

Sharing in Public: Working With Others in Ghanaian Cybercafés

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ABSTRACT

In this paper, we explore the different ways in which people collaborate and share knowledge in public Internet venues, or cybercafés, in Ghana, West Africa. Based on 150 survey interviews conducted in two different cybercafés, one urban and business-oriented and the other peri-urban and family-oriented, we find that most cybercafé customers, largely regardless of their demographic, would like to engage in collaborative work in public Internet venues and that a large percentage already are.

Contrary to the belief of resource constraints driving shared use, those participants who reported already working together in the cybercafés generally did not cite economic motivations for their collaboration but instead identified enhanced productivity as the main reason. These collaborating respondents also reported performing more instrumental activities in the café and were more likely to have learned critical computing skills there when compared to those who were not already collaborating. Furthermore, they report being more social in their activities at the venue. Finally, we note that collaboration and peer learning is not always planned or made public; voyeuristic forms of knowledge sharing, such as when someone glances at a stranger's computer screen, are also cited by our survey participants as a learning opportunity in these public venues.

We argue that these reported benefits demonstrate a unique value of public Internet venues, where collaboration is shown to be a tool for learning, enhancing productivity, and facilitating instrumental output.

Categories and Subject Descriptors

H.5.3 [Information Interfaces and Presentation]: Group and Organization Interfaces—*collaborative computing*

General Terms

Human Factors

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Keywords

Collaboration, knowledge sharing, public Internet venues

1. INTRODUCTION

In many African countries, where computer ownership and home and business Internet access is rare, public access venues, especially in the form of business-operated cybercafés, are how most people access computers and the Internet. This public access, especially in these low-income settings, is often viewed as born of economic necessity and considered to be a second-best alternative when compared to private individualized access. In this study, we interrogate this assumption, finding that public access can support forms of collaboration and knowledge sharing that enhance learning and productivity. In this way, public shared access is not necessarily second-best to private individualized contact, but may in some contexts be a preferred access method. Our findings are the result of a survey of collaboration and shared work among visitors to two Ghanaian public Internet cafés, one urban and business-oriented and the other peri-urban and family-oriented.

2. RELATED WORK

A few prior studies have examined how information and communication technologies, knowledge, and equipment can be shared among colocated individuals in schools and public venues (see [5] for a larger review).

2.1 Device Sharing

The telephone is a widely shared communication technology in many parts of the world, and a number of researchers have examined the dynamics of phone sharing. Very recent work has focused particularly on non-commercial sharing of individually owned mobile phones where friends, family, or co-workers share handsets or phone credit [6, 13]. Additional studies have examined commercial forms of phone sharing, such as at public call offices, where entrepreneurs sell time on a publicly accessible telephone [5]. A famous example of this form of commercial phone sharing is the Village Phone Operator model made particularly notable in Bangladesh through the Grameen Phone network [4, 8].

An ethnographic study of intermediated technology use in Bangalore, India also explored device sharing, and cited fear of technology, lack of literacy or technical skills, habits of dependency, cost, and access constraints as some factors motivating intermediated interactions [17]. While technology use in cybercafés is not always intermediated, we note

that some of these motivations are echoed in our observations in the cybercafé setting.

2.2 Computer Sharing in Schools

Sharing of computer equipment among students is ubiquitous, especially in low-income settings. For instance, a survey on classroom computer use within four different states in India noted “during 28 field observations, we found no cases where only one child was at a single computer terminal. At times, as many as 10 children grouped around one computer” [14]. This computer sharing is an outcome not just of resource constraints but also stems from social and pedagogical motivations; indeed as we will see even outside of classroom settings, such sharing can enhance communication, collaboration, and learning.

Technical innovations have been developed to enhance the educational outcomes that arise from collocated computer sharing in schools. In 1998, computer scientists studied how students “collaborate via a shared computer with a single shared display and simultaneous use of multiple input devices” [18]. The computer set-up, which enabled co-present users to collaborate, was called Single Display Groupware (SDG). In a four week long controlled experiment elementary school students were randomly asked to do similar tasks in a single input device condition, or an SDG setting with two mice. The majority of the students (85%) found the shared-use setup easier, and at the same time all but one student found the shared use more fun.

Similarly, Microsoft Research developed a system in which multiple mice are connected to a single computer. Each mouse controls an individual’s uniquely colored cursor on a single shared screen. In one experiment, Microsoft compared learning levels in an English language retention task between students individually operating a standard computer and groups of students using a single display, multiple mouse system. It was found that students using the “multimouse” configurations performed equally well as those using single-user systems for this retention task. Moreover, in some cases the multimouse systems resulted in enhanced learning outcomes, for instance amongst boys when they were required to collaborate on the learning activity [15].

2.3 Computers and the Cybercafé

A few studies have helped identify the importance of public shared computer facilities, especially in low-income settings. For instance, a survey of 280 small and medium enterprises (SMEs) conducted across 14 African nations found that more than half the respondents reported the Internet as either important or very important to their business but only 18.7% of responding enterprises had direct access to the Internet [19]. This dramatic access gap among SMEs is closed in most cases through the use of cybercafés and other shared access facilities. Seventy-two percent of those respondents who did not have direct access to the Internet were able to use cybercafés for some access.

Adding to our understanding of the importance of cybercafés in these African settings, studies have also examined the general flow of activities and patterns of usage in African cybercafés and the rise of a cybercafé culture [9, 10]. For instance, one series of papers has focused specifically on a set of Nigerian cybercafé case studies [1, 2, 3].

A limited number of studies have examined the forms of collaboration and learning that occurs in cybercafés. For ex-

ample, Sairosse noted that people often chose Internet cafés because they offer some form of IT training [16]. Similarly, Haseloff examined Indian cybercafés, which “can function as a center for support, education and learning about new tools and therefore could help people overcome skill deficits which would normally exclude them from access to new technologies,” [11]. Researchers studying cybercafés in both Asia and Africa noted that many people gained IT knowledge there. In a cybercafé in Yogyakarta, Indonesia 66% percent of the respondents stated that they learned IT skills from friends, while 23% learned from the café’s staff. In a Tanzania study, respondents tended to ask for help from the staff, altogether 44% learned IT skills from the staff while 29% asked for help from their friend [7].

