Patterns of adolescent students' use of mobile phones for educational activities

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Abstract

This study was conducted to identify patterns of adolescent students' use of mobile phones for educational activities. Survey research design was used and implemented through three objectives, determining the extent of mobile phone use among adolescent students, identifying the mobile phone usage patterns of adolescent school students, and identifying the problems faced by the students due to the use of mobile phones. The sample is eighty grade 12 students studying advanced level technology stream in two schools of Ibbagamuwa education division. Using questionnaire and interview schedule collected data. Both quantitative and qualitative data analysis techniques used. According to the data analysis, Mobile phone usage among adolescent students has increased rapidly in the year 2020 and all students are currently using mobile phones and weaning them from using mobile phones is an impossible task, and get them to use mobile phones effectively is possible. They often try to keep and use their mobile phone privately. Also use it for non-academic activities. The use of mobile phones has weakened their relationships. The main reasons for uncontrolled use of mobile phones by students are parents' lax policies and lack of knowledge. Following suggestions are made to guide adolescent students to use mobile phones effectively. Implementation of training programs for students and teachers on use of mobile phones for academic purposes and awareness programs for parents. Students should directed to use smart classrooms and tab computers in a planned schedule in school. Apply for concessional data packages and scholarships for students.

INTRODUCTION

In Sri Lankan society, the mobile phone was a forbidden device for school students, both in their households and in school. They are rarely allowed to use a mobile phone. That too is only for special needs. The smart mobile phone is a very attractive object for the youth and they are proficient in using the mobile phone as compared to adults. But with the corona epidemic situation in the first half of 2020, online learning started. Since the mobile phone was the most affordable device accessible for online learning, many students in Sri Lankan society owned a dedicated mobile phone.

Regarding revelations of research "Smartphone use and addiction during the coronavirus disease 2019 (COVID-19) pandemic: cohort study on 184 Italian children and adolescents" presented by Serra et al. [1] there was more frequent smartphone use among Italian children and adolescents during COVID-

19 pandemic, compared to the pre-epidemic period. This survey interestingly revealed the changing patterns and aims in the use of smartphones among young people, which allowed them to limit some effects of the crisis. Indeed, they were exploited for many purposes such as human connection, learning, and entertainment, providing psychological and social support. In the meantime, it was observed a significant increase in overuse and addiction. This led to many unfavorable clinical, psychological, and social outcomes.

According to Gamage, Rajapakshe, and Kumudumali [2], who revealed the situation in Sri Lanka through research "Determinants of Mobile Phone Ownership in Sri Lanka". Youngers have more access to mobile phones compared to adults. Younger, male individuals tend to have a higher chance of using mobile phones. Specifically, the mobile phone owners in Sri Lanka are young, male.

As mentioned Jinadasa [3] who conducted the research "Representation of Youth Generation in the Mobile Phone and Internet Media in Sri Lanka" revealed that there is a considerable difference in the use of mobile phones and internet in the youth society in Sri Lanka. While it takes an expansion of new media, there is considerable destruction of youth society behaviors in Sri Lanka. From the above findings, it is clear that there is a high level of mobile phone usage among adolescent students in Sri Lanka as well as in the world. In this way, many factors can influence the mobile phone to be very popular among young people. According to the analysis of Javed et al. [4], Smartphones are equipped with precise hardware sensors including an accelerometer, gyroscope, and magnetometer. These devices provide real-time semantic data that can be used to recognize daily life physical activities for personalized smart health assessment. A mobile phone, especially a smartphone, is a highly accessible, high-tech multi-tasking device. Adolescence is a period of rapid social and emotional growth. Also, a stage where thoughts become abstract, ready to reason and think from a broader perspective, attracted to the opposite sex, strive to spend time with peer groups, and do not resent adults, somewhat artistic. Therefore, the combination of adolescence and the mobile phone is a complex topic to study.

To increase the effectiveness of education, retain the memory of learning, and reduce forgetfulness, Thalheimer [5] introduced "The Learning-Transfer Evaluation Model" for Sending Messages to Enable Learning Effectiveness. According to LTEM Both knowledge retention and knowledge recitation focus on facts and terminology, but knowledge retention also requires learners to remember the learned information over a substantial period. According to this model, the mobile phone can be used as a device that reinforces the learning environment to reinforce learning. Considering how the mobile phone enhances the learning environment, learning is enhanced through mobile phones, by using mobile learning tools that enable quizzes, polls, discussion, question, and answer, and by providing mobile-assisted language learning opportunities, by providing skill-based learning opportunities, and by providing instant feedback opportunities, Learning can be reinforced.

