Your Photo is so Funny that I don't Mind Violating Your Privacy by Sharing it: Individual Humor Styles and Photo-sharing Behaviors

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Abstract

Sharing photos of strangers, sometimes with additional alterations (e.g., overlaying text captions to create memes), has become commonplace online. Such photos often go 'viral' because of their humorous aspects and reach a large audience. Such widespread attention, however, can pose significant risks to the privacy of the people appearing in them. Interventions such as encouraging photo-sharers to consider the consequences of their sharing may be a viable approach to restrict the circulation of such photos, but requires understanding how individual differences affect photo-sharing behaviors. In this study, we investigated how the *humor style* of a person dictates their photo-sharing behaviors. Our results suggest that *humor style* is a significant predictor of the likelihood to share memes. In particular, our finding suggest that people with a more aggressive and self-deprecating style of humor are most likely to violate the privacy of others when sharing photos online. Our findings have implications for the design of effective strategies based on personal characteristics to discourage the sharing of photos that can violate others' privacy.

1 Introduction

Sharing photos is becoming a dominant form of communication over online social media, as indicated by the unprecedented growth in the number of photos shared every day [36] as well as traditional social media (e.g., Facebook) being outpaced in popularity by photo-sharing applications (e.g., Instagram and Snapchat) [16, 25]. Users of these platforms not only post their own photos but also engage in (re-)sharing photos posted by their social contacts, often with a larger audience, and sometimes even posting these photos publicly. Such sharing of photos poses privacy risks to the people appearing in those photos in many ways. Photos shared on social media can reach people outside of the 'imagined audience' [3, 24] and may lead to 'context collapse' [6, 7, 28]. Often photos of strangers are used for a completely different purpose than originally intended and in different contexts, e.g., memes, which have become a popular source of entertainment in recent years. Memes are made using humorous or embarrassing photos, possibly with further alterations such as overlaying text capations that are often derogatory to the photo-subjects. There have been many occasions where people appearing in memes were maligned or embarrassed in front of a large audience, leading to psychological distress and disruption in their professional and personal lives [5, 33].

Technical solutions have been implemented in online platforms to limit the dissemination of a shared item to the intended audience. For example, Facebook allows users to specify who can view a shared photo. But such mechanisms cannot prevent one from re-sharing an item with a larger audience on the same or different platforms. In the case of multiple people co-owning a photo (e.g., a group photo), researchers have identified mechanisms to enable negotiations among the co-owners who differ in their sharing or privacy preferences [37]. Such solutions, however, are not applicable while sharing photos of strangers (e.g., memes) as they cannot effectively exercise ownership even though they are the subjects in the photos being shared. To prevent privacy violations created by sharing photographs of people without their consent or knowledge on social media, a promising approach might be to raise awareness among the users of such platforms – people who create, propagate, and consume content – regarding how their activities may harm others' privacy and encourage them to adopt privacy-respecting behaviors.

Behavioral interventions have been employed to help people make 'better' decisions regarding privacy and security in many contexts (see work by Acquisti et al. [2] for a review). But their success has been limited as the interventions

were generic and designed without considering individual differences [22]. In the context of sharing photos of strangers, Amon et al. found surprisingly that nudges designed to reduce the sharing of photo-memes amplified unintended behavior — participants who were primed to consider the photo-subjects' privacy demonstrated a *higher* sharing likelihood compared to the control group [4]. This finding highlights the necessity of systematic studies to discover what photo-specific, personal, and contextual factors influence photo-sharing behaviors and how they interact with individual differences so that more directed and personalized interventions can be invented.

In this paper, we seek to understand whether individual humor styles – *why* one uses humor (e.g., to enhance the self or to please others) and the *type* of humor used (e.g., benevolent or disparaging) [26] – influences the sharing of photos of other people. Our ultimate goal is to design *personalized* interventions to elicit privacy-respecting behaviors such as reduced sharing of photos that may violate others' privacy and encourage the adoption of privacy-enhancing tools, e.g., obfuscating people in photos [19, 20] depending on their roles [18] to protect their privacy. Through an online experiment, we collected data about participants' decisions (N=152) to share photo-memes as well as their past history of sharing other people's (both familiar people and strangers) photos on social media. Additionally, individual humor style was measured using the widely popular Humor Style Questionnaire [26].

