Note

Bangladesh Development Studies
Vol. XLII, December 2019, No. 4

Social Conditions of the Innovative Use of Smartphone: A Qualitative Investigation among Young Users in Dhaka

MOHAMMAD GOLAM NABI MOZUMDER*

Concerns about the adverse impacts of using smartphones are common in the literature. However, there is insufficient research on whether users make innovative use of the device. If they do, what is the nature of the creative use of smartphone? What are the social conditions that facilitate the innovative use of the smart device? This study seeks to answer these questions by investigating the use of smartphone among teenagers in Dhaka. The respondents of this research are purposively selected from the secondary schools located in five different areas of Dhaka city. Snowballing technique was used to identify the forty-four avid users. Findings of the study show that respondents employ innovative strategies of escaping supervision: Installing software, e.g., AppsLock, Gallery Lock, and CM Security; using password; and blocking parents and relatives on social media—"totally black-listed." They also read books using Gutenberg Apps and go online to learn how to wear hijab "smartly." Advance users heavily use smartphone to learn software programming, prepare science projects, and do photography for presenting at art exhibitions. Most importantly, the study identified three facilitating conditions of the creative use of smartphone: Friends, events, and parents. These social conditions constitute an ecosystem that facilitates the innovative dispositions of the young users of smartphones.

Keywords: Smartphone, Mobile Phone, Freedom, Creativity, Innovation

I. INTRODUCTION

Technology is no magic, but users can make magical things happen using technology, especially when given freedom. Smartphone is such a device that can be used with considerable freedom. Previous studies examined the impact of smartphone usage on social capital (Park, Han, and Kaid 2012), digital divide (Park 2014), and social isolation (Bian and Leung 2014). Researchers also investigated how teenagers use smartphones to negotiate freedom and autonomy both within and outside of the family (Ling 2005, Williams and Williams 2005). Social networking sites, especially Facebook, were found to be heavily used by medical students and professionals for learning purposes (Pimmer, Linxen, and Gröhbiel 2012). Others found mobile phone as an effective tool for "mLearning" (Valk,

*Bangladesh Institute of Development Studies (BIDS), Dhaka, Bangladesh.

Rashid and Elder 2010) in Asia. But the processes through which the learning takes place has remained understudied, especially in the context of South Asia. So have the diverse forms of informal experimentation and innovative endeavours of the young users of smartphone. Expressions of creativity using digital devices, such as smartphones, have yet to be studied extensively (Misra and Misra 2006: 446).

The main purpose of this paper is to address an important gap in the literature: Studying the innovative usage of smartphone among young users (Hoffman, Ivcevic, and Brackett 2016: 149). The focus is on teens mainly because they are expected to use the device in unconventional and diverse ways. This paper first identifies the nature of the innovative usage of the device among teen smartphone users in Dhaka. Subsequently, it explains the social conditions of the creative use of the device—the facilitating conditions that make it possible for the teens to use smartphone for productive purposes and in innovative ways.

The study finds that there are instances of using the device for innovative purposes among teens in Dhaka. Although that tendency may not be dominant among majority of the users, there are examples of using the handy device productively, e.g., for the purposes of education and learning. The youngsters in Dhaka make good use of the phone for doing the school assignments, preparing science projects; learning new languages; acquiring advanced digital skills, e.g., the techniques of making animation; learning and practising musical instruments, such as piano; solving math problems, and so on.

While there are widespread concerns, especially among parents, about the potentially harmful effects of the use of smartphone on young adults, there is little literature on the innovative use of the device, i.e., how this digital device contributes to unleashing the creative potentials of the young minds. In identifying the innovative use of the smart device, the study took guidance from Sternberg (2003) and Jackson *et al*. (2012). Following them, we considered any formal recognition of creative skills—an award at a science exhibition or an art exhibition—as an example of the innovative usage of the device. To clarify, the author intended to study only the innovative usage of smartphone, *not* creativity or innovation per se. Future studies might look into the potential correlation between the use of smartphone and creativity. There might be a positive correlation between these two, but heavy users of the smart device can also get trapped into potentially dangerous practices (Bian and Leung 2015, Elhai, Dvorak, and Hall 2016). Whether the young minds decide to devote their time and attention to using the device productively depends mainly on the socio-cultural settings in which the users grow up and socialize.

Finally, this paper identifies three key social conditions of the innovative usage of the smart device among teens. The three facilitating conditions are: Being friends with curious peers, participation in creative events such as science exhibition, and the cooperation of parents, especially mother. There is hardly any indication that any one of these three conditions play significantly more important role than the other two; instead, these three in coordination facilitate the realisation of the creative potential of the young minds.

II. METHODOLOGY

The evidence presented in this paper comes from an explorative study on the innovative use of smartphone in Dhaka, Bangladesh. For the lack of a good sampling frame of the creative teen users of smartphone in Dhaka, the researchers were unable to do probability sampling. So, we had to use a non-probability sampling tool. We decided to do a purposive sampling method and use the snowballing technique to trace the young users of smartphone in different areas of the city. Following Hancock and Gile (2011), we used respondent driven sampling (RDS) to "link-trace" and find the heavy teen users of smartphone. We prioritized the expert users assuming that the heavy users are more likely to use the device innovatively, productively, and in diverse ways. To find the savvy users of smartphone, "the chain referral approach" (Brickman 2012) was employed. The approach also addresses the lack of a proper sample frame for this targeted group of respondents (Heckathorn 2011). We began by finding out heavy users, who are famous among their friends as experts, who use diverse apps, or who are good at solving technical problems related to SP.

