

CROWDSOURCING IN DESIGN RESEARCH - POTENTIALS & LIMITATIONS

Soren Ingomar PETERSEN

ingomar&ingomar - consulting, United States of America

ABSTRACT

Crowdsourcing has by now proven itself particularly useful in the early phases of product design, outperforming traditional in-house R&D. However, little attention has been given to the application of crowdsourcing in design research where the cost and time of planning and executing studies, combined with inherent biases in selection of participants, unintentional priming of and inadvertent influence of subjects responses can ruin the outcome. Additionally, when unexpected and unexplainable findings occur, the value and validity of the study can be seriously undermined. Here lean, quick crowdsourcing experiments could aid in planning of conventional research or in some cases replacing these completely. We propose a Six Step Co-creation Cycle method and apply it to thirty projects with varying level of innovativeness. In doing so we uncover a range of pros, such as uncovering biases, collecting new knowledge and building a research network and cons, such as limited ability to synthesize ideas and the need to eliminating noise, of applying crowdsourcing in the early phases of design research.

Keywords: crowdsourcing, social networks, new social media, six step co-creation cycle, wisdom of crowds, design research

Contact:

Dr. Soren Ingomar Petersen
ingomar&ingomar - consulting
design quantification
South Pasadena
CA 91030
United States of America
soren.petersen@ingomar.net

1 INTRODUCTION

With the proliferation of social networking and social media together with users' increased comfort and familiarity with a range of platforms, crowdsourcing is becoming a viable alternative to the traditional early phases of information gathering in design research. The term crowdsourcing is, in part, defined as "a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task. The undertaking of the task, of variable complexity and modularity and in which the crowd should participate bringing their work, money, knowledge and/or experience, always entails mutual benefit. The user will receive the satisfaction of a given type of need, be it economic, social recognition, self-esteem, or the development of individual skills, while the crowdsourcer will obtain and utilize to their advantage that what the user has brought to the venture, whose form will depend on the type of activity undertaken" (Estellés-Arolas, 2012). Compared to the expensive and time-consuming planning of data collection in conventional design research, crowdsourced design research offers opportunities for inexpensive, quick exploration and experimentation with specific homogenous and heterogeneous groups of networking users. In this article, we propose a Six Step Co-creation Cycle (Petersen, Santiago, Aitamurto, Spencer and Joo, 2011) method that was applied on thirty-one projects with varying levels of innovation and complexity. In doing so, we uncovered pros, such as uncovering biases and collecting new knowledge and cons, such as limited ability to synthesize ideas and the need to eliminating noise and lack of a network building effect when applying crowdsourcing in the early phases of design research.

2 CROWDSOURCING

There has been a growing interest in crowdsourcing over the past couple of years, with corporations, such as IBM and NOKIA developing internal platforms and new providers, such as InnoCentive, Mechanical Turk and Open IDEO offering crowdsourcing services. Crowdsourcing has successfully been applied to a wide range of challenges, from clearly defined tasks, such as the design of logos, development of an engineering solution, writing of a piece of code, gathering ethnographic data and resolving social problems (Brabham, 2008). The underlying idea is that of "The Wisdom of Crowds" showing that the collective intelligence of a crowd, if its members refrain from communicating with each other, will converge on a more accurate answer to a challenge than any of its individual expert members (Surowiecki, 2005). Crowdsourcing concepts for product development further shows that the crowd can provide more novel and user relevant ideas with only minor payoff in feasibility (Poetz and Schreier, 2012) and is particularly useful when dealing with long distance searches, where the initiator has no or little knowledge about the challenge (Afuah and Tucci, 2012). The idea of crowdsourcing is a particularly interesting concept when combined with the Web, where large amount of self-selecting individuals can be engaged with a minimal effort. In this context crowdsourcing could be a powerful new application for aiding design research.

3 OVERALL RESEARCH PROCEDURE

Constituting the overall research question "Crowdsourcing in Design Research – Potentials & Limitations," this study examines seven important aspects, five (4.1 to 4.5) based on the study of Estellés-Arolas and two deemed relevant for research (4.6 and 4.7). The aspects are treated in turn within the findings.

