

# Communitition: The Tension between Competition and Collaboration in Community-Based Design Contests

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Following the concepts of crowdsourcing, co-creation or open innovation, companies are increasingly using contests to foster the generation of creative solutions. Currently, online idea and design contests are enjoying a resurgence through the usage of new information and communication technologies. These virtual platforms allow users both to competitively disclose their creative ideas to corporations and also to interact and collaborate with like-minded peers, communicating, discussing and sharing their insights and experiences, building social networks and establishing a sense of community. Little research has considered that contest communities both promote and benefit from simultaneous co-operation and competition and that both types of relationships need to be emphasized at the same time. In this article, it is argued that the firm-level concept of co-opetition might also be relevant for an innovation's success on the individual level within contest communities. Our concept of 'communitition' should include the elements of competitive participation without disabling the climate for co-operation, as numerous user discussions and comments improve the quality of submitted ideas and allow the future potential of an idea to shine through the so-called 'wisdom of the crowd'.

## Introduction

Forged by globalization and digitalization, it is now possible for billions of individuals scattered all over the planet, connected by the tenuous strands of the Internet, to actively participate in idea generation. This has caused a fundamental change in the innovation process. Following the concepts of crowdsourcing (Kozinets, Hemetsberger & Schau, 2008), co-creation (Winsor, 2005) and open innovation (Chesbrough, 2003), applications such as web-based toolkits (Thomke & von Hippel, 2002), virtual concept testing (Dahan & Hauser, 2002) and virtual worlds (Hemp, 2006; Kohler, Matzler & Füller, 2009) are used to enhance co-operation between users to benefit from collaborative innovation. Several studies show that network effects, reputational gains, the revealing of related innovations by others, the desire to give back to the community, or the hope of feedback from a knowledgeable audience are motives for consumers to

participate in joint innovation activities (Franke & Shah, 2003; Harhoff, Henkel & von Hippel, 2003; Füller, Jawecki & Mühlbacher, 2007).

On the other hand, the idea of using contests to reach a broad audience of people with various backgrounds, skills and expertise has a long tradition. For decades, design contests featuring competition between participants competing for the best idea have played a major role in the design of new buildings, technology inventions and breakthrough ideas – in other words, the foundation of novel services or the presentation of new design concepts within several kinds of branches and industries (Fullerton et al., 1999; Che & Gale, 2003). Currently, online idea and design contests are enjoying a resurgence through new information and communication technologies. In contrast to traditional contests, these virtual platforms allow users both to competitively disclose their creative ideas to the corporations and also to interact and collaborate with

like-minded peers, communicating, discussing and sharing their insights and experiences, building social networks and establishing a sense of community (Bullinger et al., 2010).

These patterns of co-operating and competing behaviour presented in online design contests resemble the concept of co-opetition between firms (Brandenburger & Nalebuff, 1996; Albert, 1999; Martinelli, Dussauge & Garrette, 2002; Walley, 2007), defined as a 'situation where competitors simultaneously co-operate and compete with each other' (Bengtson & Kock, 2003). This balance of the co-operative and competitive interactions between companies could also be identified by recently emerging studies of innovation-related co-opetition, with a focus on the level of the firm (Cassiman, Di Guardo & Valentini, 2009; Ritala & Hurmelinna-Laukkanen, 2009) or at unit level in multiunit organizations (Tsai, 2002). In this way, OSRAM – one of the world's leading light manufacturers – created an online idea contest in which its community members jointly developed new and consumer-oriented LED light solutions (OSRAM, 2009).

By observing communication paths and participation behaviour among users over time, we can discover that an important characteristic of virtual idea design contests is indeed co-opetition (Brandenburger & Nalebuff, 1996; Walley, 2007), or the balance between co-operative behaviour – by providing useful comments – and competitive behaviour – by trying to outperform others. Little research has studied elements of co-opetitive behaviour in design contests and the question of whether and – if so – how idea contests benefit from simultaneous co-operation and competition behaviour simultaneously.

By integrating these considerations with the concepts of idea contests, our study sheds light on the following research questions: (1) Are competitive as well as co-operative elements required for successful co-creation outcomes of online idea and design contests? (2) What types of user contributions can be identified and how do they support successful co-creation? (3) What roles, with different implications for the competitive and co-operative aspects of online idea and design contents, can be identified and how do they contribute to successful innovation outcomes?

The rest of the paper is structured as follows: we briefly review the evolution of idea tournaments and the relevant literature on open-source projects, online communities and virtual consumer integration to identify relevant behaviour patterns in innovation communities. Then, we present the design of our study and the results of our analysis.

Finally, we conclude with a discussion of theoretical as well as practical implications of our findings.

## Literature Review

### *Using Contests to Unlock the Potential of the Crowd*

Research tournaments and contests for ideas are reward structures in which compensation is based on relative rank. Participants compete with each other for rare prizes for their submitted ideas (Morgan & Wang, 2010). Such tournaments have played a major role in the economic growth of nations since the early stages of the Industrial Revolution (Fullerton et al., 1999). In 1714, the British Parliament, for example, offered a prize of £20,000 (with a value today of about £6m) for finding a reliable method of determining the longitude of a ship's location. The Longitude Prize was established not only to lead to the invention of a superior piece of equipment, but also to further fix the British Empire's dominion over the sea (for additional background information on the British Longitude Prize, see Sobel, 1996). More recently, research tournaments and contests have been organized to create a variety of new, innovative products, such as high-tech fighter aircraft for the military, digital televisions and the first manned space mission to Mars (Fullerton et al., 1999; for additional information, see Zubrin, 1996). These tournaments are proposed by innovative corporations, governments or non-profit organizations as a vehicle to spur innovations (Morgan & Wang, 2010).

In the past, organizations promoted their contests through the corresponding channels whereby they might reach experts. However, ever since the emergence of the Internet and the existence of novel information and communication technologies, contests have been run through virtual platforms. Companies invite interested users to engage with questions and problems regarding a certain topic or product range, to show their talent by uploading their creative content and to compete for prizes. On the one hand, these idea and design contests encourage competition between participants competing for the best idea and thus win the tournament. On the other hand, these virtual platforms allow users to both disclose their ideas to firms and also to offer community functionalities – the creation of a user profile, discussion boards, chat functionalities, voting systems. This, in turn, allows for the further discussion and sharing of insights with like-minded people, who vote

on which idea or design they like best, discuss various topics by leaving comments on other users' message boards, interact with other like-minded peers, build social networks, establish a sense of community, receive assistance from other community members and generally derive benefits through collaborative innovating activities.