Jenna Burrell has conducted a multi-year ethnographic study of Ghanaian cybercafés (including research at one of our field locations, Busy Internet). She has noted ways in which cybercafés became shared spaces for creating face-to-face relationships. “For youth in groups, visits to the Internet café served as a way to build social cohesion within peer groups, as well as to establish individual status and roles” [7].

Finally, an earlier report originating from our survey work at just a single Ghanaian cybercafé (Busy Internet) was reported in [6].

3. BACKGROUND AND METHODOLOGY

Our study consisted of surveying a total of 150 customers at two Internet cafes in Accra, Ghana, in West Africa. In Ghana, public cybercafés are the most common method for people to gain access to PCs and the Internet [12, 9]. Therefore understanding the constraints and affordances of public computer work – and how these venues may or may not support collaborative work – is of particular importance.

In order to sample across a range of cybercafé users, and to gain some comparative leverage, we selected two rather different Ghanaian Internet venues for our study. One, Busy Internet, is a large high-end business oriented café in the center of Accra. The other, First Page, is a small family owned café in the peri-urban outskirts of Accra.

Busy Internet was founded in 2001 with a mission to help transform the local economy to meet the opportunities of the digital age. Busy (as it is commonly called) is situated on a 14,000 square foot plot in one of Accra’s busiest commercial areas and currently has 68 computers available for use as well as a 27-seat WiFi-enabled lounge for clients who visit with their own laptops. Busy Internet also offers secretarial services, digital copying and printing, scanning, binding, and laminating. In addition the company provides for rent ready-to-use office space that is equipped with broadband Internet, fixed telephone lines, air conditioning, and furniture.

In many ways, Busy Internet is not a typical Ghanaian cybercafé. It is the largest and has the highest profile in the country and is known for an elevated quality of service and fast Internet connections. While all African cybercafé users are typically more educated and financially better off than the general population [13], this is especially true at Busy, thanks to its higher prices, better service, and overall ambiance.

The First Page Internet Café, our second venue, differs from Busy Internet in many ways. This café is much smaller, offers a lower cost of access, and is less centrally located,

situated in the Ga West District about 10 km outside of central Accra. First (as we shall sometimes call it in this report) has nine relatively out-dated computers, a printer, a server, and a scanner. It is family-owned and operated, and caters almost exclusively to local community members. In addition to basic computer and Internet access, First offers video rentals and some mobile phone services.

Seventy-five participants were interviewed in each of the two venues, for a total sample size of 150. Participant recruitment and interviews commenced at Busy Internet on 5 October 2009 and were completed on 19 November 2009. Work began at First Page on 15 December 2009 and ended on 5 February 2010. All activities were conducted on weekdays, Monday to Friday, between the hours of 10:00am to 7:00pm. Although Busy Internet is open 24 hours a day, due to the research design, we have no data regarding nighttime users and weekend visitors. Because there was no official list of café users, we could not use traditional sampling methods. Instead, we designed a simple recruitment protocol: A research assistant was positioned at the entrance of the café. If he (our research assistants were male) was not already engaged with a potential participant, he stopped and asked every entering or exiting customer who appeared to be of majority age if they would be willing to participate in a survey regarding their experiences in the café. This approach guaranteed that on weekdays, every daytime visitor had the same chance to be interviewed, so we consider the results to be representative of the population. If the person agreed, they were brought to a space reserved for the interview and led through an informed consent procedure. The study interview usually took 45 minutes to one hour to conduct. The respondents received 1.5 (at Busy) or 2 (at First Page) hours of free Internet access as compensation for participating in the study and could stop the interview at any time.

Our questionnaire consisted of 72 questions. We asked almost no open-ended questions. Almost half of the questions focused on respondents' visiting habits and their computer and internet use in the café. In this section, we asked respondents to rank and group the most important activities in the café. We also asked questions about computer sharing and various forms of collaboration in the café, including two subsections with attitudinal questions toward sharing by using Likert scale answer options. We ended the questionnaire with a block of questions regarding digital literacy and a brief demographic section.

4. DEMOGRAPHICS AND GENERAL EXPERIENCE

Survey participants from both cafés were mostly males (80%) and almost exclusively Ghanaians (93% Busy, 98% First). On average, there were older respondents, above 35 years of age, at Busy (28% were above 35, compared with 13% at First); conversely, there were more younger respondents, below 26, at First (39% vs. 19%). For both subject pools, the typical age was from 26-35 (53% Busy, 48% First). The education levels at Busy were higher than those at First, with 71% of respondents proceeding beyond secondary school compared to 48% at First. Still, we note that at both café's respondents were educated well above Ghanaian averages.

The wealth standards of respondents at both cafes echoed

this higher educational attainment. When asked surrogate questions indicative of economic standing, respondents reported relatively high financial achievement (with Busy customers higher still). For example, 97% of Busy and 93% of First respondents had electricity services at home and 53% of Busy and 24% of First respondents owned their own car.

The respondents were also quite experienced with computers and the Internet. Seventy-six percent of Busy respondents and 55% of First participants reported more than five years experience with computers while 60% at Busy and 40% at First reported more than five years experience using the Internet. Across both cafes, most respondents (55%) reported learning about computers in school as opposed to standalone formal courses, self-training, friends, or café staff. However, when asked how they learned about the Internet, a majority of respondents (54%) mentioned self-training and only 9% said they learned about the Internet at school. Five percent of respondents reported learning about computers from café staff, while a larger 23% stated that they learned about the Internet from café staff. (Though note below that the significant majority of customers ask technical questions of the café staff and report learning specific skills in the public venue beyond just computers or the Internet.) Across this set of questions, there was no significant difference in answers between the two venues.

In summary, respondents from both cafes were mostly male, well educated, financially well off, and had considerable experience with computing and the Internet.

