be concentrating on the awareness perceived by the students. In Backstage, the student uses the integrated microblog as backchannel, being aware of messages by other students, seeing the avatar-picture, the name, or pseudonym, or, if the message is posted anonymously, only the content of the message as well as the rating which is related to the message. Each slide has a new microblog thread, which makes it even more difficult to keep the overview on issues like
1.5 Motivation and Scope

"Who posted what?" or "How good are the messages rated?", "How good are my messages rated?" and "Am I more or less active than others?". The student does not get a notification if someone rates her message. She will not notice if her question is rated that good that it gets forwarded to the lecturers message ranking. This information is valuable when thinking of being motivated and building a meaningful context for assessing the own activity. In turn, students who post off-topic messages are maybe not aware of the fact that they disturb the microblog activity. They will only see it unless they go back to the concerning post, which costs time and causes distraction.

1.4.4 Social Presence on Backstage

Social presence is created, apart from the physical presence of the audience by the contents the participants share, as well as the images which are related to each person. However, the lecturer does not have an avatar, which decreases her social presence.

Every message is referenced to a category before the user writes it, thus keeping off-topic content low. By this, the space for social cues is reduced: While an off-topic message could strengthen social presence e.g. by using humor, the absence of off-topic messages makes it more important to increase social presence on Backstage by other means. As already mentioned in the previous subsection, there is little awareness of feedback which is given, although feedback is an important influence for social presence. It might happen that, if nobody posts anything, the social presence on Backstage decreases so much that the students stop using it, returning to the frontchannel, unless the lecturer reminds them to use the backchannel.

1.5 Motivation and Scope

A central aim of this thesis is to develop concepts that help Backstage to be a medium where communication is rich and social, aiming at increasing student satisfaction, motivation and fostering interaction quantity and quality. This shall be accomplished by increasing the social presence within Backstage by providing more awareness of feedback and extending the user profiles to an appropriate extent.

Furthermore a goal is to improve social awareness for the students by creating not only a general, active awareness of the activities on the backchannel but a more specific, person-related, passive awareness. This is supposed to be accomplished, inter alia by a graphical tool which dynamically aggregates available information and displays it to the student, allowing to easily draw connections between the activities of other students and the user’s behavior within the medium, thereby creating a meaningful context for the user’s activities. Additionally, it is supposed to visualize the distances to specific members of the audience, facilitating to find students, similar or even unequal to oneself, in order to form e.g. suitable learning groups.
1 Introduction

All concepts shall be designed in a way that the student is not exposed to too much distraction. The thesis focuses on the conception, design and visualization of the components, rather than on the actual information retrieving. In the following chapter, the components and their benefit will be described, as well as an insight on which components were implemented will be provided. Then, an overview of related work on increasing students’ awareness in similar environments shall be given and will be compared to the developed concepts on Backstage.
This chapter deals with the different aspects of our concept. The central aim of all concepts is to increase social presence or social awareness on Backstage. For this, a variety of different approaches are used of which not all are considered to find their way into the implementation.

At first, Backstage’s current user-interface will be described concisely.

2.1 The User-Interface

The user-interface of Backstage was changed to a calm, unobtrusive appearance, using a warm and light color-scheme.

Figure 2.1 shows the dashboard on Backstage with its current design, as seen when logged in as a listener. On the dashboard, the slides (2), considered as the most important part, are situated in the center of the screen, which leaves all other information peripheral. This signifies that the student’s attention should be centered on the lecture’s content most of the time. On the top part of the screen there’s the menubar (1) which allows to navigate within the application. On the right of the menubar, the user can see her own avatar and username, making her aware of how she is displayed to her fellow students. The microblog (3) which finds itself left to the slides consists of the posts referring to the current slide. Each post includes the author’s avatar on the left which has the post-related category above itself. The category icon is now shaped as a speaking-bubble, known from comic-books, playfully expressing the importance of communication on Backstage. In the ideal case, the user has a picture of her face as avatar, which then has the bubble-shaped category icon above itself, showing thereby that the user has something to say. This is supposed to increase the social presence of that student, making the users imagine the actual person related to the avatar say something.

One comes across the speaking-bubble theme quite often in Backstage’s new design. It is represented in Backstage’s logo as well as in the lecturer’s statement,
2 Concept

Figure 2.1: The dashboard on Backstage, consisting of the menubar (1), the lecture-slides (2), the microblog (3), the Activity Aggregator (4, see also Section 2.8) and the lecturer’s profile (5, see also Section 2.2).

which is explained more detailed in the following.

2.1.1 The Lecturer’s Social Presence

Making the lecturer socially present in a medium can lead to a lowered distance to her, which makes it easier for the student to communicate with her. Moreover, the students should be aware of the fact that the lecturer can read their posts. This should lower inappropriate behavior and off topic content.

In order to increase the lecturer’s social presence on Backstage, she has the possibility to write a statement, which is displayed together with the avatar and the lecturer’s user-name on the bottom right of the dashboard (5), see also Figure 2.2. The statement can be an arbitrary short sentence of private nature, a fun fact concerning a slide or maybe a special information referring to the lecture’s content, e.g. "The subject xy is of special importance for the final exam".