These idea and design contests add a great deal of value to a company's innovation process and are evidence of the fact that people are indeed willing to share their ideas, submit their innovative solutions, give valuable feedback and provide insights for improvement. Thus, in these community-based design contests, the announced prize or the act of winning the tournament is no longer the only motive to induce the submission of ideas; instead, there are additional motivations and benefits that are crucial for successful co-creation.

### *Collaborative Innovation and Competition among Community Members*

The phenomenon of 'online innovation communities' – both users and manufacturers who produce ideas and inspirations for new product development – has become the subject of considerable interest in research and in practice (von Hippel, 2005; von Krogh & von Hippel, 2006; Schröder & Hölzle, 2010). Drawing on the rich body of research founded in related fields such as open-source projects (Hars & Ou, 2002; Hertel, Niedner & Herrmann, 2003; Lakhani & Wolf, 2005; Nov, 2007; David & Shapiro, 2008; Oreg & Nov, 2008; Schroer & Hertel, 2009), virtual communities of practice (McLure Wasko & Faraj, 2000, 2005; Ardichvili, Page & Wentling, 2003; Sharatt & Usoro, 2003; Daugherty et al., 2005; Ardichvili, 2008), and user innovation communities and virtual consumer integration (Hemetsberger, 2002; Franke & Shah, 2003; Füller, 2006), we are offered rich insights into the motives behind why community members participate in innovation communities and the benefits of revealing their knowledge, as well as into how and why they support each other.

Collaboration in communities is based on the participants' willingness to freely reveal their knowledge and expertise and openly work together (von Hippel & von Krogh, 2003). Free revealing means 'that all existing and potential intellectual property rights to that information are voluntarily given up by that innovator and all interested parties are given access to it – the information becomes public' (Harhoff, Henkel & von Hippel, 2003, p. 1753). Well-known community examples of free revealing and open collaboration can be

found in the context of open-source software development. Expert programmers at various levels, supporters and users are voluntarily contributing to a collaborative software project. They freely reveal the source code they have produced (von Hippel & von Krogh, 2003) in order to create and collectively improve software programs. Franke and Shah (2003) showed that members of sports communities also assist each other in developing their innovations. The free revealing of assistance, information and innovation was identified as behavioural patterns within the studied communities. However, the study also showed that the level of collaboration and mutual support drastically decreases when community members become rivals, are competing against each other, for example, in surf races, and are aiming to win a tournament and the corresponding prizes. While competition reduces collaboration, it also spurs community members' interest in innovation activities. Research in the context of basketball communities has shown that community members like to self-initiate idea and design competitions to stimulate their innovation activities (Füller, Jawecki & Mühlbacher, 2007). Community member like to engage in the self-stated tournaments, in which they can compare themselves to each other and compete for the best designs. Such contests trigger intense interactions, numerous contributions and countless loops of 'trial and error' experimentations that finally lead to superior innovations (Füller, Jawecki & Mühlbacher, 2007). Recently, it has been shown that community-based contests may show similar conditions (Bullinger et al., 2010). Participants of community-based contests may compete and collaborate with each other at the same time: they interact with each other and jointly discuss their innovations, but at the same time, are trying to contribute the best solution to outperform the other contributors.

The co-operating and competing behaviour present in community-based design contests may resemble the concept of co-opetition between firms (Brandenburger & Nalebuff, 1996; Albert, 1999; Martinelli, Dussauge & Garrette, 2002; Walley, 2007), defined as a 'situation where competitors simultaneously co-operate and compete with each other' (Bengtson & Kock, 2003). According to Zinel-din (2004), co-opetition 'is a relationship based on a value net of involved actors – suppliers, distributors, subcontractors, "complementors", competitors – who collectively add value to one another's organizations'. In particular, innovation activities are conducted in co-opetitive relationships in which global

competitors work together, building co-operative relationships to improve performance by collaborating and sharing resources, knowledge and information. On the other hand, they simultaneously compete as they work independently in other domains to increase their own performance (Luo, 2007). Advantages of co-opetition are greater knowledge development, technological progress (Lado, Boyd & Hanlon, 1997) and the acquisition of new skills (Hamel, 1991). Co-opetition allows firms to reduce risk, costs and uncertainties associated with new product development and innovation (Luo, 2007). However, co-opetitive relationships also bear some risks, such as a resource-demanding establishment of the relationship, hidden costs, dependencies, large investments of time and attention paid on co-ordination and control mechanisms (Zineldin, 2004).

Thus far, co-opetition research has been focused on the firm level (Cassiman, Di Guardo & Valentini, 2009; Ritala & Hurmelinna-Laukkanen, 2009; Faems, Janssens & Van Looy, 2010) or on the unit level in multiunit organizations (Tsai, 2002). Few insights exist into the co-opetitive behaviours of the individual in community-based contests. Like organizations, individual contest participants collaborate while simultaneously competing with each other to win the contest. However, unlike the players at the organizational level of these contest communities, users may collaborate and share their knowledge with other members, because they desire to socialize, to interact and form social relationships with others who share similar interests, and thereby establish a sense of community. To capture this intense form of collaboration, we introduce the term 'communitition' – community-based collaboration among competing contest participants – to refer to the phenomenon of co-opetition in contest communities.

This study aims to shed light on communitition behaviour in community-based idea and design contests. In order to explore communitition, we have developed the following propositions based on the literature:

1. *In contest communities, competitive as well as co-operative behavioural elements can be observed simultaneously.*
2. *Based on the adoption of either competitive, co-operative or co-opetitive behaviour, different user contributions associated with different user roles can be found in a contest community.*
3. *A combination of active competition to win with simultaneous collaboration yields the highest potential for successful innovation outcomes in online idea and design contests.*

## Data and Method

### *Community Selected for Study*

To answer these research questions, we conducted an explorative study (Glaser & Strauss, 1967; Eisenhardt, 1989) with data derived from the OSRAM LED design contest (see Figure 1). OSRAM, one of the top lighting manufacturers in the world, invited designers and creative consumers from all over the world to engage in an online idea and design contest to propose new, creative consumer-oriented LED light solutions. The contest was open to designers and engineers, as well as to all people with a general interest in LED technology, light solutions and related topics. The contest was conducted in two phases: in Phase I, creative ideas for new LED light solutions could be submitted by anybody. These were subsequently evaluated and discussed by the community itself. The evaluations conducted by the community served as a filter mechanism for a jury of experts to select the most interesting ideas for Phase II. These selected ideas could be further developed and improved by all community members through the submission of further design improvements and suggestions, applications or technical solutions.