Twenty-five percent of Busy respondents had travelled greater than 5 km to reach the venue compared with just 1% at First. Conversely, while just 12% of Busy subjects traveled less than 1 km, that was the case for 39% of First respondents. A full 90% of Busy respondents stated that it was their preferred Internet café compared with just 49% of First participants. While 87% of First respondents stated that they visited the cybercafé at least once a week or more, this was true for only 60% of Busy participants. Thus, First customers were almost entirely local and many probably visited that particular café due to its geographic convenience, while many Busy customers traveled a good distance to get there but made the effort because they favored that venue over others.

Respondents were asked to rank 14 features of the café that they thought were most important. Visitors at Busy most valued its high quality computers and relatively good Internet connections, while folks at First reported that knowledgeable staff and high quality assistance were the most important feature. A safe location and the appealing layout and design of the venue were important in both cafes.

Finally, respondents were asked what they considered to be the most important activities they performed in the café. For both cafes, the clear number one activity was reading and sending emails. At First, other important activities included general browsing of the Internet and social networking activities, while at Busy, commerce, business activities, and searching for schools or jobs abroad were the next most important.

5. RESULTS

5.1 Helping Others in the Café

Perhaps the most obvious form of collaboration and learning among collocated individuals at cybercafés is simply

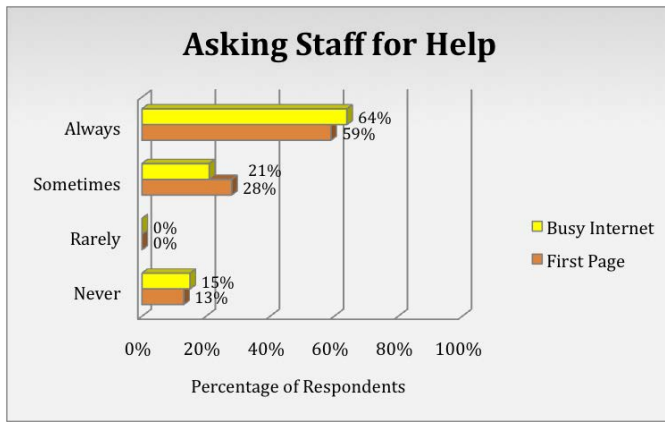


Figure 1: Reported frequency of asking for help from the staff of the café when faced with a computer-related problem.

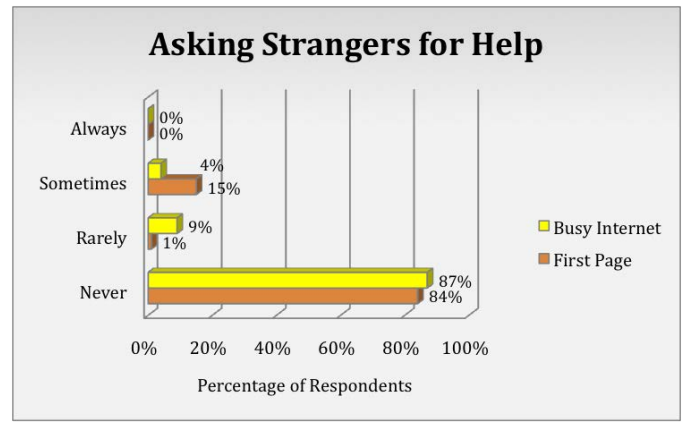


Figure 3: Reported frequency of asking for help from strangers when faced with a computer-related problem.

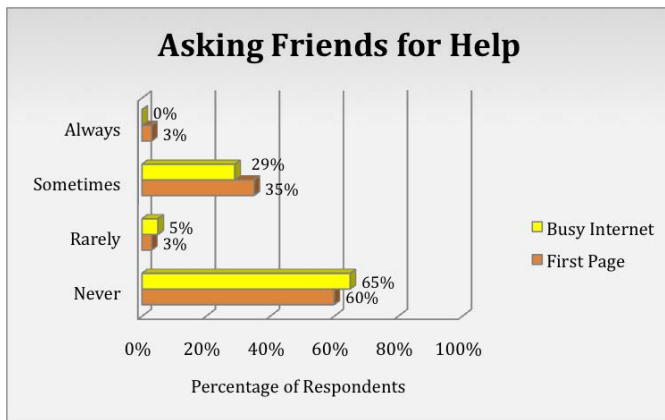


Figure 2: Reported frequency of asking for help from friends or acquaintances when faced with a computer-related problem.

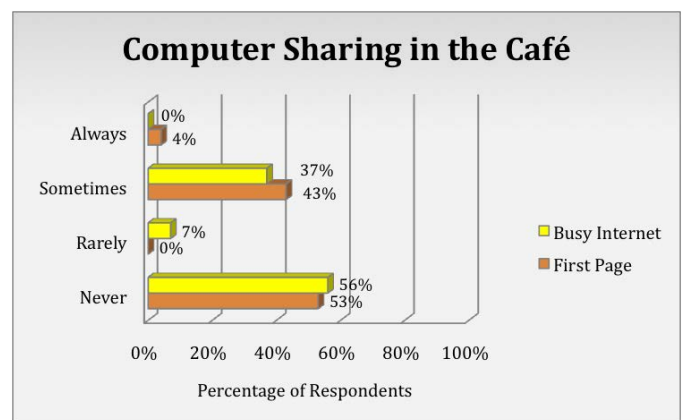


Figure 4: Reported frequency of physical computer sharing in the café.

when customers ask or answer basic computer-related questions. Indeed, when café visitors run into a problem they cannot solve alone, they often ask help from the staff of the café or from other users.

Eighty-six percent of our respondents stated that they ask the café staff for technical assistance if they have a problem with the computer systems. Asking friends or acquaintances for help at the café was less common, with 63% claiming they never do this on a four point Likert scale (always, sometimes, rarely, never). Moreover, asking help from strangers is even less common, with 85% reporting to have never done so, though respondents from First were more likely to ask strangers for help than at Busy (16% vs 13%; $\chi^2 = 10$, $p = .007$, $N = 150$). Figures 1 to 3 review these results.