Respondents were selected from the five main areas of Dhaka city. In total, 44 respondents were identified from these areas: Gulshan (6), Khilgaon (10), Mohammadpur (10), Old Dhaka (8), and Uttara (10). Almost 50 per cent of the respondents (20) were girls. Respondents were identified in two phases. In the first phase, we used personal networks to find out the respondents from the well-known schools in the respective areas. Once we found an interviewee we asked that person to inform us about other potential respondents. We then contacted that person and talked about selecting her as a potential interviewee. Follow-up interviews were conducted not only for verification purposes (Biernacki and Waldorf 1981:141) but also to better understand the process of getting involved in innovative practices.

Although the target was to interview 50 students, due to the lack of time and resources we ended up limiting the focus to 44 respondents. We also managed to interview 20 girl avid users of smartphones—two short of the goal of having 50

per cent or 22 girl respondents. This is the main reason we could not conduct a proper gender analysis of the findings. However, we tried to compare the experiences of girl users of smartphone with their male counterparts. Unlike boys, finding out girl respondents for lengthy and in-depth interviews was not always easy. Despite repeated attempts of the female interviewers to reach out to the avid girl users, we were not always successful. This happened mainly because reaching out girl users was more difficult as they tend to spend more time in their homes. They also use caution in sharing their phone numbers and responding to calls or messages from unknown numbers or individuals. To clarify, we cannot claim that girls usually do not heavily use the device. On the contrary, we found some girls who are passionate, regular, and expert users of smartphone. Against all the odds of living in a male-dominated society, the transcripts of the interviews show that there are a good number of teen girls in Dhaka who make diverse use of the smart device. However, those girl users sometimes had to deal with unfavourable circumstances in order to continue their innovative works.

All of the respondents were under the age of 18 at the time of the first round of interview; a vast majority of them were 16-17 years old. Only a few of them attended English-medium schools and the rest went to the predominant Bangla medium schools. Majority of the respondents self-identified them as members of middle-class family and only a handful reportedly belong to affluent families. None of the respondents reported belonging to a poor family. This could be considered a bias, but at the same the reality is that families that can afford to buy their children a decent smartphone usually do not belong to a poor family in Dhaka. All of the teen respondents reportedly use Wi-Fi frequently. Most of the time, they access the Internet at home using Wi-Fi; sometimes they buy data plans to go online on their phone. Almost all of them used a less expensive handset as the first phone. Later, many convinced—sometimes forced—their parents to buy them a smartphone. Only a few of the respondents reportedly had access to or used iPhone. Their parents owned the expensive phone sets, and they occasionally managed to play with the iPhone. We found both boys and girls who used or accessed iPhones. As expected, the users of iPhone belong to the affluent section of society.

With the condition of anonymity, respondents kindly consented to record the interviews. The recorded interviews were transcribed and translated into English. In total, we have about one thousand pages of interviews. The transcripts of the interviews were analysed using NVivo—the qualitative data analysis software. Profiles of all respondents were prepared based on the collected information. In addition, we collected relevant evidence, for example, browsing history, sample of works such as photo, and social media posts. The generalizability of the findings

needs to be tested by conducting more studies among similar groups living in other settings.

The framework of analysis includes three main steps: First, classifying the main activities; second, identifying the innovative usage of smartphone; and finally, explaining the facilitating conditions of getting involved in the creative endeavours. Transcripts of follow-up interviews and supplementary evidence, e.g., browsing history and activities on social media, were analysed to better understand the main factors that motivated the youngsters to commit to creatively using SP. Finally, the testimonies of the SP users were decontextualized, re-contextualised, and theorized in light of the existing theories (Bengston 2016).

Common Activities

Common activities of the teens are watching videos on YouTube, using social media, playing games, listening to music, graphic designing, photography, collecting study materials online, and reading newspapers. Some of the popular applications (apps) are Facebook (FB), Messenger, WhatsApp, Twitter, Viber, IMO, and SHAREit. Almost all users, including girls, have had Facebook accounts. Facebook is the most popular app among the users, Messenger (a component of FB) the 2nd most popular, Instagram the 3rd, and Viber the 4th. A word search from the transcripts of the interviews shows that FB was discussed 1,056 times, Messenger 411 times, Instagram 175, WhatsApp 93, and Viber 67. Teens regularly share messages/images on Messenger. Some girl users reportedly deactivated their Facebook account to avoid encountering unexpected contents or messages.

TABLE I

TECHNOLOGY DIARY OF A 16-YEAR-OLD GIRL (G4)

Time	Activity
10:00	Woke up, checked message and notification
12:30	Breakfast
1:00	Watched movie on TV
2:00	Lunch
3:30	Read book on phone and Messenger
5.30	Prepared snacks
6.00-10.00	Watched television, Instagram, Facebook, chatting with friends
10:30-11:30	Messenger, Facebook, watch Bengali drama on phone
11:30-1:00	Read a book
1.00	Went to sleep

Sending or receiving message (also known as texting) appeared 349 times in the discussion, which makes it the most common activity on SP. Gaming is a popular activity that was discussed 251 times. Considering the number of mentions, it is the second most popular activity on smartphone among the teenagers. Some of the popular games are Mini Militia, Angry Birds, and Temple Run. They also spend a lot of time watching prank videos, funny videos, and roasting videos.

Respondents use Pinterest, Tumblr, Shukran, and Snapchat. Tango (live video and gaming together) is also known to the respondents (K8). Shukaran is an uncommon social media app specially designed to cater to the preferences of Muslims (K1[1]). They use various apps to share and edit images and videos. Some of the common apps are: SHAREit, Video merger, Apex Video, Video Editor, Snapseed (image editing software). Other popular apps include Dubsmash, Moviemaker, Musical.ly (now TikTok). Image editing apps are also hugely popular among the teens in Dhaka. They use PicsArt, AirBrush, RIB photo cam, BeautyCam, YouCam, WpsApp to edit the images according to their preferences. Girls heavily use these apps for decorating [M1] themselves (G2).