In total, more than 952 participants joined the OSRAM LED contest to showcase their creativity, to submit their ideas or to provide feedback and knowledge. Participants posted 541 ideas in Phase I, which ran from 8 May to 23 July 2009. The jury determined the winners of Phase I and selected ten designs, which were further developed in Phase II, running from 23 July to 4 August 2009. In the community voting, members made more than 1,890 evaluations and contributed 3,285 qualitative and very detailed comments. These activities were also rewarded in Phases I and II. Each contribution to the community platform had a certain value, which was then calculated in the activity counter (see Appendix I). The interaction and exchange of possibilities enabled participants to build relationships among members and further establish a lively community.

### *Methods*

In our analysis, we used data from contributions to the OSRAM LED – *Emotionalize Your Light* contest in the form of submitted ideas and qualitative comments, through which members explored and built relationships, supported each other, provided feedback and challenged others. We combined structural and interpretive methods to enhance the trust-





Figure 1. OSRMA LED – Emotionalize Your Light Contest

Source: <http://www.led-emotionalize.com/>

worthiness and reliability of our data (Denzin & Lincoln, 1994). We applied (i) a qualitative content analysis as a first step to analyse the context of behaviour in the content community, (ii) complemented this analysis by identifying the structural positions in the contest community through the use of social network analysis (SNA), and (iii) linked the qualitative and quantitative analyses to verify, confirm and refine the findings of the previous steps.

#### *Content Analysis Based on Qualitative Comments*

An interpretative analysis was conducted based on evaluating the content of the qualitative, very detailed comments, which users posted regarding the uploaded designs of others. This approach allowed the researchers to identify and understand members' behaviour, their social roles and the meaning of interactions in the context in which they took place and developed. We used Atlas.ti, a

computer-assisted qualitative data analysis software for content analysis of text data, which allowed us to administer, browse, code, mark, complete and categorize data (Lewins & Silver, 2006).

#### *Social Network Analysis Based on Log-File-Data*

Through SNA, complex social phenomena such as groups of interacting individuals, community structure and evolution, and the importance of network members and their contributions in the network are not limited to the investigation via qualitative tools but rather can be explored quantitatively (Granovetter, 1973). SNA provides new insights into interaction patterns and members' roles and contributions in online innovation communities, while revealing the importance of members and their types of contributions that may otherwise be misidentified (Nolker & Zhou, 2005; Panzarasa, Opsahl & Carley, 2009). In our structural analysis, we viewed

the OSRAM LED contest community as a social network connected by member-member relationships. Computer-mediated social interaction and communication create digital records of relationships between the content creator and others, while they view, reply, annotate, comment, rate and link to one another's content (Smith et al., 2009). We were able to go back to the server database that logged any activity on the community website in order to obtain this digitally created network data.

This integrative reliance on structural data and the detailed qualitative analysis of the content and meaning of interactions allowed for a more holistic and productive approach to refine the understanding of social roles and users' behaviour (Gleave et al., 2009) than following only one of these methods.

## Results

### *Qualitative Study – Content Analysis*

In order to establish the context and content of the relations and behaviour in the OSRAM LED contest community, we analysed 3,285 qualitative, very detailed comments – of 33 words on average – corresponding to the uploaded designs. Two people on the research team individually coded content data based on established content categories (Maxwell, 2008). Users' qualitative contributions were categorized into the following six different types of contributions: 'sharing experience', 'asking questions', 'offering suggestions', 'evaluating ideas', 'criticizing ideas' and 'defending ideas' (see, e.g., Hemetsberger & Reinhardt, 2006; Burnett & Illingworth, 2008). We were also open to upcoming concepts to develop content categories inductively (Glaser & Strauss, 1967), such as 'accepting feedback', 'comment on contest' and 'comparison with other designs'. We analysed each category as being more competitive, more co-operative or both. In order to ensure inter-rater reliability and to reduce individual coding biases, the meanings of the categories were continuously negotiated and checked with the primary texts, and synonyms were merged. All in all, we discovered 25 different categories in regard to the nature of the contestants' behaviour (see Appendix II for a detailed description and examples for each category). Behaviour was either only co-operative or had both a co-operative and competitive nature simultaneously. In the OSRAM LED contest community, commenting was the main tool for participants to collaborate with other community members based on participants' willingness to freely reveal their knowledge and

expertise and to openly work together (von Hippel & von Krogh, 2003). Hence, comments were not purely competitive in nature. However, if people do not comment on the ideas of others, they do not seem to be willing to collaborate, as no knowledge is revealed or transferred. In total, 129 community members engaged in the competitive behaviour of submitting ideas to the contest without engaging in commenting at all.

As most comments consisted of more than one sentence or thought, they were coded simultaneously into several categories. Also, one category could show both competitive and co-operative features depending on the respective content and were therefore separately analysed. In total, 357 comments showed competitive activities, 1,833 comments represented co-operative behaviour, and 848 comments had features of competitive and co-operative actions. At the end, 247 codes could not be categorized because they were not related to any contest-related activity.

The findings of this content analysis imply that although participation in a contest intuitively is aimed at winning rare awards, most individual behaviour in the contest community actually engages in co-operation, thus establishing a collaborative overall context (see Figure 2).

Figure 3 shows how the different types of behaviour are distributed across the time dimension and compares Phases I and II. It can be seen that the distribution across the three types of behavioural patterns does not differ during the two phases. At all points in time, the community is characterized by a very co-operative atmosphere, which also expresses some competitive features as well. Thus, competitive and co-operative behaviour could be found in all phases of the contest.

Based on this interpretative analysis, we conclude that the nature of the contest community is of a co-competitive configuration. However, we still need to complement this investigation with a structural approach, using SNA in order to examine the macro social structure in which these behavioural patterns exist (Nadel, 1957).