The instructor can choose between three modes: A statement can be tied to her profile, making the statement global. Moreover it can be tied to one session or even to single slides. The statement is, once again, surrounded by a speaking-bubble.

Similar to the lecturer, the students can also set a statement. To lower distraction, there is only one statement for each user which appears when moving the cursor over the user’s avatar.
2.2 Followers

![Image: The representation of the lecturer's profile on the Dashboard]

Figure 2.2: The representation of the lecturer’s profile on the Dashboard

2.1.1.1 The Lecturer’s Profile on the Overview

The overview offers some space for functions that can be used before or after the lecture. By using an extended lecturer’s profile, Backstage could aggregate useful information about the lecturer’s behavior and display it to the students. An example for useful information could be whether a lecturer provides answers during or after lectures. If a student had awareness of this behavioral aspect, she could adapt her expectations during a lecture, making her wait for the answer until after the lecture instead of maybe asking the same question several times.

2.2 Followers

A student might be particularly interested in posts of one of her fellow students, because that student usually makes the best contributions in her opinion. That is why she would benefit from an emphasis of that student’s posts, making those easier to spot while looking through the microblog. On Backstage, now, each user could have the possibility to follow other users.

Following a user leads to a visual emphasis of the user’s posts, by giving it a lighter background color, thus making it more eye-catching (as can be seen in Figure 2.3). Similar to Twitter, the follower relationship is uni-directional and asymmetric. A user does not have to allow another user to follow her, neither must she follow the user back. In Backstage, a user can decide, out of various reasons, to follow another person. It might be because the user is friends with the other person, because she thinks another student makes good contributions or maybe the instructor recommended to follow that one student. It would be imaginable to develop a recommendation system integrated in Backstage which finds the most fitting peers to follow, e.g. those who are similar in learning progress or controversial parties in argumentation. The recommendations could be based on ratings, similarities or inequalities which would make the user put her attention on the users with the best contributions, the ones who behave similarly to the user or even the ones with
most behavioral inequalities, which could possibly broaden the user’s horizon. The follow-recommendations could also be taken as an example for peers that are suitable for a learning group.

2.2.1 Privacy Issues

On Twitter, the privacy issues concerning the follower relationship are as follows: A user can either display all her contributions publicly, making it possible for every other user to follow her without her permission, or she chooses to protect her Tweets. Thus only following users can see her Tweets. Therefore it makes sense that, if the Tweets are protected by the user, permission has to be given to other users in order to be her followers.

The circumstances on Backstage are different. Every post is displayed to every registered user in one lecture, unless the user addresses someone privately. That is, because unlike Twitter the audience on Backstage is a closed community. Emphasizing a user’s post does not reveal any of her private information and does therefore not have to be permitted explicitly. Additionally, every user should be aware of who is following her, making her aware of her relationships with the other users, which increases social presence.

2.3 Favorite Posts

During a lecture, it might happen that the user finds a post very interesting or more important than the other posts. She will rate the post positively but in the midst of all other posts, it will be difficult to find it again. A function that makes it possible to label important posts would be useful.
2.4 The User Involvement Indicator

Another case might come up in which a student makes a really funny but rather irrelevant post. Other students will want to show that student that they find the post funny as well, which will strengthen the social bonds. In fact, the use of humor is important as it will increase social presence by lowering social distance and showing friendliness within the learning environment [1]. The post will rather be rated positively although it is not relevant for the lecture content because nobody wants to be the spoilsport.

Furthermore, the humorous post will show up in the lecturer’s ranking, taking the space of other, more relevant messages. In the Activity Aggregator (see Section 2.8), a student that uses humor frequently would be equal to a student that actually makes good contributions. The borders between a good, helpful post and a humorous post can’t be distinguished anymore. That is why a function through which other students could show a user that they like her amusing contribution without affecting the ranking would be helpful.

Both problems could be solved by the favorite-function. Each user has the opportunity to label each post they find funny or they want to remember by clicking the favorite button. The user, who’s post is favorited will be made aware of that (See also the Section 2.7). Favoriting a post will be taken in account differently than rating a post. One could let the lecturer decide whether to include the amount of favors of a post into her ranking. The user will be able to view all favorited posts of a session on Backstage’s overview, making it therefore possible to create a personalized summary of a lecture-session, consisting of a collection of the best posts.