Diverse Use

Teens in Dhaka use smartphone to learn the rules of performing religious rituals and access entertainment items online, especially the ones produced in foreign countries. A 17-year-old girl, who is an O level student, regularly used the device for listening to the Quran (M1). A 15-year-old girl recites from the Quran using smartphone almost every morning (U4). A 14-year-old girl accesses the Bukhari and Muslim hadith (U2) using Muslim Pro app. The app can be used to find daily prayer times, listen to the call for prayer (Azan), and also find out the direction to the Qibla (the Mecca). Girl users also listen to online stars who discuss Islamic rituals for women. An example is Mufti Menk's video. Girls watch his videos to learn about smartly wearing Islamic veil. A 17-year-old girl remarked that "I wasn't used to wearing hijab smartly at first" (M1); she learned that by watching Mufti Menk's videos. Smartphone becomes an important tool for Muslim girls to incorporate religion into the folds of modern life. The girl users also watch TV serials produced in both Bangladesh and foreign countries, especially Hindi movies and cartoons (such as Doraemon—a Japanese Manga

[1] Each respondent is identified with an anonymous ID beginning with a letter representing the name of the respective area. K1 represents respondent number 1 from Khilgaon. Similarly, G2 refers to respondent number 2 from Gulshan.

series). "I like melodramatic Hindi dramas. I watch Chinese, Korean and Thai dramas. I saw two Korean dramas" (M1), a 17-year-old girl mentioned. Girl users of smartphone also learned the techniques of making bangles and earrings online (U4), a 10th grader girl reported. These examples show that smartphones cater to the already existing needs of the users, be it religious, cultural, or intellectual.

Deviant Activities

Hacking accounts, creating fake accounts on social media, watching adult content, smoking weed, and drinking alcohol are notable deviant activities mentioned by the respondents. SP was the medium by which the information on the techniques of hacking were collected. They learned the techniques of hacking by watching videos on FB and browsing the Internet (K3). Two important things are to note about hacking here. First, they did the hacking for fun, mostly with friends, not for any organised criminal groups. Second, they regret doing the immature acts of hacking. They stopped hacking as it no longer makes sense: "I now realise that it's not worth it; there is no benefit of hacking. I now know that hacking Google ID or Facebook ID is not really possible" (K8). They understood that the stories of hacking were often exaggerated.

Watching adult content on porn sites was reported. On special occasions, they drink alcohol. Rarely, they smoked weed. The use of Yaba (an illegal drug) was also mentioned by a few students. Smartphone played a role in spreading Yaba among the students. A friend "sent a picture on Messenger; that one was actually of Yaba. They said if anyone takes it the night before exam, then it will keep him/her awake. Or it will provide energy, for that he/she will be able to [study hard and] do well in the exam, he/she will not feel sleepy but will be fit without any problem; he told me that one day" (M3). Few students reported the use of Yaba. Important to note that hardly a few students fell into the trap. Most of the students successfully avoided the danger.

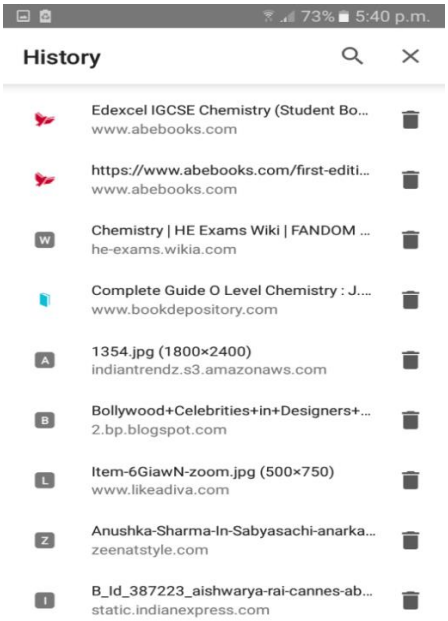
Learning

Parents worry about teens' use of SP, particularly because they are often unaware that teens may use the device for learning and innovating. Teens learn a lot using smartphones. They do not only learn about how to use the device efficiently and in diverse ways, they also use it extensively for educational purpose. They learn new software, language, photography, and the techniques of making handicrafts. Sixty-four per cent of the people in OECD countries opined that internet connection had a positive impact on education (Poushter, Bell, and

Oates 2015). Teens in Dhaka also heavily use the device for educational purposes, such as doing home-works or preparing assignments. To learn English, a 17-year-old girl, O-level student from Mohammadpur, watches the YouTube channel named "English with Lucy" (M1). To understand the basics of Physics and Chemistry and Math, a 10th grader from Mohammadpur (M5) uses BYJU's app and its YouTube channel. Others get help from Khan Academy's website, reported a 16-year-old from Old Dhaka (OD 6). A boy from Gulshan uses "all math calculations" app to learn mathematics (G1). A 15-year-old girl from Uttara learns Math from Zakaria KKD's YouTube channel (U4). A 10th grader girl from Mohammadpur reported that she regularly visits a YouTube channel that her biology teacher opened.

