

Anticipatory Social Media for Technical Communication

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Abstract

Attractive quality is an emergent and increasingly important property of all the technical products, devices, and services we are using in our daily lives. Timely and relevant technical information disseminated through an effective technical communication system is a crucial important component in building such quality. Parallel to that development, so called social media have lately become an integrated part of many peoples' e-lives. A relatively new phenomenon is that social media are also applied for technical communication. It is concluded that business firms that are successful in mastering social media for technical communication may gain considerable competitive advantages. An anticipatory approach will help in reaching that goal.

Keywords: Attractive Quality, Social Media, Technical Communication, Virtual Communities, Anticipation.

1 Introduction

Our everyday life is in an accelerating pace filled with an increasing number of technical products and artefacts, may it be cell phones, dishing machines, or cars. A beneficial and purposive utilisation of all those devices, however, is dependent on the availability of timely and correct technical information (TI). The purposeful and growing activity system producing that information we will here call Technical Communication (TC).

Further, Quality Management (QM) becomes an increasingly important issue in building competitive advantage for a business firm and to attract customers to its products and services. So far, however, technical information has not been identified as a tool to be used in QM.

Social Media (SM), at last, is currently another emerging and highly focused information technology (IT) branch. It's possible couplings to TC and its anticipatory and quality building power in such applications, however, has so far mainly been overseen both by research and practice.

Hence, the purpose of this article is to clarify the anticipatory quality potential of social media for applications in technical communication.

2 Active Quality

The objective of implementing different quality management (QM) initiatives in a business process is to create competitive advantages by increasing competitiveness and profitability (Lilja, 2010). Here Attractive Quality (AQ) as a relatively recent development step within QM recognises that quality ultimately is something that exists or emerges in the customer's mind. Differentiation being a key factor means that the product or service has to be unique along some dimensions that are widely valued by the customers. Hence, a firm ought to give its customers some perceived reason to choose its products or services instead of others. The customers have to perceive the offerings of your firm as deviating positively from those of the competitors (Lilja, 2010).

The literature on quality and QM is exhaustive. The rest of this paper, however, will focus on the so far relatively overseen question whether Technical Communication (TC) and Social Media (SM) can be applied as means for building the targeted quality perceptions.

3 Technical Communication

Undeniably our lives are more and more filled, or even dominated, by man made artefacts, i.e. different types of technical devices and machines. A successful and profitable utilisation of all that technology, however, is critically dependent on accurate and timely technical information. Currently the production, dissemination and, utilisation of that information is challenged by significant problems and difficulties (Asproth et al., 2008; 2009).

A first step to consider in order to improve the situation would be to focus on the anticipatory properties of technical information (TI) and technical communication (TC). The purpose or objective of TC is to impact a future situation or state, i.e. to be applied in a way that Holmberg (2000) has identified as prescriptive anticipation (PA). In the ideal case TC could on this point serve as a mean to improve the customer's perceived quality of the product. With other words, TC can be used for reaching the level of attractive quality (Lilja, 2010).

The main question, hence, can be reformulated in this way. In what way can social media be used for an anticipatory oriented technical communication (TC)?

4 Emerging Social Media

Today, in the digital age, the speed and transparency of information have increased in an amazing way. A new concept, Social Media, is now, in a large extent, influencing the way people and different companies communicate. Social media is online communication that is interactive and democratic, and which creates possibilities for different kinds of collaboration. It is an emerging powerful tool and it is changing the way that information is spread and shared across societies and around the world.

However, the phenomenon is just in its youth. Nevertheless, there are already a lot of examples where Social Media has proven their value to people and companies. There are different expectations on Social Media amongst organizations. Pitta (2010) claims that organizations expect Social Media to be the tool for reaching their target group in an effective and cost-effective way. According to Bernoff and Li (2009), Social Media are expected to be a tool for organizations to “*listening, talking, energizing, supporting, and embracing*” their customers. Carlsson (2009), claims that Social Media are in the first place about communication, collaboration, and relationships between people. Nevertheless, Social Media cannot be completely compared with physically social meetings.