5.2 Computer Sharing in the Café

The material sharing of a computer among users is certainly one of the simplest and easiest forms of collaboration to study. In much of our analysis, we will examine and compare users who report engaging in this physical sharing of a single computer versus those who do not.

Nearly half of all study participants reported at least some

physical computer sharing at the cybercafé in the past. On our four-point Likert scale, we found that respondents generally did not report “always” or “rarely” sharing a computer instead claiming to share “sometimes” or “never,” with a slight preponderance of the latter answer. Figure 4 details these responses disaggregated between the two study venues.

We note that there is no statistically significant difference in the reported level of physical computer sharing between the two venues ($\chi^2 = .11$, $p = .74$, $N = 150$), with 44% of respondents reporting some computer sharing at Busy and 47% at First. Furthermore, those who reported sharing did not represent a distinct demographic group compared with those who did not. Performing a statistical test with the main demographic variables, we found no statistically significant relationship (at the 0.5 level) between sharing and age, sex, ethno-linguistic groups, etc. (but c.f. [7] who found young users more likely to visit Ghanaian cybercafés socially and work together in groups sharing computers).

We will use this basic form of physical computer sharing as a “collaboration surrogate” and categorize our respondents into currently active or non-active sharers; below we study if this categorization can help explain variation along other variables. We have created a dummy variable which is as-

signed a “1” for those cases when the respondents always or sometimes shared a computer and otherwise assigned a “0”. The former group we will call “sharers” and the latter group will be referred to as “non-sharers”. There was no significant difference in the proportion of participants categorized as sharers between the two venues, and overall we found 45% of participants reporting as sharers under this surrogate measure. A lot of variation does exist, however, between the sharing and non-sharing participants when studied against other variables of interest. For example, when asked if they ever requested help from strangers while at the café (results reported in the previous section) we found that non-sharers were less likely to have done so, with 93% of them never asking strangers for help compared to 76% for sharers across the two venues ($\chi^2 = 9.4$, $p = .009$, $N = 150$).

5.3 Economic Motivations for Computer Sharing

Given the economic realities of many within our respondent pool, even allowing for their relative wealth, one might hypothesize that the main reason for them to share a computer would be cost-related with sharing prompted by limited financial resources. If this indeed were a primary motivation we would expect to find a correlation between measures of economic prosperity among the participants and their propensity towards computer sharing as measured by our dummy variable categorization.

As already mentioned, since economic status is difficult to measure through self-reports, we captured this through a set of surrogate questions including questions on ownership of high-value items. Participants were asked if they owned twelve different items such as a motorcycle, car, television, and home electricity service. For these twelve items we found a statistical relationship with sharing (at the 0.5 level or better) with just three – cassette players, radios, and personal computers – a suspicious list insofar as these particular commodities do not suggest to us a propensity towards sharing as compared to the others. In addition, when we asked participants a direct question regarding their employment status (were they working, in school, unemployed, etc) we found no significant relationship ($\chi^2 = .47$, $p = .49$, $n = 75$) between it and their propensity towards sharing.

In order to have a single summary economic surrogate measure across all 12 consumer items (cars, televisions, etc.), we summed up these responses by creating a single 12-point economic indicator. When we compared this economic surrogate with sharing, we did not find a relationship at Busy but we did find a statistically significant relationship at First ($\chi^2 = 11.8$, $p = .0006$, $n = 75$) with less well off people more prone towards sharing. But while the effect is statistically significant, the difference is modest, with non-sharers having only a single point elevation on average in our 12-point scale (mean of 6.3 for non-sharers vs 5.3 for sharers). This shows that economic dimensions have a mild influence on sharing habits in at least one of the venues we visited.

We also asked participants directly for the most important reasons motivating computer sharing. Only 4.7% of participants across both venues indicated sharing the cost of access as an important reason while almost 80% responded that they shared in order to learn from one another. Furthermore, when asked, most respondents claimed that they would continue to share even if the price of the service went down. If users could pay less for the Internet service, 61.8%

of the people who reported sharing would still like to share. There was no significant difference between the two venues on this line of questioning.

Given these results, we submit that there is no measurable relationship between whether a subject reports computer sharing and measures of their wealth and work status at Busy and only a very modest relationship at First. Instead, we find that learning and collaboration are the prime motivation for public computer sharing.

We also asked those who share a computer about the mechanics of their sharing and how they manage the cybercafé access costs. Almost half of the respondents (45.6%) said that he or she pays the costs entirely, approximately one third (32.4%) of the respondents said they let the other person pay the entire amount, and another 2.9% pay alternately. According to these results, only 19.1%, less than one in five, share the access costs with their partner. There were no significant differences between the two venues on this line of questions.

5.4 Learning Through Sharing

Given that educational rather than economic interests were reported as paramount to sharing among most of our respondents, we asked further questions to try and understand what and how these cybercafé users were learning. Utilizing a five point Likert scale, we asked respondents to rate how closely they affiliate with statements that they learned to type, search, or send email by watching others in a public Internet café. Overall, while only 18% state that they learned to type by watching others at a café, 39% and 43% respectively claim to have learned to search and email by watching others. In other words, more than one-third of respondents learned these two critical computer skills by being in a public Internet facility and being able to watch other patrons.

While learning motivates sharing, there was nonetheless only a weak relationship between whether a respondent was categorized as a sharer and if they responded positively to the statements related to learning from others in the café. The only statistically significant case was in learning to search on the Internet where 48% of sharing respondents agreed or strongly agreed to have learned to search by watching others in a café compared with 32% of non-sharers ($\chi^2 = 14$, $p = 0.007$, $N = 150$). Thus, sharers are a bit more likely to claim to have learned to browse the Internet thanks to a collaborative public Internet educational experience; but even one-third of non-sharers also claimed to have such an experience.