A 17-year-old girl from Mohammadpur learns language watching tutorials on her phone (M1). She learned English, Hindi, and Tamil. A 10th grader from Khilgaon learns Spanish watching videos on YouTube (K10). A girl from Gulshan loves playing word games on her phone (G5); instead of searching in a dictionary, she installed a dictionary app on her phone. A 16-year-old girl from Gulshan learns grammar and math formulas by watching videos provided by Ten Minute School prepared by Ayman Sadiq on YouTube (G2). The snapshot of the browsing history of a girl (Image 1) shows that she used the phone to learn about chemistry on Edexcel as part of her preparation for the exam. She also browsed a Wiki website named Home-Ed Exams to learn about the chemistry lessons. They learn about animation, e.g., Manga—Japanese comic animation—and teach friends about it. A 15-year-old girl wrote a script of a Manga story using her smartphone (M9). Another popular one is Cosplay or Costume Play. "Cosplay is an animation, [--] like a movie, [you] buy wig, do makeup then get into that character," a 15-year-old girl from Mohammadpur elaborated (M10). Another 15-year-old girl from Old Dhaka reported using movie maker apps; she got help from a friend about the use of the app (O3). The 10th grader girl found the animation app online and used it: "Yes, then I searched on YouTube saying 'how to make animation videos with photos.' Then they gave me an app named 'S movie maker.' So I downloaded it from play store and used it." A 10th grader girl from Uttara learned to play Guitar and Piano on her phone (U4). A 17-year-old boy from Uttara watches music tutorials to come up with tunes (U6). A 15-year-old girl from Gulshan learned to make butterfly, flower, and decorate stuff by watching videos on SP (G5).

Image 1: **Browsing History of a Teen Girl User (M1)**



The teens use Gutenberg app to read books; they visit Coursera and Udemy sites to get answers to the random questions come to mind (K1). Students use SP to collaborate, especially to do the assignments. A girl from Gulshan used SP to do home-works [M1]; "so, whoever finished those first sent the pic, then I copied that easily" (G4). A 10th grader from Gulshan claimed to have overcome the "problem" of asking questions to his teachers by learning to browse the Internet on his SP: "I used to feel nervous asking anything to my teacher; I couldn't do it before. Now I have my phone. So, if I don't understand anything, I can go to YouTube and see tutorials about my studies" (G1). A 10th grader girl from Khilgaon searches YouTube on her phone to get help regarding "practical [experiments] for home economics subject, making vase, carpet, flower with paper, and home decors" (K6). Some of them use Endomondo, a fitness app. "When I do [bi]cycling then I open that app. I could calculate the timing, how far I went and how much calorie I burnt, with that app" (M5).

Learning about apps, animation, manga, programming, graphics and numerous other things related to the digital world, the teens notably enriched their skills and capabilities. However, those digital skills often remain under-appreciated. In some cases, when they get the opportunity to make use of those digital skills, the young users show why they deserve commendation and encouragement.

Innovative Use

Instances of innovative use of smartphone among the teens include making science projects, writing science fiction, doing award-winning photography, earning money online by freelancing, writing animation scripts, and running a YouTube channel. Below is a brief description of important innovative works. The select few examples are analysed to find out how the teens use the digital device to perform creative works that often remain underappreciated or outright ignored. The goal is to highlight the innovative use of the device. Reasonable concerns about the unexpected consequences of using the device should not undermine the productive use of smartphone.

1. Award-Wining Science Project: Automatic Equipment Control System

A 16-year-old girl and her friends in Uttara extensively used SP to prepare projects for participating at science fairs. She also reportedly came to know about the fairs on social media. She extensively used her smartphone to browse the Internet while preparing the project. She also took help from a friend—a student of BUET (Bangladesh University of Engineering and Technology). They managed to prepare a scientific project and participated in a national competition held at a college in Dhaka. The respondent specified that their project was picked by the jury from the 32,000 projects nominated from the entire country; about 37 projects were selected and theirs was one of them. The girl remarked: "It was a big competition. I went there twice. I got three awards. I got the first award at BAF Shaheen" (U1). She provided a non-technical description of the project: "I mean you can control your AC, fan, heater, light by a remote."

The 10th grader at Uttara High School, self-identified herself as a member of a middle-class family. Her father is a public employee, and her mother a housewife. She has two other siblings. Parents bought her a phone as sometimes she had to return home alone from school in the evening. Her mother had to stay home to take care of her younger sister. Her mother is on the friend-list of her social media. Since her childhood years, she loved making things with battery and magnet. She also liked similar things on FB or YouTube. She was not a top grader. Like many of her peers, she loved playing a lot of games (such as candy crush, clash of clans) during her childhood.

2. Wrote a Science Fiction on Smartphone

A 10th grade-student at Residential Model is known among his friends as an avid user of SP, which at some point in his life was "the only companion." He enjoyed an uninterrupted access to the Internet. His father is a businessman, and mother a nurse). He used to read Zafar Iqbal (a popular science-fiction writer in Bangladesh) a lot. He reportedly loved to stay alone and immerse himself in his

favourite virtual world, watching Towhid Afridi's Vlog, for example. He was used to instantly responding to messages. He claimed not to hide anything from her parents or others about his activities on smartphone.

He briefly talked about the second science fiction that he had written using his smartphone:

> Actually, it's totally a fictional writing. There is a character; it's me and another is my friend. I named him "Ripon." Here Ripon is a robotic scientist and an inventor who I saw thinking about something for many days and he was making something. Suddenly he called me one day. He told me to go to his place and told me that he would show me something; then I saw it's a robot. He opened the robot and said that it's an afternoon. Then the robot said, "Good afternoon Mr. Ripon." Then, he asked about my health and shook hand with me. Then I asked Ripon if he made it or brought it from somewhere! Then he told me that it's a learning-type-robot. It can tell everything. I wrote all these. (M5)

This seems to be a reflection of his wishes. He imagines himself to be a robotic scientist. Instead of imagining a third person as an inventor, he likes to think of himself in that position. During the interview, he insisted repeatedly that he did all the creative activities by himself. He insisted that he was not influenced by his friends or others. Instead, he influenced his peers to participate in creative activities and to study hard; and he claimed to be successful on some occasions.

3. Award-Winning Photography

A 16-year-old boy (K10) loves doing mobile photography using his smartphone; smartphone made this amateur photographer an expert in this field. One of his photographs was awarded the 1st prize at two photo exhibitions. His photographer friend gave him the primary lesson; subsequently, he started browsing online to learn the advanced technique by himself. He initially learned the techniques of photography from a school friend. Nowadays, he consults an online friend– a professional photographer–before posting the pictures on Instagram.