Barlett and Barlett [6] view the creative nature of memory Schemas are categories of information stored in long-term memory. A schema contains groups of linked memories, concepts, or words. This grouping of things acts as a cognitive shortcut, making storing new things in your long-term memory and retrieval of them much quicker and more efficient. Bartlett argued that rather than memories being retrieved precisely as they were stored, they would be reconstructed largely in line with the individual's values and beliefs, especially when there was a gap in the memory. It is this retrieval that makes Schema theory hugely important in education. If students can associate new ideas with schema they already have, the likelihood of them remembering them is much higher.

In the social development theory, Vygotsky and Cole [7] primarily explains that socialization affects the learning process in an individual. The Social Development Theory includes three major concepts. These consist of the role of Social Interaction in Cognitive Development, the More Knowledgeable Other (MKO), and the Zone of Proximal Development (ZPD). The MKO is any person who has a higher level of ability or understanding than the learner in terms of the task, process, or concept at hand. Normally, when we think of an MKO we refer to an older adult, a teacher, or an expert. For example, a child learns multiplication of numbers because his tutor teaches him well. The traditional MKO is an older person; however, MKOs could also refer to our friends, younger people, and even electronic

devices like computers and cell phones. ZPD is the distance between what is known and what is unknown by the learner. It is the difference between the ability of the learner to perform a specific task under the guidance of his MKO and the learner`s ability to do that task independently. The theory explains that learning occurs in ZPD. Thus, the mobile phone can be used as a way to access an ocean of knowledge, and the contribution of the mobile phone as an MKO is very clear in achieving good development in the ZPD.

Cognitive theorist Piaget describes adolescence as the stage of life in which the individual's thoughts start taking more of an abstract form and egocentric thoughts decrease [8]. This allows an individual to think and reason with a wider perspective. According to Piaget, another complicated thought process that adolescents master is called "propositional thought." This means youth can determine whether a statement is logical based solely on the wording of the statement, rather than having to observe or re-create the actual scenario to determine if it is logical. They Think about different possibilities and begin to develop their own identity.

In the research, Teens, Social Media & Technology by Anderson and Jiang [9] revealed that YouTube, Instagram, and Snapchat are the most popular online platforms among teens. Fully 95% of teens have access to a smartphone, and 45% say they are online 'almost constantly'. Serra et al. [1] revealed the changing patterns and aims in the use of smartphones among young people. Therefore, they were exploited for many purposes such as human connection, learning, and entertainment, providing psychological and social support. In the meantime, it was observed a significant increase in overuse and addiction. This led to many unfavorable clinical, psychological, and social outcomes.

By the research "The Relationship between Smartphone Use and Academic Performance" in a sample of tertiary students in Singapore, Zhao et al. [10] revealed that the use of smartphones for learning has become a norm among students in Singapore. Educational institutions are creating lessons and applications for use on mobile platforms. This study was conducted to understand the association between smartphone use for learning activities and academic performance.This study showed that students who used smartphones for learning had higher academic performance. The research "The impact of using smartphones on the academic performance of undergraduate students" done by Ifeanyi and Chukwuere [11], A study conducted by North West University in South Africa shows that smartphones are also used by students as a medium to search for information anytime and anywhere [12]. This is a clear indication that college students now turn to smartphones to help them carry out academic activities. However, the positive aspects of smartphones can improve the performance of undergraduate students if used well.

The research "The impact of smartphone usage on academic performance of the undergraduates." Chathurangaa and Jaysundara [13] revealed that the majority of the respondents have used their smartphones to access social media applications, and the Web-browser is identified as the most frequently used mobile application for the study purposes. There is a positive significant impact of smartphone usage on the academic performance of the respondents in terms of Communicability with fellow students and lecturers, and accessibility to study materials. And also there is a negative significant impact of smartphone usage on the academic performance of the respondents in terms of student's concentration, and student's lifestyle related to smartphones.

Considering the above theoretical points, and empirical investigations, many positive approaches can be used with the mobile phone, and there are also negative approaches among them. It is revealed through the above research that nowadays, using mobile phones to support their studies has become a new trend among students. What kind of access a mobile phone is used to gain is based on the nature of the user. In this kind of background, this research is a study of how adolescent school students who get a mobile phone in their hands use their mobile phones. This research hopes to identify actions that can be taken to engage students in positive approaches to mobile phones.