2.4 The User Involvement Indicator

The current involvement of each user in the backchannel is shown by the User Involvement Indicator. The User Involvement Indicator consists of a term as well as a small, colored dot. If a user is either not logged in or using the overview, she is displayed to the others as “Offline” with a grey dot, indicating that activity from that user is not expected. If the user is viewing the dashboard she is either shown as "Online", which is the default and has a green dot, or she can choose to focus her whole attention to the lecture slides by selecting the "Concentrating" state, which is related to a red dot. In the "Concentrating" state, the microblog, the notifications (see Section 2.7), the Activity Aggregator (see Section 2.8) as well as the lecturer’s profile are hidden from the user, clearing the screen from every possible distraction. Other users will see the user’s status when hovering over one of her posts. An aggregated distribution of all statuses is available in the Activity Aggregator, which is further described in Section 2.8. Unlike the online-status a user can choose in instant messengers like Skype, the User Involvement Indicator is tied to an enabling or disabling of functionalities in Backstage. This is not only supposed to provide meaning to the states the user chooses but also keeps actual involvement and the set status consistent, which simplifies its usage.
2.5 Appraisals by the Lecturer

The lecturer has the same option to rate a post as the students. The lecturer is a person of authority, which in the ideal case makes her view the posts more objectively. Furthermore, the lecturer is supposedly most knowledgeable about the lecture content. Therefore, a positive rating by the lecturer should be interpreted as a praise, which should be displayed in a distinct way. Perceptions of physical and social cues shape group member’s interactions with one another, influencing the weight they give to others’ opinions [31]. E.g. if a student is known to make rather low quality contributions in one lecture, the other students expect her to do the same in another lecture, maybe rating her posts rather negatively or avoiding the rating completely. Including the lecturer’s appraisal into a post could counteract against the stereotypes the students have built up. Making the others aware of the post’s quality by letting the objective lecturer asses the post in a distinct way could lead to a less biased way of rating other’s posts.

2.6 Applause

A common practice in lecture halls is to applaud at the end of a session, showing the lecturer one’s appreciation. The applaud is a construct which can only arise if a large part of the audience partakes. Furthermore, an applaud is contagious. Once one person has started, the others join in, if they want to show their appreciation as well. Applauding during a lecture is rather avoided due to the interruption it brings. However, the lecturer might want to be aware of the students’ acknowledgment also during the lecture e.g. if she shows a very special or impressing slide. In order to meet the guidelines of not interrupting the session if unwanted but still showing the lecturer the whole community’s appreciation, the concept of an applause-button has been developed.

If a student pushes the applause-button, it remains active for a distinct period of time, after which the button falls in to a passive state again. The active state is shown globally to every student, in order to preserve the contagion by spreading the applaud. If another student pushes the button, during the active state, the button’s activity is again extended to the maximum value. If enough students push the button while active, a virtual applaud is triggered, which is forwarded to the lecturer who gains awareness of the group’s appreciation. Furthermore, the students get a notification about the applaud being forwarded, thus strengthening the sense of community.

2.7 Notifications

Creating awareness includes helping users to be aware of what their peers are doing and how they interact with oneself. Without notifications, this would not easily be possible. Imagine a student who writes a post on one slide. As the lecture goes on, the student gets curious about how many persons might have rated her post. She would have to go back and find the post, then look, by placing the cursor
2.8 The Activity Aggregator

over the post, how many positive ratings there are. It might also be interesting to know if one’s post was forwarded to the lecturer’s ranking. Furthermore, the users would want to know if the lecturer gave a positive rating. A system that keeps such information back would miss a chance of motivating the students highly, while ignoring an easy source of awareness. Therefore we have developed a notification system which is supposed to inform the student unobtrusively if anything "new" has happened. Cases, in which a notification is triggered could be:

- Being rated (positively/negatively)
- Being answered to
- Receiving a private message
- Being favorited (depending on privacy settings with or without displayed name)
- Being praised by the lecturer
- Being forwarded to the lecturer
- An applause which has been triggered

One reason which speaks against the notification system is the fact that we want to cause least distraction as possible. As mentioned earlier, any active awareness has a certain level of obtrusiveness. The notification system does therefore have a distractive potential. However, when deciding, whether to implement a notification system or not, one should consider the balance between the degree of distraction and the usefulness. The interface is held simple and unobtrusive. It has been avoided to give the notification tab a signal color like red. Instead, it is grey when empty an light blue when there are unread notifications, keeping itself in the periphery of the user’s attention. Moreover, the notifications are crucial to the usage of Backstage. For example, a student who is waiting for a reply, that could enhance her understanding, would be better off waiting for a notification while following the lecture instead of checking the slide where she placed her post until the answer finally appears. Additionally, the notifications provide immediate feedback, which is important for creating social presence [25]. If a user still has the feeling of being distracted too much, there is the possibility of going into concentration mode where all distraction including the notification system can be hidden. One may also consider to let the user selectively enable or disable the notification system in the user’s profile.

2.8 The Activity Aggregator

The Activity Aggregator makes up the most important part of our concept. It is supposed to let the student easily form a significant context out of the data from other students and herself, visualized in a compact and clear way. The data, which is displayed to the student, consists of the aggregated information about the
amount of public activity a student shows in Backstage, meaning the action of posting a message. Moreover it shows the ratings a student gained for her messages and lastly an information about the involvement in the backchannel of each user ("Online", "Offline", "Concentrating"). The Activity Aggregator enables the student to see into her own data, making her understand her behavior in class. Additionally, it facilitates the comparison of her own data with the group’s equivalent data.

A student might ask herself whether she asks or answers more questions than the others. She could be interested in the ratings she gains on her answers, indicating that she gets along well with the topic. A fellow student of her’s might be inspiring for her because she can explain the lecture material very well. With the Activity Aggregator, she will be able to see into the fellow student’s behavior, maybe finding out that the student, who’s understanding she admires asks a lot of questions in class. She could adapt this student’s behavior, thus resulting in a better understanding on her part as well.