After clustering the participants based on their scores along four dimensions of humor [26], we measured the group differences in photo-sharing behaviors. We found that the type of humor as well as valence of photos (whether the photos portray the subjects positively or negatively) can affect sharing behaviors. In particular, we found that participants with a more aggressive and self-deprecating style of humor were more likely to share 'very negative' photos of other people. These results indicate that generic interventions to discourage the sharing of sensitive photos are unlikely to succeed at scale since advancing social connections are among the most important motivations for sharing photos online [29] and how people use humor to initiate or strengthen social relationships depend on their humor types [26].

2   Background and related work

Prior works examining the effects of individual differences on social media usage and information-disclosing behaviors have mostly focused on the Big Five personality traits [14]. For example, several researchers reported that 'extraversion' and 'openness' to new experiences were positively correlated with social media usage, while 'emotional stability' was a negative predictor [11,31]. Ryan and Xenos further suggested that Facebook users were less 'conscientious' and socially lonely [31]. Moore and McElroy reported that people high in 'conscientiousness' made significantly fewer posts on Facebook about themselves and others [27]. Additionally, these people expressed more regret about posts with inappropriate content than did less conscientious users, and this was also true for 'agreeableness' [27].

Regarding privacy concerns in the context of online social media, researchers have studied how they differ across gender and age [9,10,21,34,35]. These works suggest that women are more privacy concerned [21,34] and risk-averse [9,10] than men while older people are more concerned about privacy risks [39,40] and proactively protect their data compared to younger adults [39]. More relevant to the current work, Amon et al. employed a shorter version [30] of the original questionnaire for the five-factor model, but did not find any association between personality traits and concerns for others' privacy in the context of photo-sharing. Critically, we did not find any research investigating how different humor styles [26] correspond to photo-sharing behaviors and concerns for others' privacy, even though *individual humor style* was extensively studied and shown to be associated with other relevant individual characteristics such as empathy [17], pro-social [13] and narcissistic [38] behaviors, and cyberbullying [32].

Below, we briefly outline the four dimensions of humor as discovered by Martin et al. [26] before describing their relevance in the context of photo-sharing and privacy:

Affiliative humor. Individuals who are high on this dimension tend to use harmless humorous content to entertain others with the goal of creating new or nourishing existing social relationships.
Self-enhancing humor. This dimension involves using benign humor to please the self.
Self-defeating humor. Individuals high in this dimension attempt to please others using self-disparaging humor.
Aggressive humor. This dimension of humor relates to the use of sarcastic, ridiculous, and disparaging humor without regard for its potential impact on others.

Creating new social connections and strengthening existing relationships are among the most important reasons for sharing photos online [29], and people with high levels of 'affiliative' and 'self-defeating' humor are more likely to pursue these goals. People high in 'affiliative' and 'self-enhancing' humor are also more likely to possess empathy for others [17] and exhibit pro-social behaviors [13], and thus are probably more likely to have higher concerns about others' privacy. In contrast, people high in 'aggressive' humor may engage in sharing embarrassing photos or memes of others, disregarding the consequences of their actions. Finally, memes are created and shared mostly because of their humorous aspect, as confirmed by Amon *et al.* [4], providing further support to the appropriateness of studying photo-sharing preferences through the lens of individual humor styles.

3   Method

Survey instrument and stimulus dataset. We conducted an online survey based experiment, where participants were

shown 98 photo-memes (collected by Amon et al. [4]) in random order. As in Amon et al.'s study, participants were asked "*How likely are you to share this photo on social media?*." Sharing-likelihood was measured using a 7-point Likert item (-3 = Extremely unlikely to 3 = Extremely likely). Each of these photos belonged to one of the four valence groups – 'very negative', 'negative', 'positive', and 'very positive' – depending on its 'valence score' (i.e., whether it portrays the people appearing in it in a positive or negative light). The 'valence score' was computed as the average of ratings for each photo provided by 400 participants in a separate study conducted by Amon et al. [4].

Next, participants answered the 32 questions taken from the Humor Style Questionnaire [26] and the following three questions that were designed to measure their past history of sharing other people's photos on social media including those that may have violated the photo-subjects' privacy:

Q1. Have you ever shared an embarrassing picture online of someone else you know?