RESEARCH METHOD
The survey design belonging to the quantitative research approach was used for this research. All students in grades 12-13 are the study population. 12-13 students of Ibbagamuwa Education Division were used as the target population. As a sample, 80 students studying technology stream

in the schools of that division were selected as the sample under random sampling. Questionnaires and interview schedules were used to collect data. Along with this, 20 teachers who teach them and 20 of their parents also joined the sample. Questionnaire and interview schedules were used as data collection techniques for this research. Questionnaire was primarily used to collect data from the students and data was collected by conducting a focus group interview for the students in order to obtain information that would not be revealed through the questionnaire. The methodology used to collect data from teachers and parents was focus group interview and quantitative data collected using tables and graphs and qualitative data were analyzed by describing, sorting and linking.

RESULT AND DISCUSSION

According to the survey, it was revealed that students of these age groups use more than one mobile phone and also use more than one SIM card. The information is presented in Table 1. Also, it was revealed that more students use the prepaid service when paying for the use of mobile phones. It was as high as 87.5% as a percentage.

Table 1. Number of SIMs used and payment method.

	N	%
Using a SIM	29	36.25%
Using two SIMs	51	63.75%
Using prepaid service	70	87.50%
Using postpaid service	18	22.5%

Note: N(%)=Number (Percentage) of students

Table 1 reveals that 51 of the researched students use two SIM cards. It is clear that many students are using prepaid services and some students are using both prepaid and postpaid services. The reason why many students use prepaid services may be because they are used to using the mobile phone as if they have cash in hand. These students may be using two separate SIMs to make calls and receive data. These young students may be using an extra SIM card to connect with their friends privately. The statements of the parents also revealed that the students were using the extra SIMs in their possession.

Table 2. The amount these students spend per month on their mobile phone usage

Amount spent in Rupees	For calls		To get the data	
	N	%	N	%
Less than-100	20	25.00	05	6.25
Between 100-500	57	71.25	12	15.00
Between 500-1000	02	2.50	40	50.00
More than 1000	01	1.25	23	28.75
Total	80	100	80	100

Considering the data in Table 2, it is very clear that these students spend more money to get the data. 25.00% of the students spend less than one hundred rupees for making calls. The highest percentage of students 71.25% spend between 100-500 rupees per month for making calls. In comparison, they spend a lot of money on data. 6.25% of students spend less than 100 rupees for data. 15.00% of these students spend between 100-500 rupees for data. 50.00% of students spend between 500-1000 rupees for data. According to that 28.75% students spend more than 1000 rupees per month for get data.

Thus, students spending more money on data cannot be described as an inappropriate situation because they use data to reach negative approaches as well as positive approaches. Many positive approaches that students can reach using data are now abundant on the Internet and this is a haven for a learner. As discussed in the theoretical approach, it is clear that a mobile phone can act as an attractive information provider, ladder binder, learning aid, and guide for a learner. According to social development theory of Vygotsky and Cole [7], MKO facilitates learning within the ZPD. Therefore, the mobile phone can serve as a means to access a vast ocean

of knowledge, and its role as an MKO is distinctly evident in fostering significant development within the ZPD. Therefore, instead of trying unsuccessfully to remove the mobile phone from young students, as teachers, we should take the necessary steps to direct the mobile phone, which is a very attractive object for them, to positive approaches.
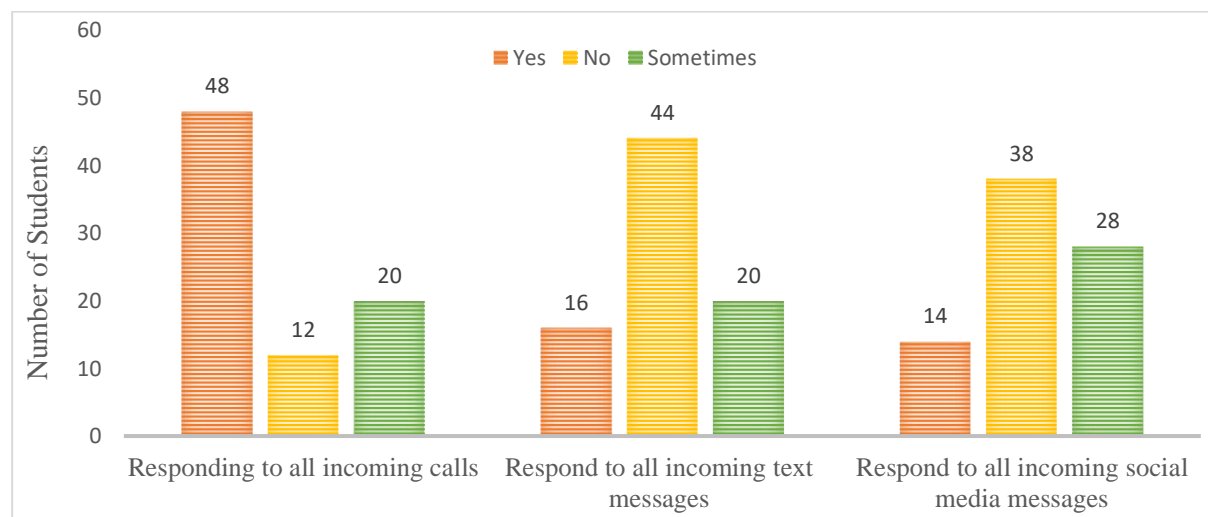