While our sharing surrogate did not explain very much variation in a respondent’s affiliation with the learning statements, there was considerable difference in responses to these statements between the two cafés (all at $p < .0001$ significance). For instance, at First 39% of respondents agreed or strongly agreed to have learned to search the web by watching others in a café compared with 28% at Busy ($\chi^2 = 24.3$, $p < .0001$, $N = 150$). Figures 5 to 7 detail all of these responses disaggregated between venues.

Below, we describe “voyeuristic learning” as a special type of collaboration where someone, for example, glances at a stranger’s computer screen. The learning described in this section may or may not be a form of voyeuristic learning; our study shows no relationship between these two lines of questioning. For example, if a respondent agrees or strongly

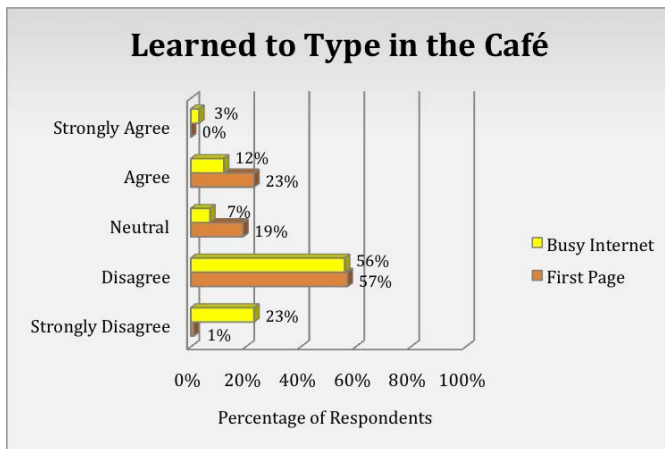


Figure 5: Likert Scale rating of the statement “I learned to type from watching others in a café.”

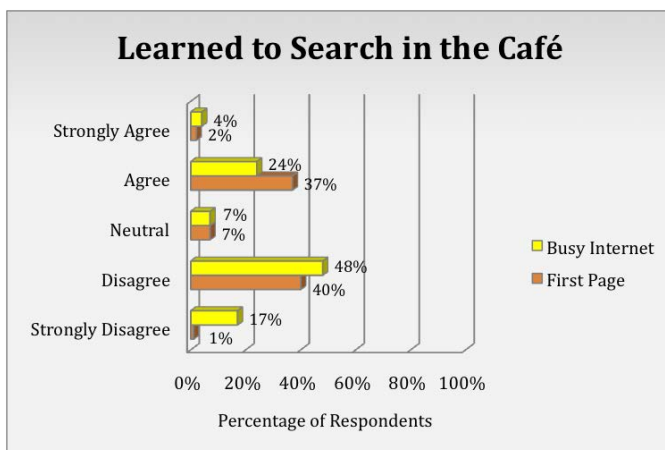


Figure 6: Likert Scale rating of the statement “I learned to search from watching others in a café.”

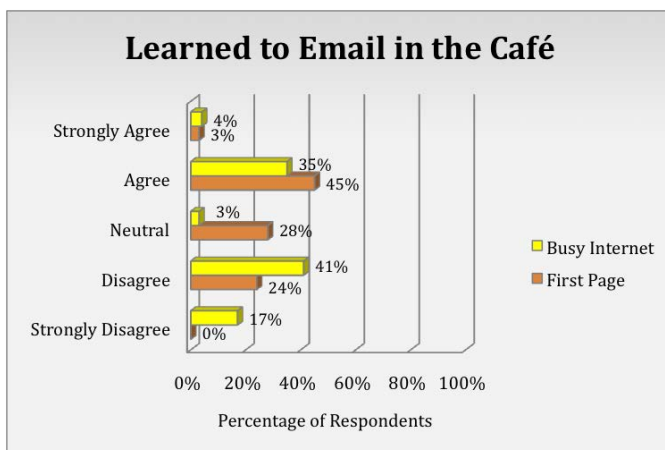


Figure 7: Likert Scale rating of the statement “I learned to email from watching others in a café.”

agrees that they sometimes look over the shoulder of another patron at the café, they are no more likely to agree that they have learned to email from others at the café ($\chi^2 = 3.7$, $p = 0.45$, $N = 150$).

We conclude from the results presented above that economic aspects are not the most important consideration behind sharing a computer with others in these public Internet venues and that educational benefits are instead the most salient. We also find that more than one-third of respondents learned some critical element of computer use, such as email or Internet browsing, by watching other people in cybercafés. Additionally, this level of in-café learning is measurably higher at First, a more informal and interactive space, compared with Busy.

5.5 Groupwork in the Café

While the physical sharing of a computer may be one of the most basic forms of co-present collaboration, in many ways we are interested in more complex forms of groupwork and collaboration – perhaps over multiple appliances and within a richer environment. Currently, there is no formal organized way for multiple people to work together at either of the cybercafés. Instead, both cafes allow some forms of group work by crowding around individual computer stations. In addition, at Busy a “laptop lane” allows users to bring their own laptop computer and connect wirelessly to the Internet. While much of this area is caroled for individual use, two large tables are present with a layout and architecture that is clearly more convivial to group collaboration.

We asked survey respondents if they would be interested in using the computers within a collaborative group setting if given this option. Only 19% responded that they would never want to participate in collaborative groupwork at the café with the largest group responding sometimes (50%) or rarely (25%). Clearly most users would like to, at times, participate in collaborative groupwork. However, there was a significant difference in the interest in groupwork between First and Busy with patrons at Busy being more likely to have an interest in this collaboration rarely (33% versus 16%) while First respondents were more likely to respond with sometimes (63% versus 37%; $\chi^2 = 11.3$, $p = .01$, $N = 150$). See Figure 8.

What other factors might best explain variation in respondent’s interest in formal collaborative groupwork in the café? First we compared the attitudes of current computer sharers and non-sharers (using the dummy variable from above) toward groupwork. Visitors who have previous sharing experience with computers are significantly more open to collaborative groupwork with sharers responding that they would always or sometimes like to engage in collaborative groupwork 78% of the time compared to 39% for non-sharers ($\chi^2 = 3.3$, $p < .0001$, $N = 150$).