Q2. Have you ever shared an embarrassing picture online of a stranger (someone that you do not personally know)?

Q3. Have you ever posted a picture of a stranger (i.e., someone you do not personally know), which may have violated his or her privacy?

Participants responded to these questions by selecting one of the three options: 'Yes', 'No', and 'Maybe'. The survey also included questions about social media usage (e.g., number of social media accounts and frequency of visits).

The survey was implemented in Qualtrics [1] and participants were recruited through Amazon's Mechanical Turk [8] service. Responses from 152 participants were recorded (43.9% female, 55.8% male). A majority of them were between the ages of 30–49 years (98, 64%), followed by 18–29 years (27, 18%), 50–64 years (25, 16.5%), and 65 years or older (2, 1.6%). The median completion time for the survey was 37 minutes while 75% of the participants completed it within 49 minutes. Participants were paid $5 for their time.

Method of analysis. Following prior work [12,23], first we conducted a cluster analysis to group the participants based on their scores along the four dimensions of humor style. In agreement with these previous studies [12,23], we found that a three-clusters structure was most appropriate based on the 'elbow-method' [15]. The z-scores of the cluster means along those dimensions are shown in Table 1. Cluster 1 has an above-average amount of all four humor styles, while Cluster 2 has below average scores in all humor styles. Cluster 3 has above-average scores for the 'affiliative' and 'self-enhancing' sub-scales while below-average for the 'self-defeating' and 'aggressive' sub-scales. Interestingly, the properties of these three clusters are strikingly similar to those discovered in prior studies [12,23]. We therefore followed Leist and Müller [23] and named the three clusters: 'humor endorsers' (N=55), 'humor deniers' (N=42), and 'self-enhancers' (N=55).

Table 1: Z-scores of the cluster means along the four dimensions of humor.

	Cluster 1 Endorsers	Cluster 2 Deniers	Cluster 3 Self-enhancers
Affiliative	0.31	-1.16	0.52
Self-enhancing	0.25	-1.12	0.55
Self-defeating	0.75	-0.40	-0.59
Aggressive	0.74	-0.17	-0.75

After clustering participants, we tested whether there were any group differences in photo-sharing preferences. To analyze photo-sharing likelihood as a function of humor type, we used a mixed linear model with 'sharing-likelihood' as the dependent variable and 'photo valence', 'humor type', and their interaction terms as the predictors. We controlled for 'gender', 'age', 'number of social media accounts', and 'photo-sharing frequency'. All pairwise comparisons (with appropriate method for p-value correction) were performed using the estimated means obtained from this model.

To examine the extent to which meme-sharing behaviors under the controlled experimental setup generalize to photo-sharing behaviors in real life, we computed how a participant's average meme-sharing likelihood correlates with their past history of sharing others' photos. Finally, we conducted a chi square test-of-independence to determine if there is any association between 'humor type' and past history of sharing sensitive photos of others by coding the responses ('Yes' = 1, 'No' = 0; 'Maybe' responses were ignored for this analysis).

4 Findings

Finding 1. People who frequently use humor (i.e., *humor endorsers*) were significantly *more likely* to share memes with *very negative* valence than others.

The analysis of variance on the linear mixed model revealed a significant effect of 'humor cluster' on meme-sharing likelihood ($F(2, 436) = 8.68$, $p < 0.001$), which was moderated by 'photo valence' ($F(6, 42292) = 4.7$, $p < 0.001$). This indicates that participants in different humor clusters exhibited different sharing preferences, which further depended on the photo-valence (as illustrated in Fig. 1). Pairwise comparisons revealed that for 'very negative' photos, 'humor endorsers' demonstrated significantly higher sharing likelihood ($M = -0.85$, $SE = 0.165$) than both 'self-enhancers' ($M = -1.66$, $SE = 0.14$) and 'humor deniers' ($M = -1.45$, $SE = 0.150$), $p = 0.03$ and $p < 0.0001$, respectively. All other comparisons were non-significant. In summary, *humor endorsers* were more likely to share memes that negatively portray other people and thus threaten their privacy.