The research project was conducted over the course of three years, from December 2009 to December 2012, as part of a Stanford Persuasive Technology Lab and Stanford Peace Innovation Lab investigation into the application of design quantification in the formulation of design briefs for incremental and breakthrough challenges. Initially, fifteen challenges, phrased as open-ended questions, focusing on peace innovation and other topics of general public interest were launched to gain familiarity with, and evaluate the potential of various crowd-sourcing platforms, including Chaordix, OpenIDEO, Jovoto, Facebook and LinkedIn. In the first exploratory phase, professionals (designers, journalists, venture capitalists and design researchers) were asked to identify pressing human challenges and opportunities such as "Peace Innovation Journalism," "How can designers help to reduce gang violence?" and Design for Social Change." Then, experts in briefing would formulate

the call, post it online and moderate the online discussion until it tapered off, usually after a couple of weeks. Comments were then collected and insights obtained from the various platforms compared. Two key lessons were: the importance of (1) a user-friendly interface for reducing the barrier to entry and (2) aligning crowdsourcing with users' daily activities to encourage engagement. The fact that everyone was comfortable with and regularly used Facebook and LinkedIn and the ease of interaction, resulted in over ten times the number of comments as compared with Chaordix. The pilot project concluded by selecting the social network platform LinkedIn as the platform for further investigation, since it combined the capability to reach targeted user groups and familiarity with the platform. In the second phase, sixteen structured design research projects, applying the SSCC process were launched, analyzing the performance of the SSCC method.

4 INDIVIDUAL STUDIES AND FINDINGS

The following information describes the seven studies and findings on crowdsourcing performance.

4.1 Who forms the crowd

When crowdsourcing domain-specific topics, understanding participant knowledge and behavior is essential for generating useful insights. Thus, group engagement and performance was studied as related to group size.

4.1.1 LinkedIn group size vs. comment rate

Launching thirty-one crowdsourcing challenges on twenty-six LinkedIn groups of various sizes (100 to 200,000 members) and compositions (artists, designers, design educators, design researchers, design managers, journalist, engineers, entrepreneurs and ergonomists) provided insights into what level of engagement could be expected. We found that group size and engagement was inversely correlated and that the groups' level of engagement, in incremental and breakthrough challenges, were independent on group size. Furthermore, challenges applying the SSCC method resulted in the same level of engagement, suggesting that control has little or no influence on engagement. There also seemed to be an upper limit to engagement, with the engagement dropping off after two to four weeks and with a maximum engagement level of approximately eight comments per hundred group members. See Figure 1.

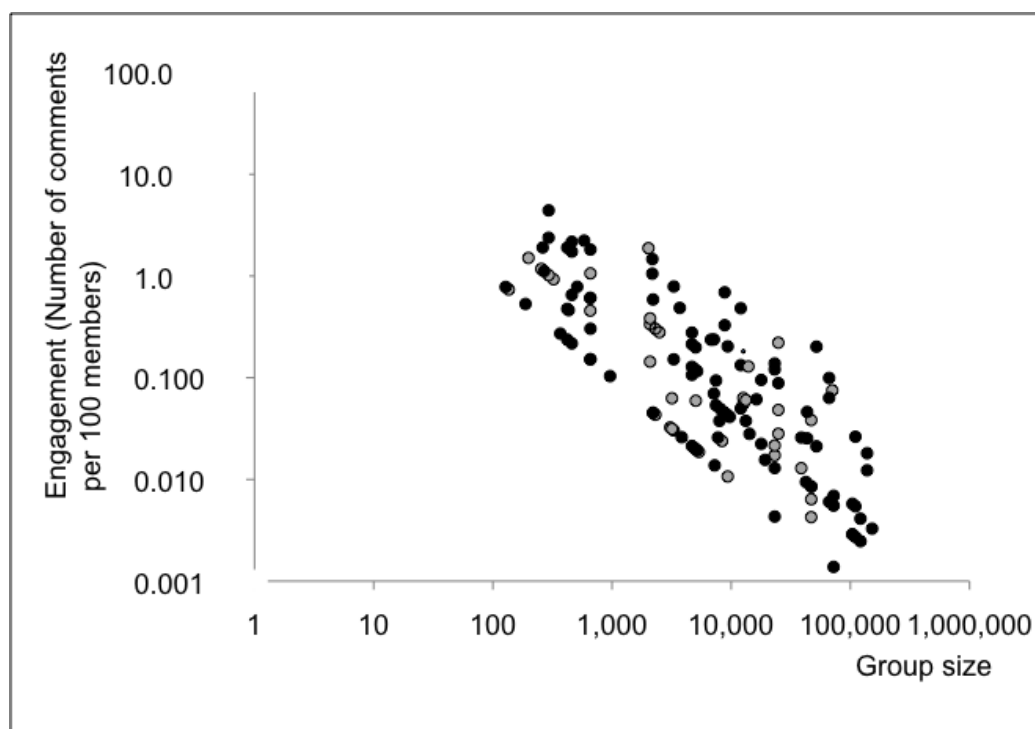


Figure 1. Participation, engagement rate (number of comments) as a function of group size. Black dots represent crowdsourcing challenges applying the SSCC approach while gray dots represent challenges with one open-ended question and no summary.