The 10th grader at Khilgaon High School often used his phone to complete school assignments, do practical experiments, and learn Spanish. His mother (who has an undergraduate degree) supported him a lot; his father—a businessman who is not highly educated—was not always happy about this habit of spending a lot of time using smartphone. In the first few months after buying a smartphone, he was obsessed with playing games (K10). At present, he mostly uses Facebook, Messenger, WhatsApp, Instagram, and YouTube. The "bad" habit of playing with the digital device made his parents, especially the father, worried, but they did not

know the technical skills that their son acquired would earn the young boy a national award.

4. Freelancing Online

A 10th grade student at Khilgaon Govt. high School initially got addicted to playing games using his smartphone. The 18-year-old boy eventually became a regular, registered freelancer. He claimed to have learned about programing on his phone: "I downloaded programming software on my phone." He has Khan Academy app installed on his phone. From that app, he learned a lot about programming. He is also a member of Stake Overflow community where programmers from all around the world share ideas. At first, he did not have a personal computer, so he started browsing on his phone. He found interest in diverse things online. He used to read books on the phone and reviews of different versions of Android. Later he started writing his own reviews. Moreover, he started writing articles on IT and health issues and posted on Reddit. He loves randomly searching online.

5. Practical Experiment

A 16-year-old boy from Khilgaon, whose mom and dad are full-time professionals with an MPH degree, extensively uses his smartphone to complete the practical assignments for his school. He claimed to produce electricity from vegetables (K3). Reading such stories on newspapers, he searched online using his smartphone and did the experiment. He loves to browse the Internet and solve practical problems. However, he does not like to copy everything. The instinctively creative boy loves doing the same exercise in a different way. For example, he elaborated:

> "They showed [on the Internet] that they used robot. The parts of the robot can be seen from outside. But my work is to cover that up from outside, and to [see] what it will become if I add a few extra things?"

He also reported that he can produce electricity from potato and lemon. He just needs pins, nails, wires and tapes. "With these, I can make a 20-watt bulb," he claimed. Furthermore, he has done a lot of practical assignments at home with the help of a smartphone. He stated:

> "You will be able to turn off your lights and fans in your house with a phone. But you will need a [smart]phone at home. Nobody will have to receive it. You will be able to do that by pressing [a button]."

He went on to say:

> "If you use the chip of a remote control in the phone, with the normal a gaming phone, you will be able to control that car."

He also mentioned another experiment that he did for his chemistry class. During the vacation, his Chemistry teacher wanted them to light a bulb. He put salt in the normal water to turn on a bulb. The same thing can also be done with lemon, he claimed.

6. Animation and Smart Street

A 10th grade student, 15-year-old girl, currently in Mohammadpur, learned the techniques of creating animation using her smartphone. She wrote an animation script and wished to create a panel on Manga (Japanese comics). She learned the technique of video editing by watching the editing tutorials on YouTube. Her friends play "Cosplay" or costume play. It's like a movie, the girl from Mohammadpur recollected: "You buy wig, do makeup then get into that character" (M10). She likes to play Spiderman. A 15-year-old girl, a student of Ahmed Baunia High School in Old Dhaka, wrote an animation script. She did the script by herself and also taught friends about it (OD3). She searched on YouTube about the techniques of making animation videos with photos. She found an app named "movie maker" and downloaded it from play store.

The technology diary of a girl—10th grade student at Mohammadpur Model High School & College (M9)—shows that she browsed the Internet to watch Stephen Hawking's lifestyle series and to learn about blue moon, red moon, space, and crafting. Her friends and she also search online to make suitable gifts for friends and to learn about grafting. Furthermore, she goes online to collect suitable images and uses Abode Illustrator to prepare presentations. Her friends and she used the skill to make a science project on crafting a "smart street." They initially thought about a project on automatic street lighting. Their project included a road plan for easing traffic jam. To avoid unwanted conversations, she uses only Messenger (instead of Facebook) to communicate and collaborate with her friends. She reportedly consults her father to solve problems with the phone. At times, she helps her mom find tips on cooking by searching on YouTube and relevant websites.

Social Conditions of the Innovative Use of Smartphone

All human beings are born with creative potentials, but not everyone learns to realise the precious potential. Those who do, they usually go through certain processes to become creative in their life-time. The social conditions play an important role in facilitating creative dispositions among young, inquisitive minds. The findings of the study underscore three conditions of nurturing creativity among young smartphone users: Friends, events, and parents.

One important finding of this study is that there is a small group of teenagers—who already embody notable creative dispositions—strive to use smartphone in

productive ways. The device does what it is put to use. It is possible that a good number of users use smartphone to "waste" time. Some teens, however, make novel use of the device to best utilise their time and energy. The digital device is smart because the user can make such use of it if she wants. Teens craving for innovative works tend to befriend folks with similar inclinations, dispositions, and sensibilities. Those potentially innovative young users of smartphone students are often guided by supportive parents. Parents, especially mothers of those teens, cooperate with the creative students to actively participate in important events, e.g., science exhibition. Important to note that teens must not already have embodied creative habitus to make innovative use of smartphone. Given the availability of the enabling conditions, teens might become creative in the way of being avid users of the digital device. Furthermore, being creative is not a finite process. Nor is there a set formula/prefigured process of remaining so. Creative ideas might be triggered by the opportunity to use smartphone in one's desired ways. The scope of the study did not allow the researcher to carefully examine whether users who enjoy such freedom become rarely or regularly creative.