The Activity Aggregator is accessible in two different ways. Either on the dashboard view or on the overview.

### 2.8.1 The Activity Aggregator on the Dashboard

Since, while the lecture-session is running, distraction is unwanted, the dashboard-view of the Activity Aggregator is rather compressed, leaving distracting information out and reducing the visualization to the most important parts. The Figure 2.4 shows how the tool is displayed on the dashboard. It contains a two-dimensional coordinate system which compares the user to the overall average.

#### 2.8.1.1 Categories

The user can choose between two views: The overall view and the categories view. The first shows the aggregation of all activity and all ratings. Such an overall view requires the capability to break down the key figures to the categories they are related to. That is why the category view in turn, allows a more particular evaluation of the data. Each available category make up a tab, which displays the information about activity and rating only for the chosen category.

#### 2.8.1.2 Activity

The activity is expressed by the position on the vertical axis. Considering the activity, the maximum value is the amount of messages, posted by the most active user divided through the overall activity, based on the current session. If there are not enough contributions for a significant best-value, e.g. right at the beginning of a session, a default value is used.

The student can easily see, probably only by taking a short glance at the graphics, how her activity relates to the average in her class. Furthermore, if she finds her
2.8 The Activity Aggregator

Figure 2.4: The Activity Aggregator on the Dashboard. The position on the y-axis displays the activity, the size and color of the dot as well as the percentage relate to the rating. The left refers to the average of all users, the right to the current user.

"dot" at the top of the coordinate system, she knows herself as the, or one of the most active in her class, which can be a motivating factor. In order to make the graphics relatively easy to interpret, once knowing what each graphical representation means, the x-axis only ranges over a discrete set of two, showing the average on the left and the user’s data on the right.

As mentioned in the previous section, the activity can be displayed in relation to a category. In that way, a student can see if she asks or answers more questions than the average. It can also be useful if, for example, a student often hits the "too slow" button. Seeing that the average of her fellow students don’t actively hit the button shows her that she might have a faster grasp of the lecture material than most of the others, making her restrain from frequently uttering her request for a higher lecture pace for the collective good.

2.8.1.3 Rating

The rating can be divided into two values which are important to be represented in our visualization. First, the percentage of positive ratings, gained throughout the session. Second, the amount of ratings, positive or negative, a user gained. This is important to value the meaning of the percentage, making it possible to distinguish different cases. E.g. a user with 100% positive ratings but only one rating in total should not be shown as better as a user who had 99% positive ratings on her total
100 ratings. The amount of ratings is represented by the size of the dot. A large dot "weighs" more, making it visually and also symbolically more significant.

As already done when visualizing the activity, once more the highest value found in the user-data is taken as maximum value. The average and the user’s values are computed in ratio of the maximum value. Once again, if there have not been enough ratings, a default value takes the place of the maximum value. The percentage of positive ratings is visualized in two different ways. First, it is shown by a color-scale from red over yellow to green. The dot’s color can show the user with only one glimpse the approximate direction of her positive-rating-percentage. If the user wants to know the exact value, it is written above the dot.

In Figure 2.4, the user asks more questions than the average. The questions are rated better than average. Still: the questions have less weight since the user’s questions were not rated as often as the average’s. However, based on asking questions, the user is one of the most active. When connecting the last two observations, there are different interpretations that could be made. The questions are rated positively (in 80% of all cases) but ratings were made rather seldom, which could mean that maybe her fellow students found her questions not interesting or too difficult, indicating that not much attention was given to her contributions.

2.8.1.4 The User Involvement Indicator

Very important for the interpretation of our statistics is the percentile distribution of the User Involvement Indicator states ("Online", "Offline", "Concentrating") over the session. It tells the user the part of registered users who aren’t attending the session, making her own activity less significant if there are only few others in the lecture. Furthermore, if a large part of the students is in the mode "Concentrating" one will not expect them to be active. It even shows the user, that there may be something important or difficult going on in the frontchannel, possibly making her think about going into concentration mode herself in order to avoid missing important parts of the lecture.

The User Involvement information could either be displayed when moving the cursor over the "All"-Dot or located permanently visible beneath the graphic. A reason why the first approach is preferred, is the simplification of the view. Showing fewer information means fewer things that distract the user. Secondly, there is less space needed. Information about the percentage of off-topic and favorited messages could be displayed in the same manner.

2.8.1.5 The Lecture Hall Shape

The Activity Aggregator intentionally sets the displayed information into a surrounding which is inspired by the shape of a lecture hall. The shape is supposed to make the visualization less abstract, making the relation between system and actual surrounding more obvious. The more active a user is, the farther in the front
2.8 The Activity Aggregator

Figure 2.5: The Activity Aggregator on Backstage’s overview. 20 Values of Activity and Rating are displayed, containing the average of all users (green line), the current user (purple line), the followed users (blue lines), randomly set users that display their profile publicly (yellow) and randomly set anonymous users (grey).

her dot is situated. This meets the common assumption that active students sit in the front of the lecture hall whereas the less active ones withdraw to the back.