### *Quantitative Study – Social Network Analysis*

Our network dataset covered the two different phases of the design contest, where each phase was considered and analysed separately. All users who contributed during Phase I and Phase II to the interactions of the network by either sending or receiving one comment were included in our structural analysis. Users who

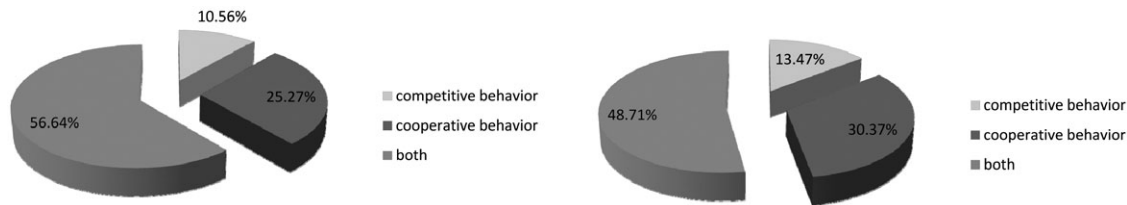


Figure 2. Behaviour of Users across Category Types

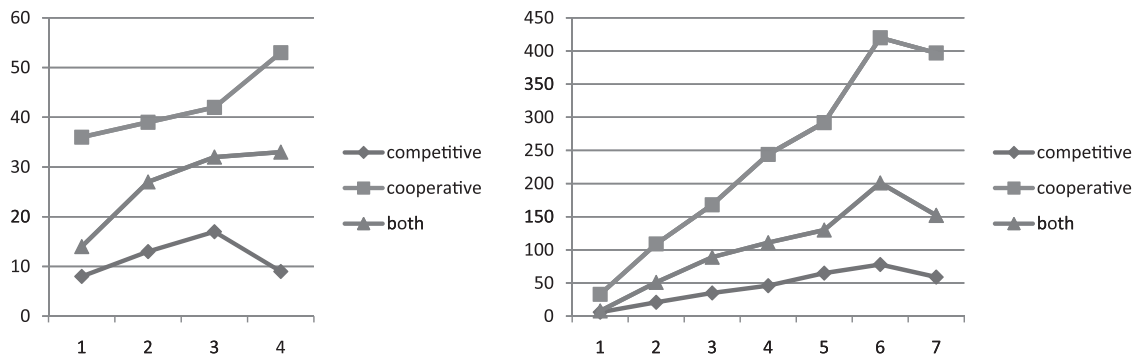


Figure 3. Number of Comments during Contest during Phase I and Phase II

simply registered in the design contest, but did not participate in the interaction, were not included. A relationship between two users in the network was established when one user commented on the designs of another participant. In defining the network, we further adopted a weak notion of social relationship (Granovetter, 1973) with directional ties, whereas the direction of a relationship indicates who commented and who received the comment. In this context, a directed tie is established between two users if one user writes a single comment for another user, even if no answer to this initial contact occurs. During the observation period of Phase I, a total of 320 users was recorded, who engaged in a total of 3,014 comments, while 271 comments were written by 49 users in Phase II.

In order to identify competitive versus co-operative structural positions in our contest community, the top 5 per cent of contributors among all network members during Phases I and II were identified (Dwyer, 2007; Dawson, 2010). This top 5 per cent provided a high number of one of the two ways to contribute to the contest, including ideas and comments. Table 1 lists the 26 identified top contributors in the network during Phase I. Users who are not included in these top contributors automatically constitute passive users, numbering 862 in the total contest community. Among these top contributors, competitive, co-operative or a combination of both structural positions

can be identified by applying well-established relation-based social network constructs of in-degree and out-degree centrality (Freeman, 1979; Zemljic & Hlebec, 2005). Those metrics are predictors of the importance of an individual's position and his or her contributions to a network (Freeman, 1979; Kratzer & Lettl, 2008; Panzarasa, Opsahl & Carley, 2009).

*Out-degree centrality* captures the number of outgoing relationships of a node. Hence, it measures the number of direct comments that a user writes concerning the ideas of others or direct replies to other comments. In the case of the contest community, it can be used to measure the level of how actively a user participates in communication with other community members. As the interpretative analysis has shown that most of the comments are co-operative in nature, a high out-degree of a user indicates that he/she is most likely engaging in a high level of co-operative activities.

*In-degree centrality* captures the number of incoming interactions of a user and is often used to define the popularity of a user (Panzarasa, Opsahl & Carley, 2009). However, it has to be considered that the comments a user receives are directed towards the particular designs he/she has submitted. Therefore, we apply in-degree to measure the potential of a user's ideas to generate a high level of attention (Hautz et al., 2010). Thus, the number of comments a user receives can be seen as an indication of the potential of his/her idea to

Table 1. Different Structural User Roles in the Network

**PHASE I**

User ID	Idea count	In-Dgree	Out-Degree	Nature of structural position
712	high	high	high	competitive
261				competitive
653				competitive
526				competitive
620	high	high	high	competitive
31			high	competitive
407			high	competitive
163			high	competitive
269			high	competitive
397			high	competitive
233			high	competitive
686			high	competitive
210			high	competitive
61			high	competitive
389			high	competitive
321				competitive
130				competitive
393				competitive
195				competitive
112				both
197				both
201				both
193				both
467				both
173				both
505				both

**PHASE II**

User ID	Idea count	In-Dgree	Out-Degree	Nature of structural position
31	high	high	high	competitive
459			high	competitive
261				competitive
112				both
197			high	both

☒ winner of phase II    ☐ selected for phase I

capture attention and arouse curiosity. By applying an in-degree centrality, users who do not engage in writing or answering comments themselves, but only receive comments without further engaging in communication, can be captured in the network.

As underscored by Hautz et al. (2010), the *number of submitted ideas* is also an important factor. In the case of an innovation community

with the goal to generate new breakthrough ideas and innovations, the user-level analysis should focus not only on the interaction behaviour of the participating users but also on the user-generated content. As users can contribute through their comments as well as through their submitted designs, the number of designs uploaded by a single user is used to capture his/her idea-generating ability. It can



be assumed that people are submitting a higher number of designs in order to increase their chances of winning the contest or to showcase their talent in a much broader, more comprehensive way (Fullerton et al., 1999; Morgan & Wang, 2010).

### *Structural Positions*

Studies have shown that if people are not willing to share their knowledge and freely reveal innovation-related information, then rivalry is usually very high (Franke & Shah, 2003). Hence, a non-co-operative behaviour implies a high level of rivalry and competing conditions. Participants are therefore labelled as having a *competitive network position* if they do not engage in the writing of comments, even if they have submitted a very large number of ideas (which increases their chances of winning the competition). Members occupy a competitive position as well if they do not write comments on their own but have submitted a few but very attractive ideas that receive a large number of comments and feedback from others. Those users actively engage in the competition with the clear aim of winning the contest, but they simultaneously avoid participating actively in network interaction through revealing knowledge, giving feedback or evaluating the designs of others. Those users who do not participate in collaboration with other network members disregard this important opportunity to add to the community.

Users with *co-operative network positions*, on the other hand, are characterized by their active engagement in commenting on other designs and are therefore also highly involved in conversations and discussions sharing their experiences, thereby providing a great deal of quality feedback. These users often do not even submit a single design in the contest, which reflects their lack of interest in winning the design contest. These users facilitate the information transfer and knowledge sharing processes while collaborating in the online community; therefore, they represent a very collaborative structural position in the network.