The smart device is not the only device used by the teens to realise the creative potentials; they simultaneously use laptop/desktop/digital gadgets such as tablet to satiate their creative thirst. The availability of various digital devices reportedly helps users pick the most desired tool for a given task. They often transfer their on-going works from smartphone to desktop or vice versa in the process of getting the work done. The testimonies of the smartphone users show that the use of the phone is neither unique nor mandatory to unleash the innovative potentials. However, its portability, confidentiality, and affordability made the device handy in nurturing the innovative dispositions of the restless, creative minds. Teens do not always have to own a smart device to materialise their creative potentials. They just need to access the device; the creative teens aspire for freedom to play around with smartphone and explore the world on their own terms. The phone appears to be the most convenient device for meeting the uncanny needs of the teens and their curious friends.

a. Friends

Teens usually do not work alone. They need friends to go about their daily lives. Smartphone plays an important role in finding friends and cultivating friendship. They make friends at school and within the family. Findings of the study show that the youngsters prepare science projects with friends, learn photography, get expert opinion from experts online, and communicate and collaborate with friends using smartphone. Having a smartphone facilitates creative conversation among inquisitive minds. The digital device with access to the Internet works as a gateway to the creative world. Important to remember that

friends are crucial in deciding how they want to utilise the access and opportunity. Those who become friends with diverse interests tend to engage in creative activities. The award-winning teen user of SP explained:

> I think interest is the main thing. I did not know about science fair. My friends used to talk about science fair a lot. Hearing that I also became interested; then I went and saw experiments. I enjoyed a lot. (U1)

The girl user became interested in doing science projects mainly by interacting with friends, who loved talking about science. She then became actively engaged and did her own project and earned the recognition—the 1st prize.

Creative minds tend to be comfortable befriending people with diverse interests. They may not be comfortable mingling with a wide variety of people, as they prefer to exchange ideas with other provocative thinkers. They also know the benefit of being in close association with inquisitive peers. Teen who wrote a science fiction elaborated why carefully choosing friends is important:

> My friend circle is small. Some of my friends are *in music. Some are good in tech, some in art*. I tell my friends to read, sometimes we study together. I encourage my friends—only two to three of them—to study hard. [..] If they do well in this line, it will be good for me too. That will be good for all of us. At the same time, I would not be involved in any other [unexpected] things; they also do the same. I have just three to four friends; all of them are more or less of my category. We study together, so we have almost similar interests. (M5).

Teens are greatly influenced by friends; they influence each other to study, work hard, and collaborate in making innovative projects. Smartphone makes it possible for them to stay in touch, learn from each other, and contribute to doing the creative works. A teen learned coding from friends: "I asked people who knew; they told me and I made use of the knowledge. I ask people who learned programming and they guide us" (K8).

Smartphone plays a big role in finding friends, cultivating friendship, and more importantly in influencing the activities of friends; the phone does not replace friends. SP works as the medium through which friends across time, space, and culture stay connected. This connectivity may not always be virtuous in nature. The device can also be used to encourage dangerous habits, such as hacking, taking drugs, and searching adult sites. Parents and social institutions play crucial roles in realising the positive potential of the digital device.

b. Events

Teens, who do creative works with their smartphone, tend to actively participate in extra-curricular activities, such as science fair, photo exhibition, and theatre. Science fair is an important type of event where teens realise their creative

potentials. They browse the Internet on their phone to find out ideas about suitable science projects. Science fairs are annual occasions when school students try to bridge the gap between theoretical learning and practical accomplishments. They search YouTube to come up with ideas for science projects (G4). They collaborate among themselves using their phone to find out an idea and implement it. Parents and teachers reportedly encourage students to participate, especially when the students earn awards. While preparing for the festivals, the teen use smartphone to brainstorm about the potential ideas. They experience both excitement and obstacles in preparing for the events. Sometimes parents and teachers insist to not spend a lot of time working on the project looking at the screen of the phone. However, once they understand the importance of the work, especially when they hear about the awards and recognition, parents start appreciating and sometimes actively cooperating with the teens. Science fairs are exciting as they get to know their peer participants/competitors hailed from various districts of the country, some of whom become good friends later on. Not surprisingly, smartphone and social networking sites play a crucial role in keeping them connected. Science fairs are also important occasions for the students to develop networks and have critical discussion regarding ideas about creative projects.

Smartphone works as an important tool for teens who like to participate in art and theatre. They come to know about art competition or photo exhibitions on social media (M5). They develop an online community to learn the crafts, peer-review the outputs, and disseminate their artistic works, often on social media, especially Facebook. A girl member of a theatre group in Uttara reported that her friends run a YouTube channel (U7). They shoot videos for the channel with their smartphone. They find important tips on making videos and post them online for the wider public. The phone works as the vital medium of realising the teens' artistic potentials; the digital device helps them reach their desired audience online. Previous studies also found that participation in theatre groups helps school students nourish creative potentials (Rao 1996, Sharma and Misra 2004).

c. Parents

The young smartphone users who do creative works with their phone have a friendly relationship with their parents, especially their mother. They are not afraid that their parents would be upset knowing about the extensive use of the device. Instead, they often get the necessary support and encouragement from their parents in completing the assignments. The teens feel reassured that their works are deemed necessary and worthy by their parents. They, especially girls, befriend their mothers on social media. The award-winning girl remarked: "My mother helped a lot. I could not do anything without her support. Ammu always said: "*Just do whatever you would like to do; do the best*" (U1). Teens desire to have parents