There are a lot of definitions presented of Social Media. Evans (2008, p.33) define Social Media as “*...the democratization of information, transforming people from content readers into content publishers. It is the shift from a broadcast mechanism to a many-to-many model, rooted in conversations between anchors, people and peers. Social media uses the “wisdom of the crowds” to connect information in a collaborative manner. Social media can take many forms, including Internet forums, message boards, weblogs, wikis, podcasts, pictures and video.*” Kaplan and Haenlein (2009) define Social Media as “*a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content.*”

Social Media systems of today are including for example wikis and on-line forums, weblogs, media-sharing sites, and photo- and link sharing sites. Platforms may be a temporary fad, but Social Media as a tool for sharing information is here to stay in our lives. Within a large definition there are a various types of Social Media. In table 1 below, some types of Social Media are classified.

Table 1: Classification of Social Media according to Kaplan and Haenlein (2009)

		Social presence/ Media richness		
		Low	Medium	High
Selfpresentation/ Selfdisclosure	High	Blogs	Social Networking Sites (e.g. Facebook)	Virtual Social Worlds (e.g. Second Life)
	Low	Collaborative Projects (e.g. Wikipedia)	Content Communities (e.g. You Tube)	Virtual Game Worlds (e.g. World of Warcraft)

In this paper the focus of Social Media would be e-Communities. Brint (2001) defines communities as “*Aggregates of people who share common activities and/or beliefs and who are bound together principally by relations of affect, loyalty, common values, and/or personal concern.*”

5 Technical Information Communities (TIC:s)

E-Communities are opening up increasingly new possibilities for people to participate and interact to each other. In the area of TC, e-Communities can play an important role in sharing knowledge and competence. Today, there are some technical communities present and in this section a few of these are to be evaluated to examine existing communities concerning technical aspects. The focus in this evaluation is on communities concerning vehicles and software.

Evaluation of e-communities

There are different possible ways to evaluate communities. Paroutis and Al Saleh (2009) have identified some key factors which are crucial for motivation and/or barriers to contribute to collaboration and knowledge sharing using Web 2.0 technologies. These are according to them:

- *Perceived organizational/management support.* The numbers of active members affect each members participation and use. Lack and communication and knowledge or the advantages, lack of response and feedback at contributions and information overload creates barriers.
- *Trust.* Uncertainty concerning the quality, reliability and relevance of the information in the community and how the information is used and managed affect the motivation in a negative manner.
- *History.* If “the old/established way of doing things” is working well, there tend to be less motivation to use Web 2.0 technologies.

- *Outcome expectations – Perceived benefits and rewards.* More effective communication, the ability to discuss ideas and special areas of interest, answers and help of problems, the ability to get information of the activities amongst colleagues, enhancement of social networks and the satisfaction to help others.

Ardichvilis et al. (2003) claim that for a working virtual community for learning, there has to be a willingness amongst the participants to share their knowledge, but also in additional learn from the information which are presented in the community. They found in their study of virtual knowledge-sharing communities that such communities were useful for “*solution of problems, for information of development in the profession and “best practice”, for collaboration amongst professionals over geographical distances and, the saving of time*”.

From the aspects mentioned above, the following aspects have been identified as interesting for evaluation of technical communities:

- Goal and objectives, i.e. there have to be a reason behind every action. This criterion addresses the purpose and goal of the community.
- The target group, i.e the target membership of the e-community.
- The control model, i.e set of tools targeted to effectively monitoring and controlling the activities of community members such as e.g. access rights, role definitions and, exception reporting.
- Usability, i.e. user-friendliness
- The communication model, i.e. the communication language.

Furthermore, Novikova (2011) has created an assessment system for e-Communities. This system is based on two main factors: Actors of e-communities, and actions and each actor and the reasons for these actions. The evaluation presented in this paper has its ground in this assessment system too.

The evaluated e-communities

The e-communities which have been evaluated are the communities of: Ubuntu, GNU Guile, VW, and BMW. Ubuntu is a complete Linux-based operating system, freely available, with both community and professional support. Ubuntu is mostly developed by people participating in the Open Source Community. GNU Guile is the official Guile extension language for the GNU Operating system. Volkswagen is vehicles which is a part of Volkswagen group, a German automobile manufacturing group. Bayerische Motoren Werke AG (BMW) is a German automobile, motorcycle and engine manufacturing company.