Finally, among the top contributors, there are those who combine *competitive as well as co-operative network features*, as seen in a large number of submitted ideas combined with a large number of outgoing as well as incoming comments. The large number of outgoing interactions of these users shows active engagement in social interactions, communication and discussions, and thus the facilitation of the transfer of information, knowledge sharing and collaboration processes. In addition,

these users are also rank high on in-degree centrality, indicating that they also receive a large number of comments. It can therefore be assumed that their designs have the potential to arouse a great deal of the attention in the contest community. Further, the large numbers of incoming comments also provide a lot of feedback, knowledge and suggestions, and allow these users to benefit from the opportunity to collaborate in the creative process in order to enhance and perfect their individual ideas through online and in-contest collaboration. This high volume of comments generated by the community also allows the emerging wisdom of the crowd to assess the future potential of a design and the alleged buzz and acceptance it can generate among customers (Kozinets, Hemetsberger & Schau, 2008). Finally, all of these users have submitted a large number of ideas, increasing their chances of winning the contest. Hence, these particular users *engage in both competitive as well as collaborating activities*.

As Phase II of the contest was much shorter than Phase I and required a further development of selected ideas rather than the submission of new designs, only six users provided the majority of contributions. Figure 4 shows the network of interactions between users during Phase II. The three nodes in the shape of a sphere represent the three winners of this phase.

User 31 engaged in a high number of comment contributions, even though he/she did not present one single idea during Phase II, thereby clearly engaging in collaborative actions. User 459, who was not among the top contributors in Phase I, showed a competitive structural position by submitting many ideas, thus increasing his/her chances of winning. This user might have been more interested in further developing and improving existing ideas and providing suggestions, like those required in Phase II, instead of developing a new design from scratch in Phase I. User 261 extended his/her very competitive position from Phase I to the second phase and continued to submit many ideas without giving a single comment himself/herself. As in Phase I, the two users 197 and 112 retained their positions by providing both the highest number of ideas as well as the highest number of comments simultaneously.

### *Linking SNA and Content Analysis*

As a next step for each top contributor, we brought together and combined the structural positions identified by the SNA – user-level indices and their idea-generating



Table 2. Linking Social Network Analysis and Qualitative Analysis

**PHASE I**

User ID	Nature of structural position	Nature of comments	User type
712	competitive	no	<i>competitor</i>
261	competitive	no	<i>competitor</i>
653	competitive	co-operative	<i>communititor</i>
526	competitive	both	<i>competitor</i>
620	co-operative	co-operative	<i>co-operator</i>
31	co-operative	co-operative	<i>co-operator</i>
407	co-operative	both	<i>co-operator</i>
163	co-operative	both	<i>co-operator</i>
269	co-operative	co-operative	<i>co-operator</i>
397	co-operative	both	<i>co-operator</i>
233	co-operative	both	<i>co-operator</i>
686	co-operative	co-operative	<i>co-operator</i>
210	co-operative	both	<i>co-operator</i>
61	co-operative	co-operative	<i>co-operator</i>
389	competitive	co-operative	<i>communititor</i>
321	competitive	co-operative	<i>communititor</i>
130	competitive	co-operative	<i>communititor</i>
393	competitive	co-operative	<i>communititor</i>
195	competitive	both	<i>competitor</i>
112	both	both	<i>communititor</i>
197	both	both	<i>communititor</i>
201	both	both	<i>communititor</i>
193	both	both	<i>communititor</i>
467	both	co-operative	<i>communititor</i>
173	both	both	<i>communititor</i>
505	both	both	<i>communititor</i>

**PHASE II**

User ID	Nature of structural position	Nature of comments	User type
31	co-operative	both	<i>co-operator</i>
459	competitive	both	<i>competitor</i>
261	competitive	competitive	<i>competitor</i>
112	both	both	<i>communititor</i>
197	both	both	<i>communititor</i>

■ winner of phase II    □ selected for phase I

which are the key prerequisites for further improvements and collaborative innovation. The findings of the SNA regarding the co-operative network positions were confirmed by the content analysis on the individual level. The context of the provided comments is found to be mostly co-operative, comprising positive evaluations of ideas, encouragement, suggestions for further

improvements, or sharing of experience, thereby providing a large amount of quality feedback and the option to further develop ideas.

*Communititors* engage in competitive as well as co-operative behaviour with the same individuals at the same time. Content analysis supported the co-operative structural position identified by the SNA and further identified

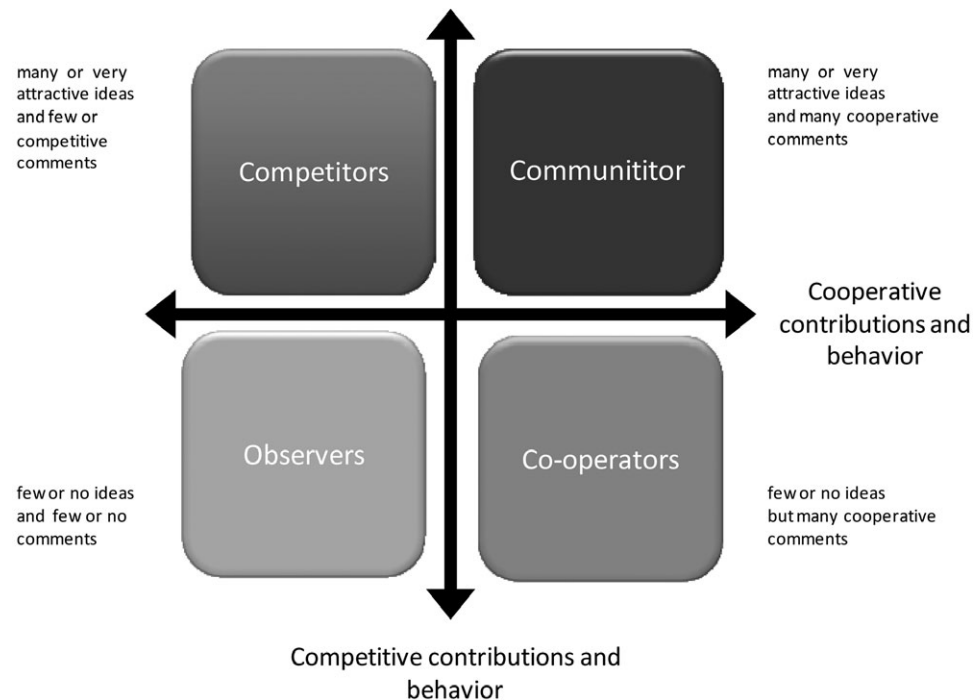


Figure 5. Different User Types Identified in the Community

users with competitive structural positions as engaging actively in collaboration through comments of a co-operative nature. Hence, communitors either have a competitive structural position or combine the structural features of co-operators and competitors. Communitors show competitive behaviour by submitting a large number of ideas or a few very attractive ideas, thereby directly and actively competing with all the other users in the contest. Their large number of designs or their potential to attract attention reflects the intention of communitors to purposely participate in the competition and to increase their chances of winning the contest and thus the offered prizes and incentives (Morgan & Wang, 2010). At the same time, they support the community through their active engagement by providing a large number of comments or several very co-operative comments. Therefore, communitors are characterized by a high out-degree centrality, with comments mostly including content co-operative in nature, with the intention to help and support each other and to contribute to improvements and further developments of the ideas of other contest members.