Thus we reason that respondents who had previously shared their computer experience were either predisposed (perhaps in their psychological or social makeup) to collaboration at the café and thus excited about additional collaboration opportunities or had positive experience with sharing, which increased their propensities towards collaborative groupwork in the future. That notwithstanding, non-sharing respondents still did have a reasonable percentage of people willing to consider collaborative groupwork sometime in the future. And this was particularly the case in the smaller and more

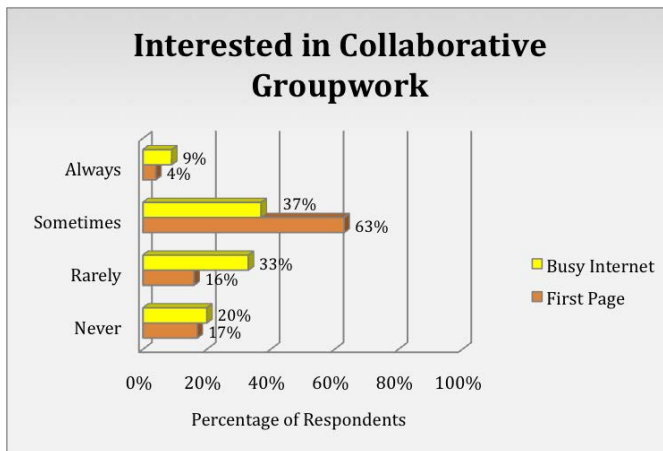


Figure 8: Percentage of visitors who are interested in collaborative groupwork.

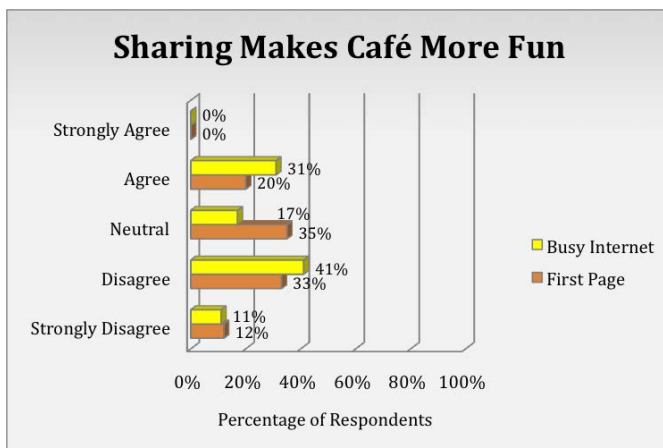


Figure 9: Likert Scale rating of the statement “Sharing makes café visits more fun.”

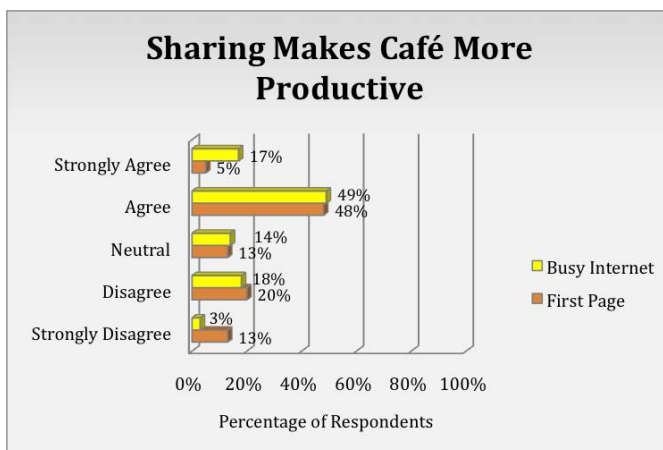


Figure 10: Likert Scale rating of the statement “Sharing makes café visits more productive.”

family oriented First Page Café.

5.6 Sharing for Productivity or Fun

We asked the respondents to evaluate different statements about sharing in Internet cafes with the help of a five point Likert scale, ranging from strongly disagree to strongly agree. In particular, we asked the café visitors if they think that sharing makes visits to the Internet café more productive or if it is more about having fun.

Respondents agreed more with the statement “sharing makes coming to the Internet café more productive” than with the statement that “sharing makes coming to the Internet café more fun.” Fifty-eight percent of respondents agreed or strongly agreed that sharing makes visiting the cybercafé more productive, while just 37% agreed or strongly agreed that sharing is more fun. But our sharing dummy variable explains a good bit of variation as to the responses to these two questions. Non-sharers are less likely to strongly agree or agree that sharing makes a visit more productive compared with sharers (46.8% vs. 73.5%; $\chi^2 = 19.9$, $p = 0.0005$, $n = 147$). Similarly, sharers are more likely to agree that collaboration makes visits more fun with 38.2% selecting agree (nobody selected strongly agree) compared with 14.1% for non-shares ($\chi^2 = 13.4$, $p = .0038$, $n = 146$).

We performed a similar disaggregated analysis of these two questions between the population from Busy and the population from First. There was no statistical difference in their response to the question regarding whether sharing is fun and there was only a truly modest difference in their responses on the productivity questions (respectively, $\chi^2 = 6.7$, $p = .07$, $n = 146$; $\chi^2 = 10.1$, $p = .04$, $n = 147$). See Figures 9 and 10 for these results.

In the demographics section above, we mentioned that by far the most popular activity at the cafes was to send and receive email and this was true for both Busy and First. When we compare how respondents rated activities against their categorization as a sharer or non-sharer we find that non-sharers list general browsing as their second most important activity, while sharers cite social networking. The third most important activity for non-sharers was reported to be searching for schools or jobs abroad, while the third most important for sharers was commerce and business activity. While productivity and instrumental activities were cited as a powerful incentive to collaborate in public Internet venues, the often non-instrumental social networks were flagged as critical applications among the sharers but not among the non-sharing respondents, though commercial and business activities come up as a very-close third. Our casual observations conforms to this response; people working together are indeed often using social networking tools together, but similarly close collaboration is often witnessed among business associates working together on a shared project. Clearly, cybercafé collaboration spans from strongly instrumental and commercial activities to primarily social uses.