2.8.2 The Activity Aggregator on the Overview

The example in the beginning of this section mentioned the case that a student might want to compare herself to particular other students. The opportunity to do so during the lecture is a tempting distraction which we want to avoid. Instead of offering the possibility of detailed comparison to fellow students during the lecture, we use the advantages of Backstage’s overview.

On Backstage’s overview, which is supposed to be used before or after the lecture the student can put her full attention on the Activity Aggregator. Thus one does not have to put distraction issues into account anymore. This gives us the chance to design the Activity Aggregator in a more detailed manner, creating a person related awareness.

The Activity Aggregator’s display on the overview can be seen as an enhancement of the one, seen on the dashboard. As shown in Figure 2.5 it is composed in a similar way. Activity and rating are displayed in the same manner, by using the y-axis for the activity-value and the dots for visualizing the values concerning the rating.
The dots are once again shown in a lecture-hall shaped surrounding. The difference to the dashboard-variant is the usage of the x-axis. Instead of displaying only two different states, the average and the user’s data, the overview-version displays 20 different states. Situated in the middle of the Activity Aggregator there is still the user’s dot next to the average dot. Left and right to those one can find the dots of 18 other users.

In the default mode, the other dots consist of a random subset of the students the user is following. If the user follows less than 18 peers, the remaining dots are filled up with data of randomly set students. An extended mode allows the user to choose those students, she finds most interesting, to show up on the activity aggregator.

The Activity Aggregator on the overview includes, like the version on the dashboard, a navigation which allows to choose a category, by which the displayed information is filtered. Furthermore, it will be possible to not only display information about a session but also about the whole lecture, which gives the opportunity to observe one’s progress.

The overview-version has space beneath the lecture-hall-shaped view where further information on a peer can be displayed. Hovering the cursor over the dot shows, in case the user has set the corresponding privacy settings to public, the user’s identity and further information on her data, consisting of:

- the distribution of online statuses
- the percentage of positive Ratings
- written messages in total
- received ratings in total
- posts that have been favorited
- best rated post of the session/lecture

### 2.8.2.1 Privacy Issues

Not every user will want to display her aggregated data to other users. Therefore there must be a possibility to customize privacy settings in a way that either data is shown to no one, to everyone or to an explicit set of users (e.g. the ones the user is following or the users which are set to be shown in the user’s Activity Aggregator). Another way to solve the privacy issue is the introduction of a two directional relationship in the usage of the Activity Aggregator. If a user wants to see another user’s data, the other user has to permit that explicitly, while at the same time, being allowed to see the requesting user’s data. The visualization in Figure 2.5 indicates the privacy settings of displayed users by the color of the line the dot is moving on. Blue lines refer to users that are followed and have permitted to show their privacy settings (based on a two directional relationship). Yellow and grey
2.9 Leaving the Dashboard

lines belong to the users which were chosen randomly. Yellow are those who allow to show their data to everyone, grey are those who are anonymous. Hovering the cursor over dots on grey lines will have no effect. Although the encoding in the visualization is quite complex, once the user has learned to interpret it, it will save her time. She will not have to hover over every dot in order to see whether there is more information hidden under it or not.

2.9 Leaving the Dashboard

The user decides herself how much she focuses on the lecture. Backstage can only help by offering only little distraction on the dashboard and the possibility of hiding distracting features by going into concentration mode. Still, students might be tempted to leave the dashboard and explore the functions on the overview. If in parallel the lecture session is running, one could let Backstage ask the student if she really wants to leave while reminding her about the fact that the lecture is still running and the community depends on contributions of each student. This could take place in a rather personal way, addressing the user by name, using familiar language. This method appeals to the student’s social responsibility. Moreover it builds up an artificial barrier for leaving the dashboard when it is not desired. It lets the system react on the student’s action, verbally addressing her, which gives the system a human behavior. This might positively affect the social climate in the online environment.

2.10 Implementation

The current implementation of Backstage includes the User Involvement Indicator, which is represented with all its features. The lecturer’s profile is displayed. Right now, only one global statement for the speaking bubble can be set for the lecturer as well as for each student. For the notification system, the follower relationship, the favorite function and the Activity Aggregator on Backstage’s dashboard, client side functionalities are implemented and will probably be included into Backstage as soon as the backend functionalities are ready. The Activity Aggregator on the overview, the Applause-Button as well as the appraisals by the lecturer still require further work until an implementation can be considered as possible.
This chapter explores the ways of increasing social presence and awareness in other digital backchannels. They are then compared to the previously described concepts and evaluated concerning the usage in large lectures.

3.1 Twitter

Twitter is a popular micro-blogging tool, used by currently over 140 Million users worldwide (2012) [26]. The microblog messages (“Tweets”) are restrained to 140 characters and are displayed to the user’s followers. Twitter.com describes Twitter as “a real-time information network that connects you to the latest stories, ideas, opinions and news about what you find interesting” [29]. A user can follow friends, politicians, VIPs or simply people that Tweet about interesting topics. Only posts of followed users are shown in the message stream on the home-tab (as can be seen in Figure 3.1).