Finding 2a. Participants' meme-sharing likelihood was significantly correlated with their past history of photo-sharing behaviors on social media.
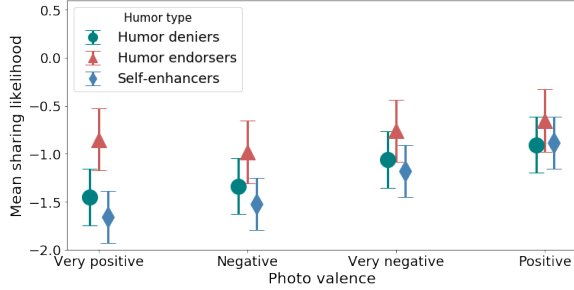
Figure 1: Mean and 95% CI of sharing likelihood.

We found a significant correlation between participants' likelihood of sharing photos during the study and their past history of sharing embarrassing photos of people they know (question Q1, $r = 0.16$, $p < 0.0001$) and strangers (question Q2, $r = 0.23$, $p < 0.001$). But photo-sharing likelihood during the study was not significantly associated with real-life sharing of photos that may have violated strangers' privacy (question Q3, $r = 0.11$, $p > 0.05$).

Finding 2b. Past history of sharing *privacy-sensitive* photos of other people on social media was *significantly* associated with participants' humor type. *Humor endorsers* shared embarrassing and privacy-violating photos of others more than expected.

Chi square tests-of-independence revealed a significant association between 'humor type' and photo-sharing history. More specifically, membership in a 'humor cluster' was significantly associated with past behavior of *sharing embarrassing photos of familiar people* ($\chi^2(2) = 18.12$, $p < 0.0001$), *sharing embarrassing photos of strangers* ($\chi^2(2) = 13.5$, $p < 0.001$), and *sharing photos of strangers that may have violated their privacy* ($\chi^2(2) = 7.30$, $p < 0.05$). To examine the nature of these differences more closely, we plotted the expected frequency of sharing privacy-sensitive photos assuming there was no association between humor type and sharing preference, along with the observed frequencies (i.e., the actual sharing data reported by the participants) in Fig. 2.

In all cases, 'humor endorsers' shared others' embarrassing and privacy-violating photos more than expected. These results are consistent with their meme-sharing behavior during the study: 'humor endorsers' chose to share memes that portray others negatively (hence more privacy-sensitive) significantly more than 'self-enhancers' and 'humor deniers' (Finding 1).
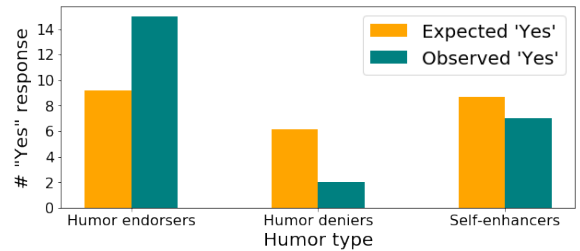
5 Conclusions

Sharing photos of strangers on social media, often accompanied by defaming text captions, pose significant privacy risks to the photo-subjects who have no means to prevent such acts. In this paper, we studied the association of *individual*
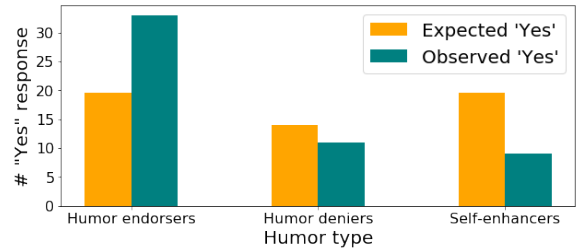
(a) Question Q1
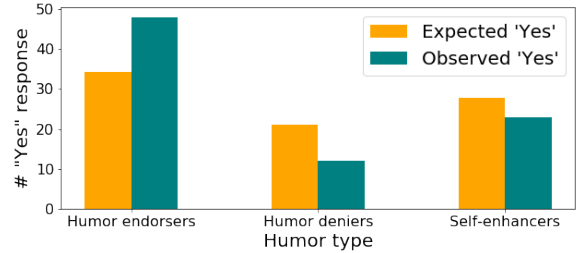
(b) Question Q2

(c) Question Q3

Figure 2: Expected and observed number of 'Yes' response when study participants were asked whether they have shared *embarrassing* or *privacy-violating* photos of other people.

humor style with photo-sharing behaviors. We found that the study participants who use humor more aggressively or as self-deprecation more frequently than average ('humor endorsers') were more likely to share photos of strangers that depict the photo-subjects *negatively*. Our study also provides evidence that *humor style* dictates photo-sharing activities in real life. We hope these findings will be valuable in designing personalized interventions to raise awareness among the photo-sharers about the consequences of their actions and encourage them to adopt privacy-respective and pro-social behaviors.