5.7 Coming Together and Meeting People

Cybercafés in Ghana are not only Internet access points, but for many customers are meeting points and centers of social life and activity among friends and family. Indeed, many respondents reported traveling together or meeting friends, family members, and business associates at the café. In our survey, 50% of respondents reported usually coming to the café with other people and those people were mostly friends

(37% of those same respondents) though some came with family members (18%) or business associates (6%). And whether or not they arrive with other people, 67% report usually meeting people they know at the café. When respondents do come to the café with others, 60% responded that they sit next to each other though only 30% report that they follow along with what the other person is doing on their computer. None of these responses differed significantly between the two study venues.

Whether respondents self-reported as computer sharers or not (as defined by our dummy variable) explains a lot of variation in whether they come in a group or meet people they know at the café. While there was no significant difference between sharers and non-sharers as to whether they meet people they know at the café, sharers are more likely to travel to the café with people as a group (56% vs. 42%; $\chi^2 = 6.9$, $p = .0084$, $N = 150$). Furthermore, sharers were much more likely to come with friends (63% vs. 14%; $\chi^2 = 40.1$, $p < .0001$, $n = 147$) or with family (32% vs. 6%; $\chi^2 = 17.3$, $p < .0001$, $n = 147$) as opposed to coming with business associates. Finally, self-identified sharers are more likely to share a single computer when they do come with someone to the café (51% vs 1%; $\chi^2 = 57.2$, $p < .0001$, $n = 146$) and much more likely to sit next to the person they come with if they use two computers (92% vs. 33%; $\chi^2 = 50.7$, $p < .0001$, $n = 145$). They also are much more likely to follow what is being done by their companion (56% vs. 8%; $\chi^2 = 42.8$, $p < .0001$, $n = 144$). Overall, sharers are more social than non-shares, which is as expected.

Unlike the differing behaviors between sharers and non-sharers described above, there is little difference between the two cafes as to whether and how people come to the café in a group or meet people they know. The only significant difference between the cafes is that at Busy, respondents are more likely to meet people at the café for business purposes (28%) compared to First (7%; $\chi^2 = 12.7$, $p = .0004$, $N = 150$). This too is not surprising given the stronger business profile of Busy.

5.8 Voyeuristic Learning and Privacy

So far, we have examined how people knowingly seek help, interact, and work together in public Internet venues. But another form of learning and interaction includes voyeuristic and fleeting forms of collaboration, for instance when one glances at a stranger's screen. Some respondents reported engaging in voyeuristic and even uninvited sharing, which is clearly in tension with the fact that many respondents reported significant privacy concerns.

When asked to rate the statement, "I sometimes look over the shoulder of people while they use a computer here" according to our five-point Likert scale, we found that 71% disagree or strongly disagree, meaning that a nearly one third of respondents are neutral or positive to it. This result was similar across sharing and non-sharing respondents ($\chi^2 = 5.4$, $p = .25$, $n = 149$). Between the two cafes, there was some statistically measurable difference with a strong majority of respondents from First (90%) reporting as neutral or disagreeing with the statement compared with just 58% from Busy ($\chi^2 = 32.1$, $p = .0001$, $n = 149$). Perhaps counterintuitively, while First is generally a more convivial space with a physical layout that ensures patrons are in much closer physical proximity to each other, the respondents from First do not report glancing at their neighbors screen as much as

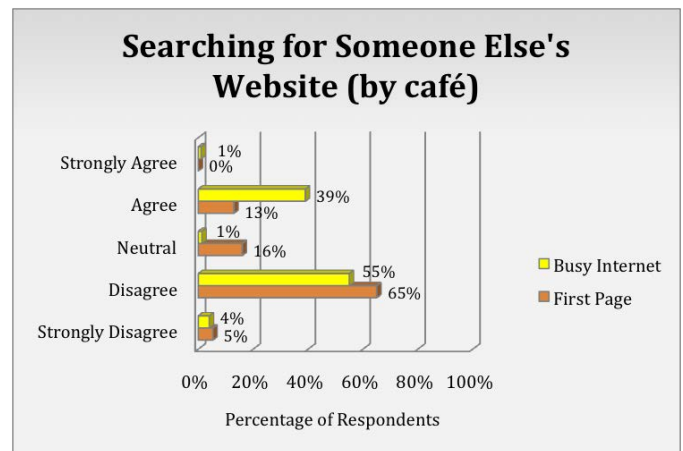


Figure 11: Likert Scale rating of the statement "If I see someone next to me looking at an interesting website I sometimes search to that same site myself." Busy Internet vs. First Page Café.

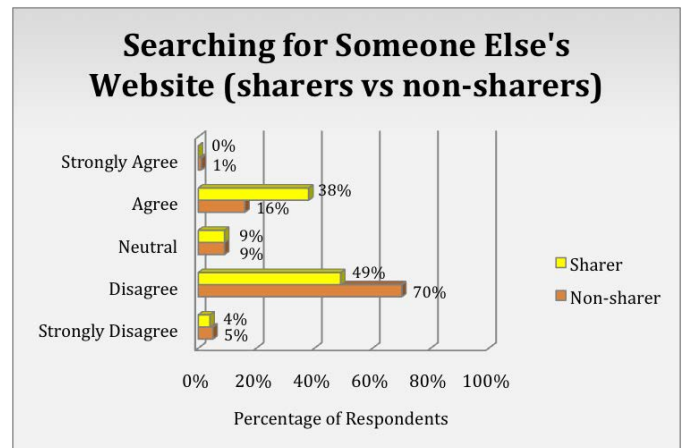


Figure 12: Likert Scale rating of the statement "If I see someone next to me looking at an interesting website I sometimes search to that same site myself." Sharers vs. Non-sharers.

those at Busy.