who like to stay informed about their children's own ambitions and concerns. And when parents actually do that, the young minds opt to go forward with their dreams and ambitions. Having that support works as a key to unleashing the creative potentials of young minds. The award-winning mobile photographer testified: "My mother supports me a lot and appreciates that. I sometimes talk to my father but he often complains why I spend a lot of time sitting with the phone" (K10). Fathers reportedly spend less time with their children as they often stay busy with their regular works. This is one of the reasons for which some of the teens end up having a less-friendly are of the reasons for which relationship with their father. Nonetheless, they do not always complain: "My father is a teacher. He probably knows what happens when I do something. Probably that's why he does not discourage me" (K8). Having a friendly relationship with parents prevents the teens from getting involved in deviant/dangerous activities. Failure to have a friendly relationship might generate misunderstanding and unexpected distance between parents and children. The girl member of a theatre group and an avid user of smartphone confessed: "[--] my relationship with my parents is going bad due to phone because they think that I'm misusing my phone, but, according to my personal understanding, I'm not misusing my phone" (U7). The girl usually stays alone at home as both of her parents are full-time employee; she does not have any siblings. Her father even broke the phone at some point to prevent her from spending a lot of time on the device. Despite all the obstacles, she keeps using the phone in her preferred ways. Parents understandably remain concerned. The lack in understanding regarding the use of the phone keeps the parents anxious; it also makes young, intelligent minds feel under-appreciated, at times threatened. Minimizing the gap turns out to be hugely beneficial simultaneously for parents, children, and the broader community.

Creative Ecosystem, Not Echo-Chamber

The way a person uses a smartphone does not depend only on the user or the device. The surrounding conditions, in which users (inter)act and live, play a significant role in influencing the nature of the use of a device. The socio-cultural conditions play a vital role in facilitating the creative use of digital devices among young users. It is the combination of curious friends, understanding family members, and participation in intriguing events (such as science fairs) that facilitates the nourishing of creative dispositions among young users of smartphone. A respondent calls it "the ecosystem" (K8); I prefer to identify it as "creative ecosystem" (Babič and Gašpar 2018), or "creative synergy" (Bown and McCormack 2010:225). The eco-system comprises three essential components—curious friends, friendly parents, and intriguing events—working in coordination

with each other. Only an understanding family, simply befriending intelligent peers, or merely participating in the events would not constitute sufficient conditions for nurturing creative dispositions among young children. Furthermore, meeting all three conditions does not guarantee the expected outcome—realised creative dispositions. The combination of these three conditions proves to be critical in generating sincere interest in innovative works among the teens. Smartphone proves to be important in nurturing creativity also of the young active members of art communities. For example, the 15-year-old girl (U7) was already active in a theatre group. The interest and experience in theatrical performances made it possible for the user of smartphone to prepare the videos.

"Power, curiosity, intellectual evolution, and hunger for new experiences" are keys to unleashing the creative potentials, argued Rubin (2012), corroborating Franken (1994) and Magyiari-Beck (1996). Complementing the previous studies, we find that curiosity, joy, and freedom are three key constituents of the innovative spirit of the teens. And the three sources of those constituents are friends, events, and parents, respectively. The device is the juncture where these three keys converge. Smartphone provides the easily accessible virtual site where creative minds interact, the transformation of the curiosities into reality takes place, and a sense of joy in the fulfilment of the curiosity is generated. Freedom of the users is instrumental in making that happen. The freelancer, programmer (K8) enjoyed learning programming by himself on his phone and learned to troubleshoot:

> I just randomly tried something, did something intuitively and that's how I fixed things. I am still not sure how I did those things. I was just playing with them.

Freedom begets joy; he loved playing with things online for fun. He concluded:

> "If you do not find pleasure, it is not possible to learn anything. I failed almost 20 times while trying to learn coding."

The phone worked as a catalyst in both satiating and generating the thirst of curiosity and creativity in the young boy.

Thinking out of the box and setting non-conventional goals is essential in flourishing creativity (Freedman 2010:12). Smartphone with access to the Internet is a blessing for those young students who love doing things differently, creatively (K3). Creativity is nothing but going beyond a given objective (Magyari-Beck 1996: 411). The creative smartphone users changed the purpose of using a

smartphone. While traditionally, it has been considered a tool for communication, the tech-friendly teens have made it a seminal tool for learning, socialising, collaborating, and also critically reflecting on contemporary issues related to everyday life (M5). Smartphone brings opportunities for the teens to engage in diverse and globally recognised forms of creative activities, such as Manga and Cosplay (M9, M10). Creativity is simultaneously an individual and a social activity. Smartphone facilitates unleashing the creative potentials by making the socializing process more convenient (but less familiar) for the tech-savvy teens. Smartphone also allows them to enjoy other necessary arrangements for fostering creativity, i.e., to become "auto-didactic" and to be passionate, obsessive, and immersed in a topic of their interest (Freedman 2010:12). Being more comfortable in the digital world, the smartphone users at times find it difficult to comply with the conventional norms of sociality and civility. This unease is both expected and necessary in realising the creative potentials of the users of the digital device, as "creativity often thrives on turmoil, marginality and other aspects of disorganization" (Kaplan 1963:6). The necessary turmoil of creativity is needed to break boundaries and cross-pollinate ideas (Mishra 2012:16), and smartphone is an effective tool in making that happen.

III. CONCLUSIONS

Besides for the purposes of entertainment, deviance, and socialization, teens heavily use smartphones to do innovative works. The findings of the study underscore that youngsters love to use smartphone to perform creative works in their preferred ways—freely, without supervision, or instruction. They enjoy exploring the (digital) world on their own terms. Smartphone is popular because the mobile device is one of the few means teens can use to live the life they wish to. This digital device earns them recognition, especially from their desired group of people—peers living near and far. The portable device allows them the freedom they craved but was deprived of. However, freedom is no panacea. A good balance of freedom and persuasion is needed to reap the most benefits of the device. Parents need to know more about the digital device, especially the possible productive use of it. And young users need to be more aware of the potential dangers. Both parents and children immensely benefit by learning about the digital device from each other. Concerns about the adverse impacts of using the device are often valid, but that should not forestall the possibilities of creative endeavours of the inquisitive teens. A better understanding of the use of the device among both the elder and younger generation is both beneficial and warranted. Voices of the teenagers must be heard: "Force does not work" (M5). Instead, parents need to be attentive to their

needs, aspirations, and anxieties. That would make the relationship between parents and children friendlier. More studies need to examine the less appreciated (but important) innovative use of smartphone among other groups, especially students in non-formal settings. Not only do learning and innovation find a new meaning in the era of smartphone, they also have a new medium: Smartphone. What is already known and well-recognised is that innovation is hard to imagine without freedom. Freedom is not free; it comes with a cost. Denial of that freedom is far costlier!