One can also just read Tweets about a certain subject or event, without having to follow the authors. Those are displayed on the "discover"-tab. Tweets can be related to arbitrary topics by tagging them with a hashtag in front of the describing term, e.g. "The sun is shining and it is warm #weather". The follower relationship is uni-directional and the communication is asynchronous.

Twitter is often used as backchannel during conferences. A hashtag is defined through which every related Tweet is identified. A problem with the usage of a hashtag is that people who don’t participate in the frontchannel can Tweet about it only by using the hashtag. The audience is not closed, everyone can join in and everyone can read what is written about the topic. It is likely that, when attending a large event, a stream of posts is created which includes not only topic related content. The distractive potential is high and it is difficult to focus on the important Tweets.
Figure 3.1: The Twitter web-interface. The menubar (1) contains the currently picked home-tab, a connect-tab which shows interactions of other users with oneself and the discover-tab which shows stories and news and allows searching for posts related to certain keywords or hashtags. The user’s profile (2) shows the avatar and the username as well as a link to an expanded profile page. The total number of Tweets, the amount of followed users and the amount of followers are displayed. (3) shows follow-recommendations. (4) is a list of currently trending topics in the user’s home-country. The Tweets of followed users are seen in (5).
3.1 Twitter

On Twitter there are four ways of interacting with other users: @replies, direct messages, Retweets and favoriting. @replies are used to directly address a user in a public way by including a @username in the Tweet. A direct message is used when writing to the user in private. Retweeting is a way of spreading a Tweet by one user in the timeline to all the users who are following the retweeting user. In conferences, this is one way of rating a Tweet: If e.g. a question is tweeted, which another user finds interesting as well, she retweets it. However, this way a lot of overhead is produced. Furthermore, a negative rating is not possible which limits the ways of reducing inappropriate behavior or off topic messages. Favoriting Tweets is the last way of interacting with a user. It works similar to the favoriting function in Backstage, by labeling Tweets with a star that are worth remembering. Other users have access to the list of favorited Tweets of every user that has a public profile.

3.1.1 Social Awareness and Social Presence on Twitter

Through a detailed user-profile page, the user gains awareness of how she is displayed to other users. Under a header containing the avatar, the username, the amount of Tweets, followed users and followers, a timeline of all recent Tweets is shown. Furthermore there are displayed similar users and a menu where one can see the users one is following, as well as the followers, the favorite Tweets, the recently posted images and lastly the lists, which are groups of followed users. A notification system, represented by the "connect"-tab, gives immediate feedback about interactions by other users with oneself. Notifications about Retweets, mentions of one’s username by @replies and other users favoriting a Tweet the user has written strengthen the social bonds between the involved users and provide important feedback and awareness of how others react to their own Tweets. The fact that Twitter is the currently leading microblog with a large amount of active users and internal communities shows, that the social presence and awareness provided in Twitter has its effect. However, when using Twitter as a backchannel with higher educational background, there are some drawbacks. Twitter has a lot of rather distracting features. One is tempted to explore the profiles of other attending users or read Tweets about topics that are not related to the lecture. There is no rating function in order to hold off topic messages down or provide feedback on the quality of posts. The audience is not closed and people who are following and not attending the lecture can read all the posts a user makes. Moreover, no such tool as the Activity Aggregator is available. Therefore, there is only little possibility for a meaningful comparison between users. Although one can see how many Tweets have been made, this is only a total number which relates to all Tweets and not to a certain time period or topic, which makes it difficult to evaluate the own activity. The lack of a rating function on Twitter makes it also difficult to adapt the behavior to the group’s requirements. Then, there is no awareness of the current involvement of other users. One can only guess whether they are attending or not by noticing their Tweets, however, there is no User Involvement Indicator like in Backstage.
3.2 GoSoapBox

GoSoapBox\(^1\) is a backchannel tool that is optimized for the classroom. A teacher can set up an "event" for each class or period. An event is seen as a space where students and teachers can interact. Each event has an access-code with which the students can join. All they have to do is fill in the access-code and their name. After joining a class, the student’s name is displayed to her on the top left of the page. There is no avatar and all communication among students takes place anonymously: only the teacher can see the names of the students. Each event has five core features (as can also be seen in Figure 3.2):

- The Confusion Barometer
- Quizzes
- Polling
- Discussions
- Audience Questions

The Confusion Barometer gives the student the chance to express whether she has understood the current lecture content or she is confused. The lecturer can see the amount of confused students on her view.

A Quiz is a series of questions. Students answer the quiz and receive their score afterwards. Furthermore, the teacher is able to export the quiz results in order to assess the students.

A Poll consists of one question or topic. The students’ answers are displayed in a piechart and updated in real time. Once more, the Teacher can export the results to a spreadsheet.

Discussions include a question, the teacher wants her students to discuss on. The anonymity among students is supposed to encourage also shy students to participate.

The Audience Questions are automatically ranked. A student can submit a question, reply or vote for a question. The question with the most votes is displayed on top of the list.