Table 2: Summary of results of evaluation.

Ubuntu (www.ubuntu.com/community)	
<i>Goal and objective:</i>	To improve and develop, to offer help and support, and to promote Ubuntu to a wider audience.
<i>Target group:</i>	All users and all interesting in Ubuntu.
<i>Control Model:</i>	There is detailed code of conducts presented. The rules are visible in several places and they are present when to post in the different forums.
<i>Usability:</i>	User friendly, clear menus mm. Some difficulties to find the forums. There are different types of users identified and there are possibilities to choose the type of user agreeing with ones competence and skills.
<i>Communication Model:</i>	Friendly and helpful atmosphere. Smiles and some slangs and short messages. There are possibilities to interact via e.g. forums, chat, mailing lists, scheduled meetings, personal e-mail, and wikis.
GNU Guile (www.gnu.org/software/guile/community.html)	
<i>Goal and objective:</i>	A meeting place for users of GNU Guile.
<i>Target group:</i>	GNU Guile users.
<i>Control Model:</i>	There are general sets of rules, but these are not so detailed.
<i>Usability:</i>	The usability is quite good. There are some difficulties to find information. To read or subscribe is within your own e-mail system.
<i>Communication Model:</i>	Friendly and helpful atmosphere. Smiles and some slangs and short messages. The community consists of several mailing lists and an Internet relay chat. There are possibilities to interact via e.g. forums, chat, mailing lists, scheduled meetings, personal e-mail, and wikis.
VW (www.ivdub.com)	
<i>Goal and objective:</i>	A meeting-place for owners of and people interested in Volkswagen.
<i>Target group:</i>	VW owners and other interested in VW.
<i>Control Model:</i>	There are sets of rules which are presented for new members when they are joining the community and where to post a contribution.
<i>Usability:</i>	The usability is good.
<i>Communication Model:</i>	Friendly atmosphere. Smiles and some slangs and short messages. There are possibilities to interact via e.g. forums, chat, mailing lists, blogs, polls, personal e-mail, instant messenger, and wikis.
BMW (www.bimmerfest.com)	
<i>Goal and objective:</i>	A meeting-place for owners of and people interested in BMW.
<i>Target group:</i>	BMW owners
<i>Control Model:</i>	There are sets of rules which are presented for new members when they are joining the community and when to post a contribution.
<i>Usability:</i>	The usability is good.
<i>Communication Model:</i>	Friendly atmosphere. Smiles and some slangs and short messages. There are possibilities to interact via e.g. forums, chat, mailing lists, blogs, personal e-mail, and wikis.

The table below (table 3) is a summary of the evaluation according to Novikova's (2011) assessment system of the selected communities:

Table 3: Summary of results of evaluation.

Metric Group	Sub-group (if any)	Metric	Ubuntu	Guile	IVdub.com	BMV
General	Definition	Clear definition of the community's purpose	Yes	Yes	Yes	Yes
		Clear definition of motives to interact	Yes	Yes	Yes	Yes
Statistical	Popularity	Number of members	1300000 /61000 active	-	-	Approx. 234000
		Page views	Yes	No	Yes	Yes
Belonging	Feelings of belonging	Number of tools for interaction	>10	<10	>10	>10
		Number of possibilities to contribute	5-10	1-5	>10	>10
		Ratio of belonging	Yes	No	Yes	Yes
		Ratio of contribution	Yes	No	Yes	Yes
	Social identity	Depth of users profiles	Detailed user info	No users profiles	Detailed user info	Detailed user info
		Users ratings	Yes	No	Yes	Yes
	Personal relations	Tools for making contacts	e-mail, chat	e-mail chat	e.g. e-mail, chat, instant message, friends	e.g. e-mail, chat, instant message, friends
Exchange of views and social support		Possibility to discuss	Yes	Yes	Yes	Yes
		Possibility to rate	No	No	Yes	Yes
		Possibility to recommend	No	No	No	Yes
Access to information	Usability	Ease of joining the e-Community	Yes	Yes	Yes/no	Yes
		Ease of use	Yes/no	Yes/no	Yes	Yes