4.1.2 Challenge topics in which creative professionals engage

To what type of challenges will creative professionals contribute? Analyzing the engagement for the SSCC crowdsourcing projects show that creative professionals are primarily motivated by topics related to design, the top seven most active challenges related to design, the lowest four challenges relating to business and process. See Figure 2.

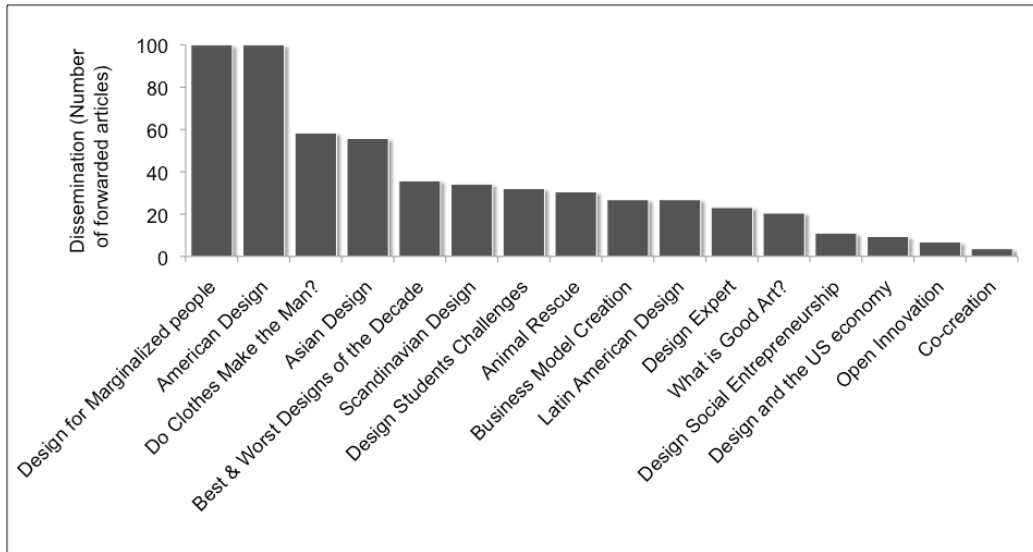


Figure 2. Challenge topics (n=16) and the corresponding level of engagement of creative professionals

4.1.3 Challenges in which LinkedIn groups participate

To what part of design challenges will creative professionals contribute? Analyzing the engagement in challenges from seven leading LinkedIn design groups on topics of strategic, contextual and execution show these primarily contribute to challenges related to execution. See Figure 3.

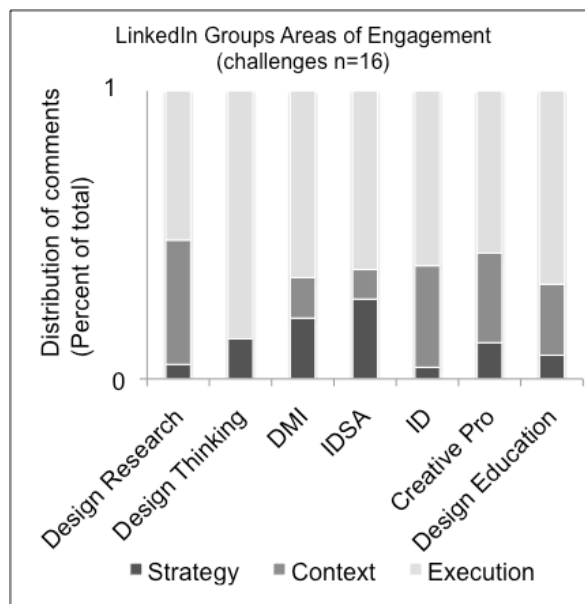


Figure 3. Challenge for design groups (n=7) divided by type: Strategy, Context and Execution, with the corresponding level of engagement of the creative professionals

