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RESEARCH ARTICLE

HARNESSING THE POWER OF SELF-ORGANIZATION IN AN ONLINE COMMUNITY DURING ORGANIZATIONAL CRISIS

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Appendix A

Technical Specifications of the Online Forum

The technology platform of FEU's online forum is an open source software product called Discuz!NT. As of May 26, 2008, the version of Discuz!NT powering FEU's online forum was Discuz!NT 2.1. This version provided basic online message board features including subforums, user profiles, photo uploading, and file attachments. Compared to today's online forums, Discuz!NT 2.1 did not have a tag feature for content association, a private message feature for one-to-one communication, an automated alert feature for triggered attending, or a follow feature for network building (according to the DisCuz!NT version history on http://zh.wikipedia.org/wiki/Discuz!NT).

Appendix B

Coding Scheme Development

In developing the coding scheme for content themes, we first identified existing content categories from the online community research (see Table 1 in the main article for the list of research articles). This step yielded the content categories listed in Table B1. Then, the first author applied the existing content categories to an initial round of coding. This exercise quickly indicated the need to revise existing content categories according to the research context and research questions of our study. For example, disease outbreak information (Palen et al. 2007; Salathé et al. 2013) does not apply to the earthquake context of our research site. Meanwhile, negative emotions should be added as a separate content theme because it captures message content dynamics and feedback loop dynamics immediately after the earthquake. Following the iterative comparison and grouping process of the open coding technique (Corbin and Strauss 1990), we eliminated content categories that do not apply to our study, aggregated content categories that reveal similar insights, and added new content categories that are salient in our data. In particular, while previous studies identified a number of information-related content categories, we aggregate these into a single category for information because information seeking, provision, synthesizing, and curation exhibit similar distribution patterns during our data collection window. They offer similar theoretical insights regarding the order creation dynamics. Meanwhile, our coding scheme includes two categories of emotion-related content: negative emotions and emotional support. These two types of emotions showed distinct changing patterns

following the earthquake and revealed different feedback loop dynamics. We also recognize two types of opinion-related content categories from our data: appreciation and self-reflection. These two content categories are differentiated by their changing patterns and theoretical insights.

Table B1. Adaptation of Existing Content Categories to Our Study

Existing Categories	Source	Related Categories in Our Study
Disease outbreak information	Palen et al. 2007; Salathé et al. 2013	Not included
Information seeking	Palen et al. 2007; Palen et al. 2009	• Information
Information provision	Palen et al. 2007; Palen et al. 2009; Starbird et al. 2010	
Information synthesizing	Starbird et al. 2010	
Information curation	Starbird et al. 2010	
Geo-location information	Majchrzak and More 2011; Vieweg et al. 2010	
Situational information	Li and Rao 2010; Majchrzak and More 2011; Vieweg et al. 2010	
Actions	Qu et al. 2009; Salathé et al. 2013	• Action
Emotions	Qu et al. 2009; Salathé et al. 2013	• Negative emotions • Emotional support
Opinions	Qu et al. 2009	• Appreciation • Reflection

Appendix C

Chow Test Results

The Chow test (1960) is commonly used to assess whether certain statistical relationships remain stable in two periods of time. It employs an F-test to decide whether subsets of coefficients in two regressions are equal. We took four steps in applying the Chow test to our data analysis. Our time series data are lagged *hourly*. First, we selected break points between different phases. The hour when the earthquake occurred (2 p.m. on May 12, 2008) was a natural break point between the precrisis and post-crisis periods. For the remaining break points, we first narrowed down the selection to a few possible hours according to the message content dynamics depicted in Figure 4 of the paper. Then following Chiles et al. (2004) we used a trial-and-error approach to identify the particular break hour between phase 1 and 2 (6 a.m. on May 14), between phase 2 and 3 (5 a.m. on May 16), and between phase 3 and 4 (3 a.m. on May 19).

Second, we created five dummy variables corresponding to the five phases in the time series data: precrisis, phase 1 (sensing), phase 2 (understanding), phase 3 (deciding), and phase 4 (concluding). We also generated the interaction terms of each phase dummy variable and the one-hour lag of the independent variables and dependent variable. As explained in the paper, the independent variables include the amounts of posts associated with different message content themes in the previous hour as well as the percentage of earthquake-related posts in the previous hour. The dependent variable is the percentage of earthquake-related posts among all posts. This regression model captures the relationship between message content dynamics and the overall activity level of self-organized online crisis management.

Third, we conducted four regressions between the dependent variable and the independent variables along with the interaction terms and the phase dummy variable. Each regression used data from two adjacent phases. The regression results are displayed in Table C1. Finally, we ran an F-test on the coefficients for the interaction terms and the phase dummy variable from each regression. The F-test results are presented in the last row of Table C1. All four tests indicate significant breaks between different online crisis management phases.