		Features open to unregistered users	Read and search	Read and search	Read, search, and member register	None
		Possibility to create sub-communities	Yes	No	Yes	Yes
Security and privacy level		Security rules	Yes	Yes	Yes, but not easy to find.	Yes, before registration
		Privacy rules	Yes	Yes	Yes	Yes, before registration

The summary of the results shows the similarities and differences between the e-communities evaluated. At first they differed in their focus. Two were communities considering vehicles, where the members were owners and people interested in these vehicles. The other two were considering software, where the members were developers and users of some kind. The communities were designed and structured in different ways. The e-communities of Ubuntu, VW and BMW were ordinary communities with discussion forums structured in topics and discussions in different threads. Additionally, the community of BMW and VW were quite similar concerning interface and content. The community concerning GNU Guile consisted of different mailing lists where the members can subscribe to a list concerning an area they are interested in. In this community the members were more anonymous. The community by Ubuntu had different member types identified and this possibility to log in as one specific type of member give the members better opportunities to find people with similar interests and knowledge. This would also have an effect on trust and perceived support which, according to Paroutis and Al Saleh (2009), is two key factors which are crucial for motivation to contribute to collaboration and knowledge in e.g. e-communities.

Ratio of belonging and contribution demonstrate to members the importance and visibility of their contribution for the e-community and this could be an important part of the feeling of belonging. In the assessment of the e-communities it could be seen that there were some ratios of belonging and contribution. However, the ratio of belonging consisted in three of the communities evaluated of, more or less detailed member profiles. The profiles at VW and BMW were rather detailed and at Ubuntu it was less information about the members in their profiles. In all these communities, the members were searchable and in the communities of VW and BMW it was possible to create lists of members in several ways. At GNU Guile it was no information about the members at all and consequently, there were no member profiles available. However, in this community, the discussions occur as e-mail conversations and maybe this can give the members a feeling of belonging. Paroutis and Al Saleh (2009) claim that the satisfaction to help others contribute to e.g. perceived benefits and rewards and the ratio of contribution would fulfill this. The ratio of contribution was in BMW and VW visible through the members' profile where the number of contributions in the forums the member had done was presented. However, the degree of contribution was not

published in a more visible way, e.g. there were no lists of most read authors etc presented in some of the main pages. At the communities of VW and BMW possibilities to rate the members and this would also affect the feeling of belonging. Ardichvilis et al. (2003) claim that for a working virtual community for learning, there has to be a willingness amongst the participants to share their knowledge and enhanced perceived benefits and rewards would increase the member's willingness to share their knowledge.

To interact with other members is an important feature in e-communities and this will increase the outcome expectations and affect the willingness to contribute and use the community according to Paroutis and Al Saleh (2009). The possibility to make friends and/or contacts is important and in this case the e-communities evaluated differed. In VW and BMW it is easy to make contacts and friends. In Ubuntu it is more difficult and in GNU Guile the only way to make contact is to send an e-mail to one contributor which have made a contribution in one discussion/thread. Possibilities to create personal sub-communities would be an important feature to increase the attractiveness of information which are produced and published in the e-community. If the community is rather large, it is hard to find relevant information and the possibility to create sub-communities with members of similar interests would increase the possibility to focus and the wish to participate.

In the e-communities by Ubuntu and VW, there were possibilities for unregistered members to read contributions in different forums. In the community by BMW there were no such possibilities and in the e-community by GNU Guile there were possibilities to read previous discussions in the archive. The possibility to see the discussions in the e-community before being a member, would increase the possibilities for prospective members to decide if to join or not, and for the community to consist of proper members.

Al Paroutis and Al Saleh (2009) claim that more effective communication, the ability to discuss ideas and special areas of interest etc. is important for the motivation to participate in e.g. communities and all the evaluated e-communities have possibilities for members to discuss things in several ways, e.g. chat.