3.2.1 Social Presence and Social Awareness on GoSoapBox

The teacher has a relatively high awareness of the students’ actions: She can see the students’ names, has access to the Confusion Barometer and is allowed to export summarized results for polls and quizzes on a spreadsheet. However, the students cannot access this information. Other students’ names are not displayed, leading to a lack of person related awareness. They are allowed to express their confusion, still they will not be aware of how the others feel. Social presence is considered low in GoSoapBox: There is no avatar or other personal information about the participants. Moreover, there is no indicator of the current involvement of other users.

\(^1\)http://www.gosoapbox.com
3.2 GoSoapBox

Figure 3.2: The five core features of an event on Soapbox [10]
The misbalance between students’ and teacher’s awareness may make sense in a school’s classroom environment, where classes are small and the social presence and awareness that arises from the co-located setting is enough to create a meaningful context for each student’s actions. The Teacher’s awareness must be higher in those environments where she has to use the gained information from the system in order to assess her students. Furthermore it is more likely in small classes, that the teacher gives individual feedback to students.

In large, higher educational lectures however, students are more dependent on their own assessment of their current learning effect. Courses are accomplished only by passing an exam and lecturer’s assessment on steady collaboration does not influence the grade. Students have a higher responsibility for their learning success. Thus, the building of a context gains more importance, because it gives the students the chance of assessing their behavior in comparison to their fellow students. A student that is responsible for her learning success has a better chance of improving herself when she knows where she stands by comparing herself to others. This is how she will know how much effort she still has to put into learning and how she can adapt her behavior in the backchannel towards a better learning effect. With the Activity Aggregator, Backstage offers the opportunity for building a context. Furthermore, the social presence as higher than on GoSoapBox because each student is represented stronger, using an avatar and personal information, as well as the User Involvement Indicator. This is why we consider Backstage as better suitable for large lectures in university than GoSoapBox.

### 3.3 TodaysMeet

TodaysMeet\(^2\) is an easy to use microblog backchannel for presentations. It offers the advantage of not requiring a registration in order to open a backchannel. The user simply chooses a name for her backchannel and picks a time-period during which the backchannel is available. People who are supposed to join the backchannel are given the url. They type in a username and can join the conversation without registering either.

The messages are restricted to a maximum of 140 characters. Message, username and date as well as the medium which was used (e.g.”via web”) are displayed on a message stream (see also Figure 3.3).

The Backchannel content remains relatively private which is an advantage in comparison to Twitter. Furthermore, the barrier for joining TodaysMeet is very low because one does not have to create a user account.

#### 3.3.1 Social Presence and Social Awareness on TodaysMeet

TodaysMeet is held very simple. The focus is laid on easy usage and the display of the content in a private environment. The problem that occurs in TodaysMeet

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\(^2\)http://www.todaysmeet.com
3.3 TodaysMeet

Figure 3.3: The backchannel TodaysMeet: The message stream is situated on the left. The user types in her message on the right. [27]
is the fact that no user accounts exist. A user with a specific name could for example leave the backchannel whereas another user may pick the previous user’s name. No unique identification is possible and thus no person related awareness. Furthermore, the simplicity of the user interface concentrates solely on the content of the post. There is no further information on the user like e.g. an avatar. Moreover, there are no functions that facilitate interaction between users: There is no explicit answering to a user, no favorite function or rating. TodaysMeet is rather made for temporary use, e.g. a single presentation which is held. For the use in a lecture though, the social awareness and social presence provided in TodaysMeet are insufficient because it offers too little functionality.
Future Work

The focus of our future work lies on the usage of Backstage in non-co-located environments as well as on the usage on mobile devices like smartphones and tablets. This thesis concentrates on increasing social presence and social awareness on Backstage, which is designed to be used in the lecture hall. However, now already, it is possible to access Backstage from home. The student can follow the slides as well as the comments on the backchannel without being physically present. In order to make this type of usage comfortable for the student, the way of providing social presence and awareness must be adapted to the new circumstances, e.g. by implementing an audio or video stream. Streaming will create a virtual co-presence of the students on one hand and the lecturer on the other hand. The stream could be positioned on the lecturer’s profile on Backstage’s dashboard. A goal is, to make the student who is not present feel like she is actually sitting in a lecture hall in the midst of the other students while listening to the lecture. Further investigation on how the social characteristics of the system can be adapted to non-co-located settings is still needed in future.

Making Backstage accessible from mobile devices is the other important subject of our future work. On mobile devices, usually less space is available for displaying the application’s view. Furthermore, interactions are carried out differently: there is no mouse anymore, instead, touch screens are used. This demands high standards of usability, in order to hold distraction low. Distraction could be caused by a too complicated usage. Additionally, the potential of locating the Backstage-user almost everywhere, creates a new kind of location-based awareness, which is possibly interesting for the students and also the lecturer. Speaking of the lecturer’s awareness, it is considered to make the Activity Aggregator also accessible for the lecturer. Thus, she can gain awareness of which students are interesting to pay more attention to. Lastly, it is considered to examine the amount of perceived social presence and social awareness among students when using Backstage in order to make modifications and improvements concerning the current concepts.
4 Future Work

4.1 Measuring Social Presence and Social Awareness

The measurement of the perceived social presence and social awareness could be made by conducting a user study among the students. Short et al. [25] developed a strategy for measuring social presence. They applied a semantic differential scale to four adjective pairs: personal–impersonal, sensitive–insensitive, warm–cold, and sociable–unsociable. A medium which is perceived more personal, sensitive, warm and sociable is the one with higher social presence.