Finally, *observers* sign up and browse designs and discussions for different reasons (Preece, Nonnecke & Andrews, 2004) but neither submit many designs nor contribute with a large number of comments. However, observers are also needed as they contribute to the

community's critical mass, or the number of people needed to make an online community viable, to attract others and to hold the interest of existing members (Preece, 2000). In addition, observers can use the online innovation community to virtually learn, to get inspired and excited in advance about potential products, and to spread the word about them (Brown, Broderick & Lee, 2007). However, if little or no content is provided, a large number of silent observers can become a problem because so much is happening on the Internet that people do not return to quiet communities (Preece, Nonnecke & Andrews, 2004).

#### *What Kinds of Behaviour and Roles Pay Off?*

After identifying simultaneous co-operation and competition in the contest community, how these aspects may contribute to successful innovation outcomes is analysed and whether a certain kind of behaviour or structural position might ultimately be associated with high-quality outcomes or even winning the contest. Therefore, as a first step we analysed the winners in detail. The three activity awards and two of the three design awards did not go to competitive users who only cared about winning, but rather to communitors. Two of those communitors, 112 and 197, won the activity awards as well as the design contest itself. Both users occupied a



co-opetitive structural role during Phase I and retained these positions in Phase II. They actively commented on other designs, although they aimed at winning the contest and the activity award with 29 and 18 submitted ideas and 906 and 582 comments, respectively. The great number of comments both increased their activity points and also included many very valuable suggestions to other users as well as constructive questions about their designs, which allowed other users to improve and further develop their own designs.

Content analysis further provided support for the assumption that the large number of submitted comments was not rooted in the intention to win the activity award. Co-operators as well as communititors predominantly posted longer and more meaningful comments than 'I like it' or 'Cool'. As assumed, they really engaged in co-operative behaviour through their comments and suggestions to other users, they asked constructive questions about their designs, they challenged and positively evaluated ideas, and they shared their knowledge and experience. Despite their winning intentions, these users actively collaborated with others.

In addition, these users not only sent a lot of comments, they also received a large number of comments, arousing a very high level of the attention in the contest community. This reciprocal engagement in social interactions, communication and discussions facilitates the transfer of information and knowledge sharing and allows collaboration processes to emerge within the network. Although these findings imply that at least in the case of these two users the combination of competitive as well as co-operative behaviour provided beneficial conditions to support the creation of a high-quality, breakthrough idea that wins the contest, it has to be kept in mind that other important factors could have affected this outcome. Obviously, those two people were very active and invested a lot of effort and time in their participation in the contest, which could have positively influenced their chances of winning.

Therefore, we went beyond the winners of the contest determined through jury evaluation and extended our analysis to the top 30 designs, based on the community evaluation in Phase I of the contest. Surprisingly at first glance, many passive users can be found among the top 30. However, as compared to the relative number of user types in the community, passive users show a low probability of being found among the top 30. This is particularly true for communititors, who submitted a large proportion of the top 30

ideas based on their relative number in the contest community. Also a large proportion of competitors seemed to be able to submit ideas that were very highly ranked; however, their low number in the community has to be considered.

However, these preliminary results highlight that further research is needed to analyse the impact of the communititive strategy on an individual's innovation success. In this context, communitition and its innovation outcomes have to be further examined in additional contests in different settings in order to exclude the possibility that these findings are based on mere coincidence.

## Discussion and Implications

Contests aimed at fostering innovation and new ideas have always played an important role in the economic and business environment (Fullerton et al., 1999). Contests have taken place wherever experts are found, so it comes as no surprise that contests have moved onto the Internet, thereby leading to the phenomenon of 'online innovation communities' (von Hippel, 2005; von Krogh & von Hippel, 2006) and online idea design contests. Such online contests provide rare prizes for winners and offer community functionalities, such as user profiles, discussion boards, chat functionalities and voting systems, thus offering a competitive and collaborative environment at the same time.

Exploring the OSRAM LED design contest, our findings demonstrate that different behaviours ranging from competitive to collaborative can be found. Our findings also show that collaborative and competitive behaviour was stable over time. Overall, users showed rather collaborative commenting behaviour with most comments falling into categories such as 'asking questions', 'positive evaluating ideas' and 'sharing experience/information'. The extensive list of different behavioural patterns complements the findings of existing research (see, e.g., Hemetsberger & Reinhardt, 2006; Burnett & Illingworth, 2008). None of the 25 discovered categories of behaviour fall solely into competitive activities. Hence in the OSRAM LED contest community, commenting itself was used as a tool to reveal and share knowledge and information. Not engaging in this form of collaboration by not submitting a single comment may therefore be interpreted as competitive action.

Further, our research confirmed that users in contest communities differ in their structural positions in the network based on their level of activity and the relevance of interac-

tions (Nolker & Zhou, 2005; Zemljic & Hlebec, 2005; Lettl, Herstatt & Gemuenden, 2006; Hinds & Lee, 2008; Panzarasa, Opsahl & Carley, 2009). We complemented these findings by taking the qualitative nature of the comments into consideration. Four user types were identified: (1) competitors, mainly interested in showcasing their talent and winning the contest; (2) collaborators, characterized by active engagement in commenting, suggesting improvements and providing quality feedback; (3) communitors, combining the features of the former two by providing valuable feedback as well as promising breakthrough designs; and (4) observers, browsing the contest out of curiosity, without submitting designs or providing feedback.

These structural and behavioural patterns were found to indeed resemble the co-opetition phenomenon observed between companies. Therefore, in this study, we could show that co-opetitive behaviour takes place not only at the firm level (Cassiman, Di Guardo & Valentini, 2009; Ritala & Hurmelinna-Laukkanen, 2009) or at the unit level in multiunit organizations (Tsai, 2002), but also at the individual level. As these co-opetitive activities have been discovered in an online community, we introduce the concept of 'communitition' to the literature. Our concept of communitition includes elements of competitive behaviour without disabling the climate of community-based collaboration, as the numerous user discussions and comments within the contest community improve the quality of submitted ideas and allow the future potential of the idea to shine through so-called 'wisdom of the crowd' (Howe, 2008).