Table C1. Chow Test for Structural Breaks in Time Series Data (D.V. = Percentage of earthquake related posts among all posts; t = hour)

	Before and After Earthquake (n = 460)	Between Phase 1 & 2 (n = 85)	Between Phase 2 & 3 (n = 103)	Between Phase 3 & 4 (n = 213)
	β (p)	***β (p)***	***β (p)***	***β (p)***
Constant	-0.007 (0.615)	0.322 (0.001)	0.487 (0.002)	0.030 (0.655)
% Earthquake $_{t-1}$	0.884 (< 0.001)	0.593 (< 0.001)	0.516 (0.002)	0.757 (< 0.001)
Negative emotion $_{t-1}$	0.118 (0.001)	-0.024 (0.760)	0.081 (0.657)	0.418 (0.154)
Information $_{t-1}$	0.078 (0.003)	0.208 (0.018)	-0.586 (0.063)	-0.079 (0.759)
Appreciation $_{t-1}$	0.240 (0.008)	0.402 (0.550)	-0.588 (0.076)	-0.175 (0.374)
Emotional support $_{t-1}$	-0.030 (0.573)	0.362 (0.733)	-0.855 (0.005)	0.195 (0.345)
Self-reflection $_{t-1}$	0.061 (0.227)	-0.985 (0.080)	1.193 (0.002)	-0.040 (0.812)
Action $_{t-1}$	0.123 (0.012)	-0.089 (0.903)	-0.158 (0.438)	0.389 (0.001)
Phase dummy	0.007 (0.760)	0.165 (0.366)	-0.458 (0.010)	-0.019 (0.777)
Phase*%Earthquake $_{t-1}$	Dropped	-0.078 (0.707)	0.241 (0.193)	0.065 (0.465)
Phase*Negative emotion $_{t-1}$	-0.118 (0.905)	0.105 (0.594)	0.337 (0.387)	-0.444 (0.143)
Phase*Information $_{t-1}$	-0.078 (0.030)	-0.794 (0.016)	0.508 (0.244)	0.073 (0.778)
Phase*Appreciation $_{t-1}$	-0.240 (0.043)	-0.990 (0.187)	0.413 (0.305)	0.463 (0.065)
Phase*Emotional support $_{t-1}$	0.030 (0.834)	-1.217 (0.272)	1.050 (0.008)	-0.186 (0.392)
Phase*Self-reflection $_{t-1}$	-0.061 (0.685)	2.178 (0.002)	-1.233 (0.005)	0.158 (0.385)
Phase*Action $_{t-1}$	-0.122 (0.535)	-0.069 (0.928)	0.547 (0.026)	-0.360 (0.016)
Chow test	F (7, 445) = 2.77, ***p* = 0.008**	F (8, 69) = 2.11, ***p* = 0.046**	F (8, 87) = 4.10, ***p* = 0.0004**	F (8, 197) = 2.11, ***p* = 0.037**

Appendix D

The First Post-Earthquake Discussion Thread in Chinese

Table D1 below displays the discussion thread "Strong Earthquake Hit Campus" in the original Chinese language. Each entry corresponds to a translated message in Table 5 of the manuscript.

Table D1. The First Post-Earthquake Discussion Thread in Chinese

发帖时间; 帖子主题	帖子内容
2:37 p.m., 5/12/08; 刚才光华有强烈的地震感	现在我的心还在跳~~~在震感最强烈的那一刻~~我感受到了人生命的渺小~感谢上天~~GOD
2:39 p.m., 5/12/08; 回复：	是地震，没错~~真的是地震的感觉~~~ 生命的脆弱，人的渺小，呃~~~我们真的是很幸运~~
2: 54 p.m., 5/12/08; 回复：	隔壁的电脑都震到地上去了
2: 55 p.m., 5/12/08; 回复：	楼上两位兄弟厉害，还能坚守岗位哦~ 我们爬起来就往下面跑~~ 有的人连衣服都没穿
4: 41 p.m., 5/12/08; 回复：	数名内裤男冲出宿舍，明德楼有数出裂痕和坠落的碎物 操场上停留很多人
4:54 p.m., 5/12/08; 回复：	我在文献中心五楼看书,感觉整个楼都摇摇入坠了，然后就是大家一起往外跑，跑的还不算乱，都还有点秩序吧，出来后心都还跳的。。。。。
7:34 p.m., 5/12/08; 回复：	地震时间好长哦！一直晃了好久。。但是我当时人在阳光广场，听说6楼的很惨！不知道柳林的同学们怎么样了，我在群上呼唤了，但是显然他们被疏散离开寝室了，一个都没在.....
7:43 p.m., 5/12/08; 回复：	地震的时候一个人在宿舍~感受到了前所未有的孤独，2分钟似乎过去了N个小时~~ 命大啊~~截至目前~~大成都死亡58人~~:'(默哀~~~
8:32 p.m., 5/12/08; 回复：	实在吓人，觉得天地要塌了 有一种怎么样都逃脱不了的感觉。
8:38 p.m., 5/12/08; 回复：	收到短信说晚上可能还有余震 大家注意安全啊！！
9:08 p.m., 5/12/08; 回复：	终于回到寝室了。。。:'(:'(:'(
9:24 p.m., 5/12/08; 回复：	今晚怎么熬哦！！
9:36 p.m., 5/12/08; 回复：	很晃很地震. 刚刚一路上来.看到被晃跨的一些小地方. 看到大家凌乱的寝室. 觉得真的恍若隔世.
10:41 p.m., 5/12/08; 回复：	六零也有很强烈的感觉，毕竟温江离汶川较近啊，没事都还好
11:13 p.m., 5/12/08; 回复：	在余震中，看到了这个帖子！
11:23 p.m., 5/12/08; 回复：	像亲历电影画面，估计今夜无人入眠了
11:27 p.m., 5/12/08; 回复：	现在腿还是软的，地震～吓人啊！
12:06 a.m., 5/13/08; 回复：	今天有死里逃生的感觉，不怕不怕不怕。
1:05 a.m., 5/13/08; 回复：	刚才又小的余震了几次，不过都很小，大的已经过去了
1:59 a.m., 5/13/08; 回复：	又震了
2:00 a.m., 5/13/08; 回复：	我想哭
2:03 a.m., 5/13/08; 回复：	明天怎么过
3:51 a.m., 5/13/08; 回复：	知道不知道绵阳北川怎样啊?怎么没有人过去看看呢,我急于想要知道那里的情况,西望我的家人没有出事
12:02 a.m., 5/14/08; 回复：	我也非常想知道北川的具体情况~~~北川这次遭的很严重很严重~~~:'(心痛~~ 所有联系方式均无法联系到那边~~~