We also asked directly about a specific form of voyeuristic learning: glancing at a website that a neighbor has browsed to. Respondents rated the statement, "If I see someone next to me looking at an interesting website I sometimes search to that same site myself" with 51% of respondents overall disagreeing or strongly disagreeing with this statement, meaning that a full half of the subjects seem to be neutral or engage in some instances of this form of voyeuristic learning. There were differences in responses to this question between the two cafes ($\chi^2 = 22.8$, $p = .0001$, $N = 150$) and between those categorized as sharers versus non-sharers ($\chi^2 = 11.2$, $p = .02$, $N = 150$). Figures 11 and 12 detail these results.

It would seem that a respondent's comfort with and tendency to engage in voyeuristic and fleeting collaborations is impacted by his or her own level of privacy concerns. Overall, respondents reported very high levels of privacy concern while working at the cybercafés. On a four point Likert scale

(from very important to very unimportant) we found that nearly every respondent (93%) described computer privacy as either important or very important. However, the two cafés were statistically different in the level of their privacy concerns. For instance, at Busy, 68% of respondents identified privacy as being very important, compared to just 32% at First ($\chi^2 = 20.9$, $p < .0001$, $N = 150$). Also, First continued to demonstrate less of a business focus with just 7% of respondents reporting privacy of commerce and business affairs to be important or very important, compared with 79% at Busy ($\chi^2 = 85.5$, $p < .0001$, $N = 150$). As mentioned above, the First café positions patrons very close to each other with little privacy for their screens, compared to Busy, which has a bit more space between patrons. Also aligning with expectations, we found that our sharing respondents were less concerned with privacy than those who we identified as non-sharing. Sixty percent of participants who did not share identified privacy as very important compared with 38% who did ($\chi^2 = 10.7$, $p = .005$, $N = 150$).

6. CONCLUSION AND FUTURE WORK

Public shared access to computers and the Internet in low-income countries is often painted as second-class to individualized private access, and as the outcome of resource constraints. We have surveyed 150 patrons of two cybercafés in Accra, Ghana, about the ways in which they use computers in these venues and the benefits or drawbacks of public access and sharing. We find that public access often results in forms of sharing and collaboration among patrons from the most simplistic (such as asking a café employee a quick question) to more formalized (such as meeting business partners and working together around a single computer) to fleeting and voyeuristic (such as glancing at a stranger's computer screen and noticing an interesting website). Contrary to the belief of resource constraints driving public shared access, participants who are already sharing discounted economic grounds, instead highlighting the learning benefits of working together. We surveyed patrons in two different cybercafés, one large, centrally located, and business-orientated and the other small, family-owned, and located in the suburbs of Accra. We notice only limited differences in responses between these two cafés suggesting some universal qualities of sharing.

Nearly half of survey respondents reported that they already physically share a single computer with others in the cybercafé, and three-quarters of respondents reported interest in environments that support enhanced collaborative groupwork. Users also reported that sharing made their visits at the café more productive and fun.

We found that the main demographic variables, including wealth indicators, had little or no effect on sharing. In other words, people tend to share computers in Ghanaian cybercafés independent to their demographic or economic position. Moreover, we showed that the main motivation behind shared access to computers is not economic or cost sharing. For example, it was uncommon to share the cost of common computer use with others and respondents rarely reported sharing in order to save money. Instead, our data shows that users share a computer mostly because they want to learn from each other.

Self-reported learning outcomes from this public sharing were significant with roughly 40% of respondents claiming to have learned to browse the web or use email by watching

others in a public Internet facility. Having fellow users and skillful staff present in the same physical space also reportedly helps solve computer-related problems. When respondents faced difficulties with computer or Internet use, they most commonly reported turning to the staff of the café. However, it was not uncommon that they reported asking for help from their friends or even from fellow patrons whom they had not met before. Also, respondents reported that they sometimes themselves help others, even strangers, in the café.

The collaborative nature of public Internet access is also demonstrated through the social dimensions of a cybercafé visit. The majority of respondents to our survey report that they come to the cafés to meet their friends, family members, or business associates. Ghanaian cybercafés are not only important social meeting places, but the physical setting and the social norms of the cafés let visitors interact with each other even while working on separate computers. For example, more than half of the respondents who join people they know at the café reported that they try to sit next to each other and then follow what the other one is doing on their individual computer.

Finally, we identified a special form of peer learning in the cafés occurring when visitors glance at a stranger's computer screen. We call this form of learning voyeuristic or fleeting. Both the physical setting of the cafés, especially the arrangement of computers, and the social norms of the venues seem to support this voyeuristic form of learning. Nevertheless, café users are highly concerned about their own privacy. Almost all of our respondents found privacy to be an important issue, though users who have experience with sharing were less privacy-conscious.

6.1 Next Steps

Based on the results of our survey, we strongly believe that there is a need for developing information and communication technologies and applications which support collaboration and groupwork in shared Internet access points, as the existing technology in the cybercafés we studied is designed primarily for single-user scenarios. Our survey results suggest that café visitors would be interested in using the computers in new ways which support collaboration among them. The great majority of the respondents indicated that they would like to participate in collaborative groupwork at the café.

However, the application of such a groupwork application is not clear yet, especially to users themselves. It is not surprising that most of the people who are interested answered that they would only use this opportunity sometimes or rarely, and only a small minority indicated that they would be interested in collaborative forms of computer and Internet use.

We have already developed and deployed, in collaboration with Busy Internet patrons and managers, a prototype application that allows café patrons to share text, pictures, and online content from their individual workstation with the other visitors of the café via a shared screen. We are also exploring other ideas for content sharing such as a "shared clipboard" that might enable users to collaborate while using separate workstations. Additionally, we envision applications that could support educational use, such as by making users aware of others with similar interests or skills that could be leveraged for mutual benefit through collaboration.

We hope that such prototypes will prove valuable in exploring how to best promote collaborative uses of technology given the multi-user models we have discussed.

Our study is strictly limited to Ghanaian cybercafés and we recognize that sharing in a public Internet access point is influenced by the local cultural and social norms. We also believe that users participating in the development process lead to better innovations especially when developing technologies for users from a different culture.

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