4.2 What does the crowd have to do?

What is the applicability of crowdsourcing in design research regarding the types of challenge and feedback, which can be addressed? Analyzing the comments of the initial fifteen pilot projects

revealed that participants primarily question the assumptions and uncover biases in the formulation of the call, bring new knowledge (personal experiences, observations and anecdotal), and references (links to data and contacts). Participants challenge, support as well as build on previous comments. However, synthesizing comments into conclusions did not take place, which was then included by the moderator in the second phase exploration. Following the initial findings and using SSCC, the second phase, examined incremental and breakthrough challenges as combinations of high/low understanding of the market and high/low understanding of execution.

4.3 What does the crowd get in return?

What motivates the crowd to sustain and return to participation in future challenges? The initial pilot project experimented with intrinsic as well as extrinsic rewards and found that extrinsic monetary rewards in these type of challenges inhibits participation. These findings were confirmed in interviews with crowdsourcing experts (Waterhouse, 2011) and (Unterberg, 2011). Hence, for the second phase, intrinsic motivation and continued sharing of findings through group posting of conversation summary and sharing articles using new social media was used.

4.4 Who is the initiator, what type of calls and what does the initiator get in return?

The initiator was the Design Quantification Lab; a virtual globally distributed multi-functional and multi-cultural design research group congregating on design research topics of mutual interest. Challenges posted to the crowd constituted part of parallel projects, applying design quantification on topics such as “Peace Innovation,” “Design and Cultures,” “Open Innovation,” “Design & Business Models” and “Design Briefing.” The quality of knowledge resulting from the challenges proved of a sufficiently high quality to contribute to papers. Example of insights from crowdsourcing:

- Peace Innovation Journalism: Assuming that the brand value of journalism could be leveraged in peace innovation we learned that most participants were highly skeptical of the profession (Petersen, 2012).
- Marketing & Design: Soliciting the crowd for the major hurdles in coordinating marketing and design showed this to be translating marketing data into actionable criteria.
- Designing for Marginalized Users: Soliciting the crowd for their experiences in designing for users very different from themselves, highlighted the importance of working with and including these users in the design process (Petersen and Hussain, 2012).
- Creative Animal Rescue: Soliciting the crowd for insights into how design could assist in animal rescue revealed that not only does the US have an overpopulation of companion animals due to profit driven, unregulated breeding practices but also extremely poor marketing of the shelter animals waiting to be rescued (Petersen, 2012).
- Design and Cultures: Soliciting the crowd on design characteristics of various regions (Europe, North America, Latin America, Asia, Africa and Scandinavian revealed similarities and differences between regions and offered cultural explanations for these (Petersen, 2012).

4.5 What type of process and what medium to use?

Based on the experience from the initial pilot projects and auditing of commercial crowdsourcing platforms the Six-Step Co-creation Cycle was developed in a brainstorming session. The advantages of the SSCC method, is that it enables the launching of weekly independent small and inexpensive challenges, making a large number of challenges possible within a short timeframe (2-3 weeks per challenge). Time investment for setting up, moderating, summarizing, concluding and publishing a challenge on new social media ranged from one to two days depending on the level of engagement. The SSCC method consists of the following six steps, see Figure 4.

- 1) A challenge is formulated by posing a one-line open-ended research question, supported by a short clarification. For example:

What is American Design?

Every culture has its own beliefs, value and attitudes, reflected in the design of its products, and services. What adjectives would you assign to American design? Example: Sincerity, Excitement, Competence, Sophistication, Ruggedness How do these differ from European and Asian design?

The challenge is posted to a number of LinkedIn groups, which contribution and performance is to be evaluated.