REFERENCES

Babič F., and V. Gašpar. 2018. "A Creative Ecosystem to Improve the Students Adaptation to Current Trends in IT Companies." *Advances in Intelligent Systems and Computing*, vol. 715. Springer, Cham.

Bengtsson, M. 2016. "How to Plan and Perform a Qualitative Study using Content Analysis." *NursingPlus Open*, 2: 8-14.

Biernacki, P. and D. Waldorf. 1981. "Snowball Sampling: Problems and Techniques of Chain Referral Sampling." *Sociological Methods & Research*, 10(2): 141-163.

Bian, Mengwei, and Louis Leung. 2014. "Smartphone Addiction: Linking Loneliness, Shyness, Symptoms and Patterns of use to Social Capital." *Media Asia* 41 (2):159-176.

Brickman Bhutta, C. 2012. "Not by the Book: Facebook as a Sampling Frame." *Sociological Methods & Research*, 41(1): 57-88.

Bown, O. and J. McCormack. 2010. "Taming Nature: Tapping the Creative Potential of Ecosystem Models in the Arts." *Digital Creativity*, 21(4): 215-231.

Elhai, J. D., J. C. Levine, R. D. Dvorak and B. J. Hall. 2016. "Fear of Missing out, Need for Touch, Anxiety and Depression are Related to Problematic Smartphone Use." *Computers in Human Behavior*, 63: 509-516.

Franken, R. 1994. *Human Motivation*. Pacific Grove, CA: Brooks.

Freedman, K., 2010. "Rethinking Creativity: A Definition to Support Contemporary Practice." *Art Education*, 63(2):8-15.

Hancock, M. and K. J. Gile. 2011. *On the Concept of Snowball Sampling*. Cornell University Library.

Heckathorn, D. D. 2011. "Comment: Snowball versus Respondent-driven Sampling." *Sociological Methodology*, 41(1): 355-366.

Hoffmann, J., Z. Ivcevic and M. Brackett. 2016. "Creativity in the Age of Technology: Measuring the Digital Creativity of Millennials." *Creativity Research Journal*, 28(2): 149-153.

Jackson, L. A., E. A. Witt, A. I. Games, H. E. Fitzgerald, A. Von Eye, and Y. Zhao. 2012. "Information Technology Use and Creativity: Findings from the Children and Technology Project." *Computers in Human Behavior*, 28(2): 370-376.

Kaplan, M. 1963. "The Social Scientist Views Creativity: Social Conditions and Creativity." *Journal of Education*, 145(3): 6-13.

Ling, Rich. 2005. "Mobile Communications vis-à-vis Teen Emancipation, Peer Group Integration and Deviance." *In The Inside Text*, 175–193. Springer.

Magyari-Beck, I. 1996. "The Torrance Phenomenon." *Creativity Research Journal*, 9(4): 411-414.

Mishra, P. 2012. "Rethinking Technology & Creativity in the 21st Century: Crayons are the Future." *TechTrends*, 56(5): 13.

Misra, G., A. K. Srivastava, and I. Misra, 2006. *Culture and Facets of Creativity: The Indian Experience*. Cambridge University Press.

Park, Kyung-Gook, Sehee Han, and Lynda Lee Kaid. 2012. "Does Social Networking Service Usage Mediate the Association between Smartphone Usage and Social Capital?" *New Media & Society* 15 (7):1077-1093. doi: 10.1177/14614448 12465927.

Park, Yong Jin. 2014. "My Whole World's in My Palm! The Second-level Divide of Teenagers' Mobile Use and Skill." *New Media & Society* 17 (6):977-995. doi: 10.1177/1461444813520302.

Pimmer, C., S. Linxen, and U. Gröhbiel. 2012. "Facebook as a Learning Tool? A Case Study on the Appropriation of Social Network Sites from Mobile Phones in Developing Countries." *British Journal of Educational Technology*, 43(5): 726-738.

Poushter, J., J. Bell and R. Oates. 2015. "Internet Seen as Positive Influence on Education but Negative on Morality in Emerging and Developing Nations." Pew Research Center.

Rao, U. 1996. "Drama Activity–A Tool in Teaching–learning Process." *Education in Asia*, 16: 126-30.

Rubin, J. 2012. "Technology's Impact on the Creative Potential of Youth." *Creativity Research Journal*, 24(2-3): 252-256.

Sharma, C. and G. Misra. 2004. "Creative Drama for Humane Education: The Indian Experience." Paper Presented at IDEA, Fifth World Congress, Ottawa, Canada.

Talbot, David. 2012. "Given Tablets but no Teachers, Ethiopian Children Teach Themselves." *MIT Technology Review*.

Sternberg, R. J. 2003. "Creative Thinking in the Classroom." *Scandinavian Journal of Educational Research*, 47(3): 325-338.

Valk, J. H., A. T. Rashid, and L. Elder. 2010. "Using Mobile Phones to Improve Educational Outcomes: An Analysis of Evidence from Asia." *The International Review of Research in Open and Distributed Learning*, 11(1): 117-140.

Williams, S. and L. Williams. 2005. "Space Invaders: The Negotiation of Teenage Boundaries through the Mobile Phone." *The Sociological Review*, 53(2): 314-331.