Appendix E

Time Series Analysis of IT Affordances' Immediate Impact

The time series data is lagged hourly. The phase dummy variables created for the Chow test were used in this analysis. The pre-crisis phase dummy variable is omitted from the analysis to prevent dummy variable trap.

Table E1. Effects of IT Affordances on Message Content Themes (N = 460)

D.V. / I.V.	Negative Emotion	Information	Appreciation	Self-Reflection	Emotional Support	Action
D.V. $_{(t-1)}$	0.446 ($p < 0.001$)	0.068 ($p = 0.160$)	0.024 ($p = 0.606$)	0.288 ($p < 0.001$)	0.501 ($p < 0.001$)	0.427 ($p < 0.001$)
Sensing phase dummy	0.189 ($p < 0.001$)	-0.305 ($p < 0.001$)	-0.378 ($p = 0.010$)	0.025 ($p = 0.170$)	-0.013 ($p = 0.441$)	0.009 ($p = 0.573$)
Understanding phase dummy	0.069 ($p < 0.001$)	-0.295 ($p < 0.001$)	0.025 ($p = 0.058$)	0.083 ($p < 0.001$)	0.027 ($p = 0.089$)	0.049 ($p = 0.001$)
Deciding phase dummy	0.013 ($p = 0.455$)	-0.368 ($p < 0.001$)	0.028 ($p = 0.029$)	0.098 ($p < 0.001$)	0.063 ($p < 0.001$)	0.133 ($p < 0.001$)
Concluding phase dummy	-0.0004 ($p = 0.979$)	-0.381 ($p < 0.001$)	-0.056 ($p < 0.001$)	0.083 ($p < 0.001$)	0.019 ($p = 0.193$)	0.025 ($p = 0.058$)
Assembling $_{(t-1)}$	0.056 ($p = 0.047$)	0.333 ($p < 0.001$)	-0.006 ($p = 0.754$)	-0.033 ($p = 0.191$)	0.014 ($p = 0.570$)	0.012 ($p = 0.590$)
Verifying $_{(t-1)}$	-0.005 ($p = 0.891$)	0.287 ($p = 0.003$)	-0.042 ($p = 0.128$)	0.091 ($p = 0.007$)	-0.015 ($p = 0.648$)	0.010 ($p = 0.733$)
Metavoicing $_{(t-1)}$	0.042 ($p = 0.209$)	-0.100 ($p = 0.238$)	-0.040 ($p = 0.110$)	-0.036 ($p = 0.241$)	-0.218 ($p < 0.001$)	-0.078 ($p = 0.004$)
Associating $_{(t-1)}$	0.096 ($p = 0.445$)	-0.257 ($p = 0.414$)	-0.259 ($p = 0.005$)	0.307 ($p = 0.007$)	0.228 ($p = 0.037$)	0.301 ($p = 0.003$)
Constant	-0.026 ($p = 0.095$)	0.319 ($p < 0.001$)	0.097 ($p < 0.001$)	0.020 ($p = 0.152$)	0.025 ($p = 0.064$)	-0.003 ($p = 0.808$)
F (9, 450), *p*, R^2	53.21, $p < 0.001$, $R^2 = 0.516$	18.94, $p < 0.001$, $R^2 = 0.275$	9.59, $p < 0.001$, $R^2 = 0.161$	19.82, $p < 0.001$, $R^2 = 0.284$	13.83, $p < 0.001$, $R^2 = 0.217$	46.82, $p < 0.001$, $R^2 = 0.484$

I.V.: independent variables; **D.V.**: dependent variables.

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