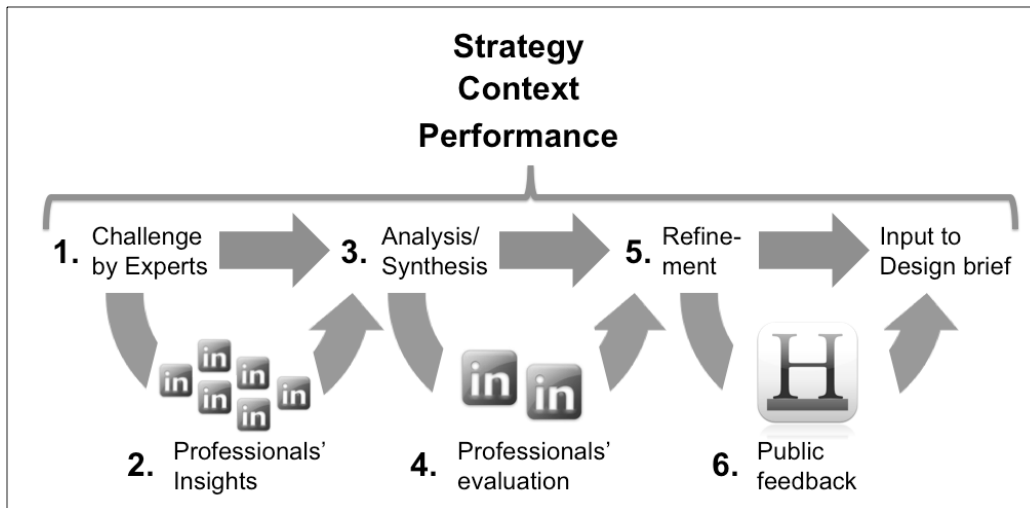


Figure 4. Six Step Co-creation Cycle, alternating between expert evaluation and crowdsourcing ideas on online social networks

- 2) Discussions on the LinkedIn group are moderated daily and neutral comments are posted for each contribution to encourage participation. For example:
“Thank you for sharing,” “Good point” or “Could you please elaborate”
 Comments are continuously documented in an XLS document and when the discussion tapers off, usually after 2 to 3 weeks, the number of comments is tallied for analysis.
- 3) Comments are transferred from XLS to a Word document, coded, analyzed and an engaging short summary story is formulated in approximately 500 words. Popular writing style, combined with brevity is intended to increase likelihood that challenge participants subsequently read and commented on the content.
- 4) Short summary story is posted to the participating LinkedIn groups and the resulting discussion is monitored as in step 2, usually discussions taper off after a week.
- 5) Short summary story is updated according to the new comments and the new version is shared with a minimum of three experts in the area for final evaluation.
- 6) Finally, - the summary and conclusion is posted to The Huffington Post and the number of “Likes” as well as forwarded articles by Twitter, Email, and Facebook are tallied in an XLS document.

4.6 Community building

What is the usefulness of the SSCC method in building a crowdsourcing community? An important issue for commercial crowdsourcing platforms is building a community of participants for participation in future challenges. Although leveraging LinkedIn groups ensures an audience, can momentum be built for engagement on future challenges? To measure the community building effect of the SSCC method, the number of groups and the number of engagements over the two phases were examined.

4.6.1 Community building effect over time (group participation)

Longitudinal observations of group activity show no increase in the number groups participating, thus launching fifteen to thirty-one challenges with regular intervals do not attract more groups. See Figure 5.

4.7 Dissemination

How effective is crowdsourcing for disseminating information?

4.7.1 Dissemination of crowdsourced articles vs. expert articles

Concurrent with publishing the second phase crowdsourcing findings, articles written with individual experts were published. Analyzing the number of forwarded articles for the two types of articles show that articles written by experts in general commanded the same number of forwarded articles as the ones based on findings from crowdsourcing (Mean experts 38 and mean crowdsourced 41, not

statistically different). High numbers of forwarded articles is expected to relate to audience interest, thus, the question of which topics were more likely to be disseminated by crowdsourcing was examined.