According to Paroutis and Al Saleh (2009) the number of active members affects each member's participation and use. Ubuntu and BMW are presenting the current number of members in their communities. Ubuntu also present the number of active members. VW does not present the number of current members. However, there are possibilities to search in the member register and the members are presented in different ways in the communities. GNU have no member register available and no number of members presented. However, as their community consists of mailing lists, there may not affect the member's participation and use so much. Trust is also a factor having an effect on member's participation and use according to Paroutis and Al Saleh (2009). The possibility in Ubuntu to see which type of user the member is, should affect the trust and also the outcome expectations and perceived benefits and rewards.

6 Research Base for Social Media in Technical Communication

Dubois and Sabatier (1998) have studied the effects of different population densities and population distributions on the spreading of infections. By exchanging infected people with people informed via a social media a similar approach can be applied in order to study the effects of social media in technical communication. Hence, the situation may be expressed by the finite difference equations 1a – 1c

$$S(t + \Delta t) = S(t) - \beta \Delta t I(t)S(t) + \rho \Delta t R(t) \quad (1a)$$

$$I(t + \Delta t) = I(t) + \beta \Delta t I(t)S(t) - \gamma \Delta t I(t) \quad (1b)$$

$$R(t + \Delta t) = R(t) + \gamma \Delta t I(t) - \rho \Delta t R(t) \quad (1c)$$

where S are those susceptible to be informed, I are people that have already been informed and R are those who have rejected the information or who have found it not relevant. The parameter β is the transmission rate, ρ is the rate of decay in recovered people, and γ , at last, is the rate of decay in informed people. Δt is the discrete time step. The conservation of the total population (N) is given by 1d

$$N(t + \Delta t) = S(t + \Delta t) + I(t + \Delta t) + R(t + \Delta t) = N(t) = S(t) + I(t) + R(t) = C \quad (1d)$$

More research is needed in order to understand the full implications of those relationships in the context of technical communication. However, directly it is obvious that if equations 1a-c are applicable for the case with social media they have to be modified according to equations 2a-d in order to approximately describe the situation with conventional technical communication without social media.

$$S(t + \Delta t) = S(t) - \beta \Delta t I(t)S(t) + \rho \Delta t R(t) \quad (2a)$$

$$I(t + \Delta t) = I(t) + \beta \Delta t T(t)S(t) - \gamma \Delta t I(t) \quad (2b)$$

$$R(t + \Delta t) = R(t) + \gamma \Delta t I(t) - \rho \Delta t R(t) \quad (2c)$$

$$T(t + \Delta t) = T(t) \quad (2d)$$

Here T stands for the professionals working with technical communication. The great difference being that T will be approximately constant, at least for shorter time periods. Hence, the population of informed people (I) will increase linear and much slower in the case without social media (eqs. 2a-d) than in the case there social media are applied (eqs 1a-c).

Further, in equations 1a-c the parameter β will be a measure of the effectiveness or coherence of the virtual community set up by the applied social medium. We on this point hypothesise that an anticipatory approach may help in increasing the coherence and making the community more effective. With other words, the information will propagate more rapidly through the community and the information quality will increase at the same time.

Geographical space or population density will, in contrast to the infection case, have no impact on the propagation rate. Geographical distance will in the virtual community be replaced with "information distance". A unit dependant on the cohesion and attractiveness of the virtual community in question. The challenge, hence, will be to create such cohesion, or information density, in the social medium applied for technical communication.

7 Conclusion

Much more research is needed on the use of social media in technical communication. However, already after the short and introductory investigation in this paper we find substantial evidence for the following conclusions:

- Social media is already successfully applied for some kind of technical communication by some front end companies.
- Social media will, however, just be a compliment to already well established means and channels for technical communication.
- Significant problems and vulnerabilities will emerge if social media are applied for technical communication on a greater scale.
- Much more research and technical development will be needed in order to find solutions to those problems connected with the application of social media for technical communication.
- The companies that will be successful in finding solutions to those problems will gain considerable market benefits and they will increase the attractive quality of their products and services.
- Hence, the study and mastering of social media will be an important part in the training of people who will work with technical communication in the future.
- Anticipatory approaches and anticipatory techniques will form vigorous ingredients in such prospective training for technical communication with social media.

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