The implications of our research are manifold: in our paper we showed how qualitative and quantitative analysis could be combined to provide a data basis primed for conclusions. Moreover, our results revealed a community behaviour we termed 'communitition' (in resemblance to co-opetition). Finally, not only could we identify the phenomenon of communitition in the context of an online idea and design contest, but we were further able to show that ideas submitted by communitors – users combining co-operative as well as competitive features – show a higher probability of being highly ranked by community evaluation and winning. These findings indicate that engaging in competitive behaviour aimed at winning the contest while simultaneously participating in community collaboration may positively correlate with the quality of the submitted designs. Hence, our study shows that participants' innovative, high-quality contributions may be explained both by their competi-

tive intention to win the contest and also by building on the concepts of social network theory. Our findings add to the body of literature that has found an individual's structural position to determine the flow and the quantity of information that influence its outcomes, including innovative outcomes and characteristics such as innovativeness or lead useriness (Granovetter, 2005; Kratzer & Lettl, 2009; Bullinger et al., 2010). Further research is needed to deepen the preliminary understanding of individual communitition as related to the quality of contributions.

Our findings have very important practical implications for companies. In the future, more and more companies may consider using design and idea contests like the one presented in our study to enrich their development and innovation activities. Based on our results, companies should devise and align their actions with an appropriate management of online innovation communities, community rules and norms. First, it is important to provide community functionality that allows members to collaborate through communication and interaction. Such functionalities enable the contest community to go beyond the limits of a contest in which users simply submit their ideas. Co-operators and communitors need to be enabled through appropriate means, as their reciprocal engagement in social interactions, communication and discussions facilitate a transfer of information and knowledge sharing, which, in turn, foster collaborative processes within the network (Füller, Jawecki & Mühlbacher, 2007). The results of our study also prove the need for appropriate rewards and encouragement for users who are actively contributing to supporting the needs and health of the community. Both users who compete via a large number of ideas and also users who show a high level of collaborative engagement via their comments and votes need to be encouraged through different incentives and tasks. Communitors in particular need to be attracted, as these users embody the necessary combination of competitive as well as co-operative behaviour to support the creation of high-quality, new ideas, which are ultimately the goal of idea and design contests. Furthermore, highlighting communitors as promising contest participants might help companies to uncover the most promising designs out of the huge number of submitted ideas while reducing the risk of eliminating potential winners. Hence, the identification of the communitors in the community network can help to preselect ideas that have a high probability of meeting experts' criteria.

However, to be able to extend the concept of communitition and its implied strategies beyond the context of the OSRAM LED design contest, future research on competitive and co-operative elements is needed. Future studies should comprise contest communities with various goals, tasks and backgrounds of participants in order to be able to gain a deeper and more comprehensive understanding of the relevance and value of communitition.

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## Appendix I

Activity	Contest phase	Value
Phase 1: contribution of one idea	1	20
Phase 2: contribution of one design	2	10
Phase 2: contribution of one technical solution	2	10
Detailed evaluation of one idea	1 and 2	5
Upload of profile picture (once)	1 and 2	5
Providing an idea with one comment	1 and 2	3
Leaving a message to another member	1 and 2	3
Intuitive evaluation of one idea	1 and 2	2