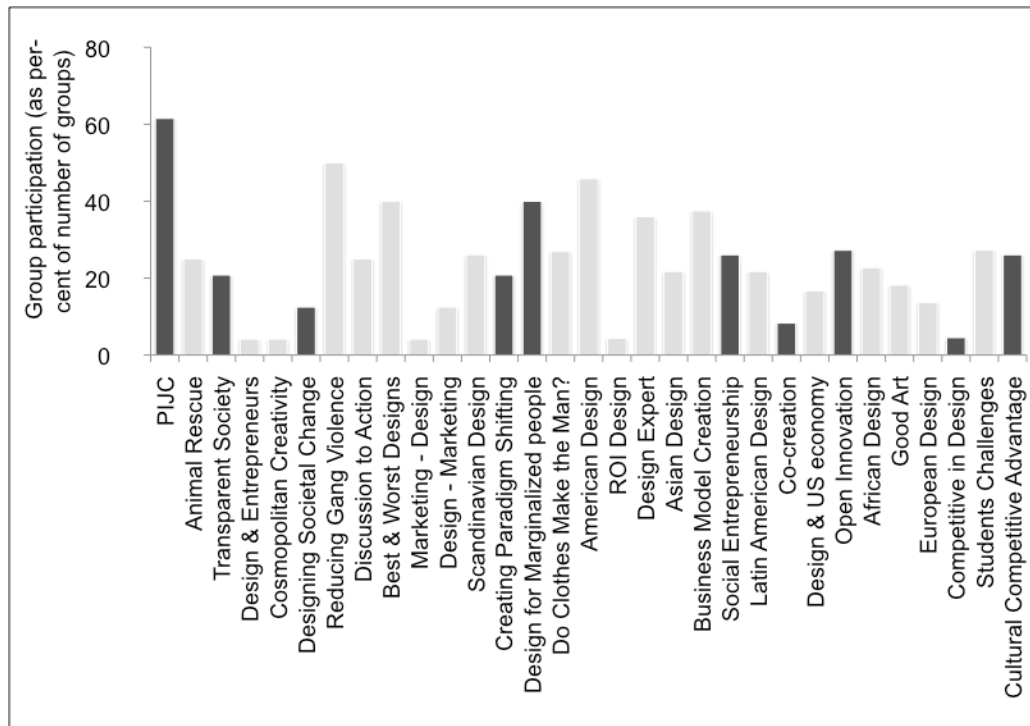


Figure 5. Number of groups participating as a percentage of the total number of groups the challenges was posted to (groups ranging from 12 to 26). Dark columns represent breakthrough challenges, while gray columns represent incremental challenges

4.7.2 Dissemination for all articles

Analyzing which topics the crowd disseminate more, shows that articles addressing topics of business and performance related issues are forwarded more often than other topics. See Figure 7.

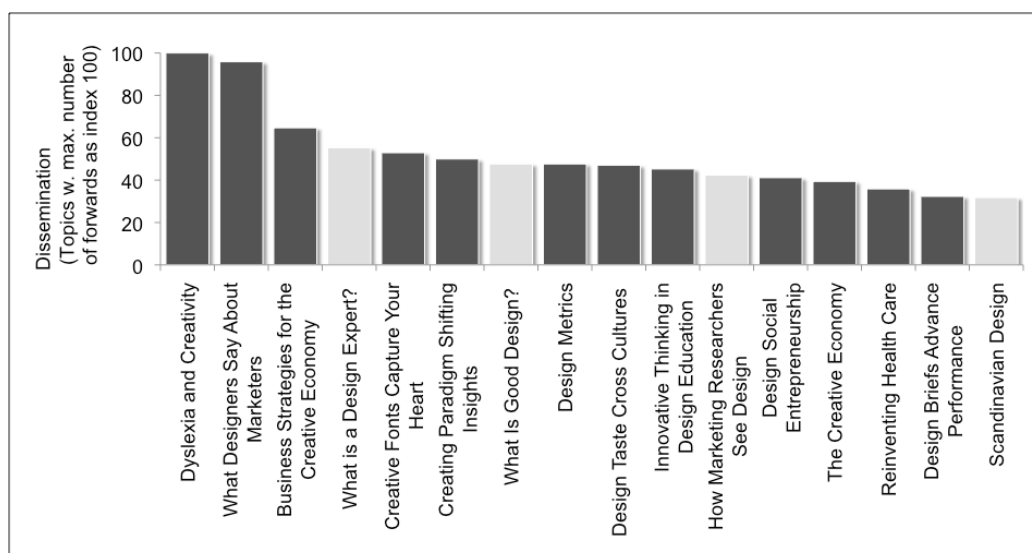


Figure 7. Article forwarded most (top 16 of 69), with highest number of forwards, 170 forwards set to index 100. Dark columns represent articles written by experts, while gray columns represent articles based on crowdsourced challenges

4.7.3 Dissemination of topics

Examining what types of articles are of most interest to the creative community in general, we analyzed the numbers of forwarded articles for categories that were defined by The Huffington Post, and articles that were assigned to these categories by The Huffington Post's editors. Business, Healthy Living and Technology was found to be the three main topics of interest, while Art and Style came in as numbers four and five. Design related topics are thus unlikely to be forwarded more than other articles. See Figure 8.