Acknowledgments

References

[1] Qualtrics. https://www.qualtrics.com, 2020.

[2] Alessandro Acquisti, Idris Adjerid, Rebecca Balebako, Laura Brandimarte, Lorrie Faith Cranor, Saranga Komanduri, Pedro Giovanni Leon, Norman Sadeh, Florian Schaub, Manya Sleeper, Yang Wang, and Shomir Wilson. Nudges for Privacy and Security: Understanding and Assisting Users' Choices Online. *ACM Comput. Surv.*, 50(3), 8 2017.

[3] Alessandro Acquisti and Ralph Gross. Imagined communities: Awareness, information sharing, and privacy on the {F}acebook. In *Privacy enhancing technologies*, pages 36–58. Springer, 2006.

[4] Mary Jean Amon, Rakibul Hasan, Kurt Hugenberg, Bennett I Bertenthal, and Apu Kapadia. Influencing Photo Sharing Decisions on Social Media: A Case of Paradoxical Findings. In *the Proceedings of the IEEE Symposium on Security & Privacy (SP '20)*. IEEE Computer Society, 5 2020.

[5] BBC. 'Can't hide it forever': The model who became a meme, 2016.

[6] danah boyd. *Taken out of context: American teen sociality in networked publics*. PhD thesis, University of California, Berkeley, 2008.

[7] danah boyd. *It's complicated: The social lives of networked teens*. Yale University Press, 2014.

[8] Michael Buhrmester, Tracy Kwang, and Samuel D Gosling. Amazon's Mechanical Turk: A New Source of Inexpensive, Yet High-Quality, Data? *Perspectives on Psychological Science*, 6(1):3–5, 2011.

[9] James P Byrnes, David C Miller, and William D Schafer. Gender differences in risk taking: a meta-analysis. *Psychological bulletin*, 125(3):367, 1999.

[10] Gary Charness and Uri Gneezy. Strong Evidence for Gender Differences in Risk Taking. *Journal of Economic Behavior & Organization*, 83(1):50–58, 2012.

[11] Teresa Correa, Amber Willard Hinsley, and Homero Gil [de Zúñiga]. Who interacts on the Web?: The intersection of users' personality and social media use. *Computers in Human Behavior*, 26(2):247–253, 2010.

[12] Thomas Rhys Evans and Gail Steptoe-Warren. Humor Style Clusters: Exploring Managerial Humor. *International Journal of Business Communication*, 55(4):443–454, 2018.

[13] Rossella Falanga, Maria Elvira De Caroli, and Elisabetta Sagone. Humor Styles, Self-efficacy and Prosocial Tendencies in Middle Adolescents. *Procedia - Social and Behavioral Sciences*, 127:214–218, 2014.

[14] Lewis R Goldberg. The development of markers for the Big-Five factor structure. *Psychological assessment*, 4(1):26, 1992.

[15] Robert Gove. Using the elbow method to determine the optimal number of clusters for k-means clustering. *URL: https://bl. ocks. org/rpgove/0060ff3b656618e9136b*, 17:19, 2015.

[16] Isobel Asher Hamilton. Instagram has avoided Facebook's trust problem, beating its parent as app of choice for Generation Z, 2019.

[17] William P Hampes. The Relation Between Humor Styles and Empathy. *Europe's Journal of Psychology*, 6(3):34–45, 2010.

[18] Rakibul Hasan, David Crandall, and Mario Fritz Apu Kapadia. Automatically Detecting Bystanders in Photos to Reduce Privacy Risks. In *2020 IEEE Symposium on Security and Privacy (SP)*, Los Alamitos, CA, USA, 5 2020. IEEE Computer Society.

[19] Rakibul Hasan, Eman Hassan, Yifang Li, Kelly Caine, David J Crandall, Roberto Hoyle, and Apu Kapadia. Viewer Experience of Obscuring Scene Elements in Photos to Enhance Privacy. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, CHI '18, pages 47:1–47:13, New York, NY, USA, 2018. ACM.