Tu [28] examined the perception of social presence and privacy within the usage of e-mail, bulletin board and real-time discussion by developing the Social Presence and Privacy Questionnaire (SPPQ). The questionnaire contains 17 items assessing social presence and 13 items assessing privacy, each with a 5-point Likert scale. A factor analysis on the items resulted in five factors within the questionnaire: social context, online communication, interactivity, system privacy, and feeling of privacy.

Rourke et al. [23] suggest to measure social presence by analyzing the computer conferencing transcripts. Social presence includes affective responses, interactive responses, and cohesive responses. Furthermore there are 12 indicators for the three categories (see also Figure 4.1). The indicators are supposed to be identified within the transcript in order to show the amount of social presence.

We consider the combination of a qualitative analysis as done by Rourke et al. with a quantitative questionnaire as done by Tu as a suitable basis for a user study on Backstage when measuring social presence. In order to measure the social awareness provided by the activity aggregator and the User Involvement Indicator, a comparison between one user group that has access to the two tools and another group from which the aggregated information is hidden could be made. The participants could be asked to write down how they perceived the quantity and quality of their contributions on Backstage. The amount of differences of the content in the two user groups could be an indicator for the effectiveness of the two tools. Additionally, a qualitative questionnaire, aiming on examining the perceived awareness within Backstage could be designed.
### 4.1 Measuring Social Presence and Social Awareness

<table>
<thead>
<tr>
<th>Category</th>
<th>Indicators</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affective</td>
<td>Expression of emotions</td>
<td>Conventional expressions of emotion, or unconventional expressions of emotion, includes repetitious punctuation, conspicuous capitalization, emoticons.</td>
</tr>
<tr>
<td></td>
<td>Use of humor</td>
<td>Teasing, cajoling, irony, understatements, sarcasm.</td>
</tr>
<tr>
<td></td>
<td>Self-disclosure</td>
<td>Presents details of life outside of class, or expresses vulnerability.</td>
</tr>
<tr>
<td>Interactive</td>
<td>Continuing a thread</td>
<td>Using reply feature of software, rather than starting a new thread.</td>
</tr>
<tr>
<td></td>
<td>Quoting from others' messages</td>
<td>Using software features to quote others entire message or cutting and pasting selections of others' messages.</td>
</tr>
<tr>
<td></td>
<td>Referring explicitly to others' messages</td>
<td>Direct references to contents of others' posts.</td>
</tr>
<tr>
<td></td>
<td>Asking questions</td>
<td>Students ask questions of other students or the moderator.</td>
</tr>
<tr>
<td></td>
<td>Complimenting, expressing appreciation</td>
<td>Complimenting others or contents of others' messages.</td>
</tr>
<tr>
<td></td>
<td>Expressing agreement</td>
<td>Expressing agreement with others or contents of others' messages.</td>
</tr>
<tr>
<td>Cohesive</td>
<td>Vocatives</td>
<td>Addressing or referring to participants by name.</td>
</tr>
<tr>
<td></td>
<td>Addresses or refers to the group using inclusive pronouns</td>
<td>Addresses the group as we, us, our, group.</td>
</tr>
<tr>
<td></td>
<td>Phatics, salutations</td>
<td>Communication that serves a purely social function; greetings, closures.</td>
</tr>
</tbody>
</table>

Figure 4.1: The categories of Social Presence and their indicators after Rourke et al. [23]
The drawbacks of large lectures can be overcome to a certain degree by the usage of a digital backchannel: interaction can be increased and participation tends to be more balanced. The remaining problems like an impersonal atmosphere in the backchannel medium, the feeling of students to be one of many and insecurities among students about the quality of their contributions have been tried to be solved in this thesis. Backstage has been enriched with concepts that are supposed to increase social presence and social awareness, improving thereby the social climate within the medium, in order to make the student feel comfortable and increase participation quantity and quality. With the Activity Aggregator, a tool has been introduced that gives the students the chance of building a significant and meaningful context about their activities on Backstage. The comparison to a chosen set of followed students as well as the average values makes it possible for the user to assess her own behavior, potentially leading to an increase of contribution-quality on one hand and to an improved learning effect on the other. Following interesting users, favoriting distinct posts and the graphical summary of the aggregated activities shall facilitate a structured review of lecture sessions, possible to access 24 hours a day.

The awareness of the current involvement of other users can lead to a reflection of the user’s own involvement and create an increased awareness of the audience’s ability of contributing to the backchannel. The introduced concepts are only a first step into increasing social presence and social awareness among students. Further examination of the specific effectiveness of the tools is required in order to evaluate and eventually improve them.


Bibliography