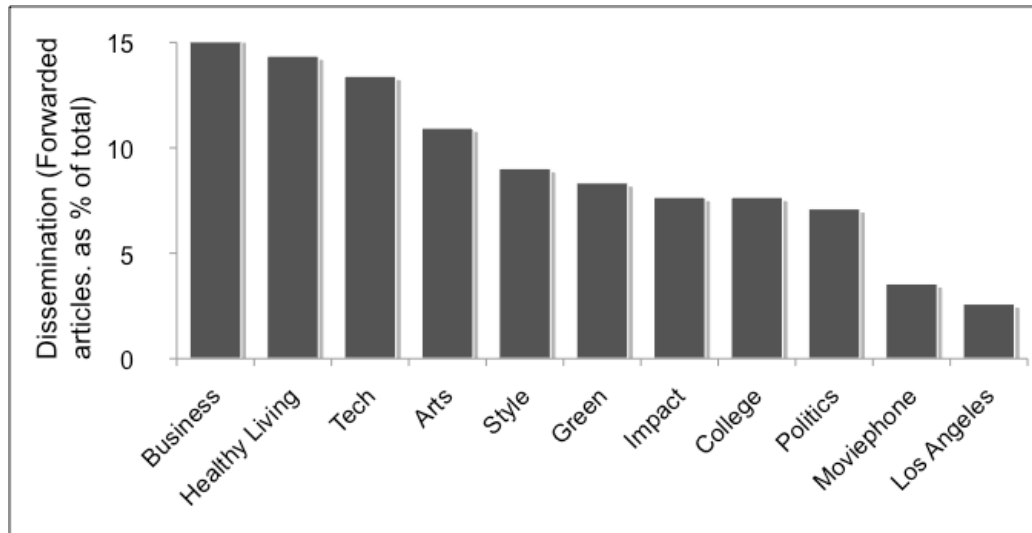


Figure 8. Topics of interests ($n=11$) for creative professionals as measured by percentage of forwarded articles

5 SUMMARY AND CONCLUSION

Our study of thirty-one crowdsourced challenges using a social network platform and new social media shows that applying crowdsourcing in design research, using the Six Step Co-creation Cycle method, represents a quick, low-cost alternative to the initial phases of design research. The approach can be used for examining assumptions and uncovering biases, as well as, gathering information. It provides insights into a wide range of design topics of varying complexity. These range from fashion and regional design languages to design for marginalized users and open innovation, contributing to knowledge from strategy and context to execution.

The advantages of using an established social network platform, such as LinkedIn, for crowdsourcing, are that no platform development, administration or maintenance or recruitment of participants is required. Professional communities already exist and can be reached at no expense for platform use. Since group members are alerted of new challenges and are accustomed to using the platforms, a high level of engagement is achieved. However, engagement is highly topics-related, such that creative professionals mainly contribute to design related topics and less to business related topics.

Group size and engagement is invert correlated and large (10,000 – 100,000 members) and small groups (500 – 5,000 members) engage to the same extent in incremental and breakthrough challenges. Thus, targeting larger and more heterogeneous groups and smaller more homogenous groups does not present a tradeoff in participation.

Insights from crowdsourced research are disseminated as readily on new social media as that written by experts on these subjects. Furthermore, observing engagement on LinkedIn (number of comments), dissemination by The Huffington Post (number of forwarded articles) provides behavioral metrics of familiarity with topics as well as levels of interest.

Regular crowdsourcing and using SSCC, however, does not facilitate community building, since the number of groups participating and engagement does not increase over time. This has the advantage that it is possible to directly compare challenge engagement, and the groups' ability to contribute, over time.

Drawbacks to applying crowdsourcing are that the communities are unable to synthesize insights/solutions and this has to be done separately by the design research team. Furthermore, the knowledge gathered varies widely in quality, and verification can be time consuming. An attempt to

address this within the SSCC method is to have three or more experts review the summary of the crowdsourcing challenge and conduct fact checking on questionable findings.

Another is establishing when applying crowdsourcing in new product development is most advantageous. Our experience with crowdsourcing in research and product development suggests that the method offers especially valuable insights early in the process. Crowdsourcing has successfully informed research objectives in research as well as business strategies and business models in product design.

Further research opportunities would be exploring how to expand the use of crowdsourcing to entrepreneurial endeavors, where typically the knowledge gap is huge, the risk high, development speed crucial and resources scarce. One way to investigate this could be to conduct semi-controlled experiments in startup accelerators and incubators.

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