[20] Rakibul Hasan, Yifang Li, Eman Hassan, Kelly Caine, David J. Crandall, Roberto Hoyle, and Apu Kapadia. Can privacy be satisfying? On improving viewer satisfaction for privacy-enhanced photos using aesthetic transforms. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, volume 14, page 25. ACM, 2019.

[21] Mariea Grubbs Hoy and George Milne. Gender Differences in Privacy-Related Measures for Young Adult Facebook Users. *Journal of Interactive Advertising*, 10(2):28–45, 2010.

[22] Bart P Knijnenburg. Simplifying Privacy Decisions: Towards Interactive and Adaptive Solutions. In *Decisions@ RecSys*, pages 40–41, 2013.

[23] Anja K. Leist and Daniela Müller. Humor Types Show Different Patterns of Self-Regulation, Self-Esteem, and Well-Being. *Journal of Happiness Studies*, 14(2):551–569, 2013.

[24] Amanda Lenhart, Kristen Purcell, Aaron Smith, and Kathryn Zickuhr. Social Media & Mobile Internet Use among Teens and Young Adults. *Pew internet & American life project*, 2010.

[25] Natasha Lomas. Teens favoring Snapchat and Instagram over Facebook -says e-marketer, 2017.

[26] Rod A Martin, Patricia Puhlik-Doris, Gwen Larsen, Jeanette Gray, and Kelly Weir. Individual differences in uses of humor and their relation to psychological well-being: Development of the Humor Styles Questionnaire. *Journal of Research in Personality*, 37(1):48–75, 2003.

[27] Kelly Moore and James C McElroy. The influence of personality on Facebook usage, wall postings, and regret. *Computers in Human Behavior*, 28(1):267–274, 2012.

[28] Helen Nissenbaum. *Privacy in context: Technology, policy, and the integrity of social life*. Stanford University Press, 2009.

[29] Anne Oeldorf-Hirsch and S Shyam Sundar. Social and Technological Motivations for Online Photo Sharing. *Journal of Broadcasting and Electronic Media*, 60(4):624–642, 2016.

[30] Beatrice Rammstedt and Oliver P John. Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality*, 41(1):203–212, 2007.

[31] Tracii Ryan and Sophia Xenos. Who uses Facebook? An investigation into the relationship between the Big Five, shyness, narcissism, loneliness, and Facebook usage. *Computers in Human Behavior*, 27(5):1658–1664, 2011.

[32] Serkan Volkan Sari. Was it just joke? Cyberbullying perpetrations and their styles of humor. *Computers in Human Behavior*, 54:555–559, 2016.

[33] Shane Larkin. Memes that destroyed lives, 2017.

[34] Kim [Bartel Sheehan]. An investigation of gender differences in on-line privacy concerns and resultant behaviors. *Journal of Interactive Marketing*, 13(4):24–38, 1999.

[35] Kim Bartel Sheehan. Toward a Typology of Internet Users and Online Privacy Concerns. *The Information Society*, 18(1):21–32, 2002.

[36] Kit Smith. 53 Incredible Facebook Statistics and Facts, 2019.

[37] J M Such and N Criado. Resolving Multi-Party Privacy Conflicts in Social Media. *IEEE Transactions on Knowledge and Data Engineering*, 28(7):1851–1863, 2016.

[38] Virgil Zeigler-Hill and Avi Besser. Humor style mediates the association between pathological narcissism and self-esteem. *Personality and Individual Differences*, 50(8):1196–1201, 2011.

[39] Eva-Maria Zeissig, Chantal Lidynia, Luisa Vervier, Andera Gadeib, and Martina Ziefle. Online Privacy Perceptions of Older Adults. In Jia Zhou and Gavriel Salvendy, editors, *Human Aspects of IT for the Aged Population. Applications, Services and Contexts*, pages 181–200, Cham, 2017. Springer International Publishing.

[40] Tomasz Zukowski and Irwin Brown. Examining the Influence of Demographic Factors on Internet Users' Information Privacy Concerns. In *Proceedings of the 2007 Annual Research Conference of the South African Institute of Computer Scientists and Information Technologists on IT Research in Developing Countries*, SAICSIT '07, page 197–204, New York, NY, USA, 2007. Association for Computing Machinery.