## Appendix II

### *Comment Categories and Their Description*

Category of comment	Description	Behaviour	Example	No. of comments
<b>Accepting feedback</b>	Accepting feedback could be identified if users were posting on their own design and the content was an answer to a question, a critique or an improvement suggestion showing that they agreed with the commenter.	Co-operative	'it exist a remote ... so you can change the colour to ... lime-green or warm-white or UV ... these colours are not so bright you can mix. Yes, a sensor is a good idea :-)' (comment #381)	56
<b>Agreeing</b>	Agreeing is having the same opinion as other users, who have previously commented on a certain design.	Co-operative	'wow, I'd love to have this; this is great stuff for parties! :-)' (comment #3)	307
<b>Apologizing</b>	Apologizing can refer to expressing regrets that users have to criticize others' designs (which still is competitive) or that they were not able to understand the design/comment	Co-operative or competitive or both	'It is really a good idea – but sorry to say – I got a design honour mention prize with the same idea in 2005 ...' (comment #1431) 'Sorry, I am still not sure what this is but I would like to know more!' (comment #852)	22
<b>Asking questions</b>	Asking questions includes the need to receive more information because of a poor description or the lack of differentiating features to existing designs (i.e., competitive), showing a real interest in getting further details, needing help and offering suggestions (co-operative).	Co-operative or competitive or both	'Can you explain further what would make this different than other things that are like this on the market already?' (comment #1295) 'Poor description, I don't understand well your idea' (comment #3012) 'Very well thought – do you also have a design for it so we can imagine better?' (comment #3036) '... Maybe they have a special shaker at the paint store and it only is guaranteed if you paint with it within 24–48 hours?' (comment #453) 'Since I had the same idea I made a research recently and this kind of lamp is already available: ...' (comment #2584) 'this looks better than sicker with bulb' (comment #1499) 'It would be interesting to develop it further to see if you could get the patterns to change the same way Rorschach's mask did in The Watchmen ...' (comment #2293)	457
<b>Comparison with other designs</b>	Comparing designs with other designs can be competitive, if the user wants to criticize the newness of an idea, but can also be co-operative if users compare a design with another excellent design or offer suggestions by giving inspiration.	Co-operative or competitive or both	'I am not sure I understand either.' (comment #3013) '... Can you explain what you see in this idea? I am not sure if it is a language barrier or not, we would like to know more about it Thanks.' (comment #854) 'Great work and very cool design – there are some ideas heading this direction yet yours is unique in many ways! Congrats – also to your other work – wow!' (comment #3034) 'I don't really get this idea ... where are the LED-lights?' (comment #169) 'I like the idea a lot, but I think the color of those lights in the main image should be brighter, maybe a cyan?' (comment #74) 'I agree that the positioning is not the best, but the idea is the point not the placement ...' (comment #1926) '... Yes, I was thinking that the ball, or outer form would be a seamless molded shell either soft or semi ridged so once it was put together, it didn't come apart ...' (comment #982)	169
<b>Confessing problem</b>	Confessing a problem is used if an idea is criticized (i.e., competitive) or if users want to show suggestions for further improvements (i.e., co-operative).	Co-operative or competitive or both	'I am not sure I understand either.' (comment #3013) '... Can you explain what you see in this idea? I am not sure if it is a language barrier or not, we would like to know more about it Thanks.' (comment #854) 'Great work and very cool design – there are some ideas heading this direction yet yours is unique in many ways! Congrats – also to your other work – wow!' (comment #3034) 'I don't really get this idea ... where are the LED-lights?' (comment #169) 'I like the idea a lot, but I think the color of those lights in the main image should be brighter, maybe a cyan?' (comment #74) 'I agree that the positioning is not the best, but the idea is the point not the placement ...' (comment #1926) '... Yes, I was thinking that the ball, or outer form would be a seamless molded shell either soft or semi ridged so once it was put together, it didn't come apart ...' (comment #982)	75
<b>Congratulation</b>	Congratulations are a very positive evaluation of ideas.	Co-operative	'Great work and very cool design – there are some ideas heading this direction yet yours is unique in many ways! Congrats – also to your other work – wow!' (comment #3034) 'I don't really get this idea ... where are the LED-lights?' (comment #169) 'I like the idea a lot, but I think the color of those lights in the main image should be brighter, maybe a cyan?' (comment #74) 'I agree that the positioning is not the best, but the idea is the point not the placement ...' (comment #1926) '... Yes, I was thinking that the ball, or outer form would be a seamless molded shell either soft or semi ridged so once it was put together, it didn't come apart ...' (comment #982)	80
<b>Criticizing ideas</b>	Criticizing ideas can be competitive if the idea is just negatively evaluated, but can also be co-operative if further suggestions for improvement are included.	Co-operative or competitive or both	'Great work and very cool design – there are some ideas heading this direction yet yours is unique in many ways! Congrats – also to your other work – wow!' (comment #3034) 'I don't really get this idea ... where are the LED-lights?' (comment #169) 'I like the idea a lot, but I think the color of those lights in the main image should be brighter, maybe a cyan?' (comment #74) 'I agree that the positioning is not the best, but the idea is the point not the placement ...' (comment #1926) '... Yes, I was thinking that the ball, or outer form would be a seamless molded shell either soft or semi ridged so once it was put together, it didn't come apart ...' (comment #982)	86
<b>Defending comment/idea</b>	Defending an idea or comment is competitive in nature because feedback is not accepted; however, sometimes clarifications are given so defending the idea shows that feedback was accepted and applied to the new design.	Co-operative or competitive or both	'Great work and very cool design – there are some ideas heading this direction yet yours is unique in many ways! Congrats – also to your other work – wow!' (comment #3034) 'I don't really get this idea ... where are the LED-lights?' (comment #169) 'I like the idea a lot, but I think the color of those lights in the main image should be brighter, maybe a cyan?' (comment #74) 'I agree that the positioning is not the best, but the idea is the point not the placement ...' (comment #1926) '... Yes, I was thinking that the ball, or outer form would be a seamless molded shell either soft or semi ridged so once it was put together, it didn't come apart ...' (comment #982)	59
<b>Demanding feedback</b>	Demanding feedback includes questions of designers to specified users or the community as a whole to give their opinion about the design.	Co-operative	'Could you please comment my idea?! What do you think?' (comment #193)	18

Encouraging	Users encourage other users to go on working on their design.	Co-operative	'I love it more than the work of Helen Evans and Heiko Hansen (modular light system) and other light graffiti artists. . . . People overvalue the originality! You will win my friend, continue this way!' (comment #759)	33
Expressing needs	Expressing needs include the real-life desires that users have concerning lights. These comments either focus on wanting to have the provided design (i.e., design is good as it is) or is accompanied by suggestions for improvements.	Co-operative	'Wow I would really like to have such thing in my house:' (comment #6)	191
Giving details about design joking	Mostly, giving details about a design is attached to a co-operative question or a critique showing that feedback is accepted. Joking is not very helpful in advancing ideas, but nevertheless they create a good atmosphere which facilitates collaboration.	Co-operative	'Nice idea . . . now I wish someone would design something to hold my book that would allow me to turn the pages, stick \'mark\' on and I'm sold.' (comment #1560)	400
Offering suggestions	Offering suggestions comprise hints where their design might be used or who the target group could be, which material could be used, which colours might look better, etc.	Co-operative	'Just a quick note, I did take your advice and post an idea based on light around the screen, called Screen Light . . . ' (comment #1576)	248
		Co-operative	'Yes, we can know when to stop making noise in a party before the police come. :)' (comment #3248)	1178
		Co-operative	'Yes of course. I wasn't implying that it was identical or anything, just the same. I think it would be great to be able to go into home depot and buy rolls of this stuff the same as wallpaper and be able to download your pattern as you saw fit. It would be great for theme parties, or Halloween or Winter Holidays, or that Toga party you throw every year. Just point, click and by the Power of Greyskull your wall changes.' (comment #691)	
		Co-operative	'Use this in a bar to send anonymous messages for example to the cute brunette in the corner booth.' (comment #2378)	
Outside link	Giving a link to web pages always appears with a question, a suggestion or the wish to share information. So, it depends on the context if it is co-operative or competitive.	Co-operative or competitive or both	'Nice idea – though it's unfortunately too similar to the ideas at <a href="http://www.ambientdevices.com/">http://www.ambientdevices.com/</a> ' (comment #43)	113
		Co-operative or competitive or both	'Nice idea . . . cool stuff . . . I saw something like at Philips . . . it is called Lumalive but I believe is really expensive and a top of the edge technology because you can only rent it from them. I believe that this material has a lot of potential maybe you could make it more affordable. <a href="http://www.lumalive.com/">http://www.lumalive.com/</a> ' (comment #732)	1211
Positive evaluating ideas	Positive evaluating ideas can be co-operative or competitive. Competitiveness is shown if positive statements do not give further information and is merely focused on collecting activity points to win the activity award. Co-operation is shown if suggestions or questions are related to this.	Co-operative or competitive or both	'I like the idea, I'd prefer different shapes though. Could you provide examples?' (comment #338)	
Sharing experience/information	Sharing experience can either imply that someone wants to show off or really wants to help others.	Co-operative or competitive or both	'They don't even have to be that close together. I use a set up like that on my rain barrel. I have a 250 gallon barrel collecting water from my roof with a standard tap connected to a 12v pump. When the water reaches the top 6 inches, two metal prongs close a circuit and start the pump which waters the garden through a seeper hose . . . ' (comment #1144)	745
Thanking	Thanking is a reaction to support and feedback.	Co-operative	'Thanks, I was kinda worried about the conveyance of the idea. I'm glad that it portrays the idea well.' (comment #289)	293