Figure 1. The nature of adolescent students' response to mobile phones

Data (see Figure 1) shows that the majority of these students (60%) respond to all their calls, but a small number of students are in the habit of responding to all their text messages and social media messages. Paying attention to and responding to all messages received on their cell phone can be considered a sign of cell phone addiction, and it is clear that the majority of students surveyed do not exhibit such characteristics. But it is a clear fact that few students (about 18%) show signs of addiction.

Table 3. Time spent per day with the mobile phone

Time spent per day with mobile phone	N	%
Less than an hour	2	2.5
Between 1-4 hours	50	62.5
Between 4-8 hours	22	27.5
More than 8 hours	6	7.5
Total	80	100

To find out the extent to which these students use mobile phones, the time they spend with the mobile phone per day was obtained. In Table 3, according to the facts revealed there, 42.7% of students use mobile phones for less than three hours. Another fact revealed was that 25% of the students who were subjected to the research use their mobile phones for more than 5 hours a day. The increase in the amount of time these students spend with mobile phones per day cannot be simply reflected as a negative situation, because they can be associated with mobile phones for positive approaches. However, the data shows that these students are accustomed to using mobile phones. In the interviews conducted with the children, it was also clear that they check their mobile phones frequently. But mobile phones are used for academic purposes as parents are always keeping an eye on them. In the interview, the parents also said that these students resort to using mobile phones frequently and constantly try to use mobile phones for non-academic activities. But their statements revealed that they too cannot control this situation.

It was revealed from the teachers that these students are using phones excessively and a few students are showing addiction to the use of mobile phones which has directly affected their academic performance and the parents have also failed to control this situation. But they also emphasized that there are students who have used this to improve their academic performance.

Sri Lankan parents still provide opportunities for their children to use mobile phones under their supervision. In such a background, it will not be a difficult task to get students to use mobile phones for positive approaches. But since the social and economic educational background of these parents is different, the government and educational institutions need to prepare some work programmes together to raise their awareness regarding the use of mobile phones in general.

A mobile phone is a personal device. The group of students undergoing the research are adolescent school students. They are still under parental supervision. They are indeed going through a stormy season when it comes to youth. According to cognitive theorist Piaget, adolescents think about different possibilities and begin to develop their own identity and also they are at an age where they trust their friends and work together with them [8]. Therefore, even though the mobile phone is a personal device, these students need to be under the supervision of their parents in how they deal with their mobile phones. But it can be seen that young people prefer to use their mobile phones very privately. For this reason, the following data were obtained to clarify this situation.
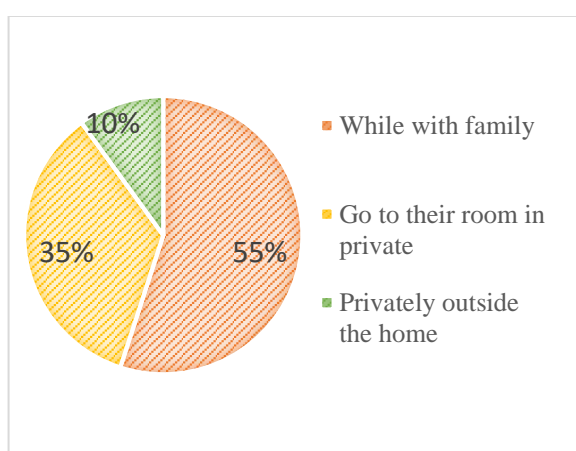

Figure 4. Responsive nature of mobile phone

Figure 5. Privacy of students' mobile phone information

According to Figure 4, it appears that there are 55% of students who can answer their phone while they are with their family. And it is clear that except for 54% of the students, all the rest of the students make some effort to keep the information on their mobile phones private. Another noteworthy point is that 10% of students re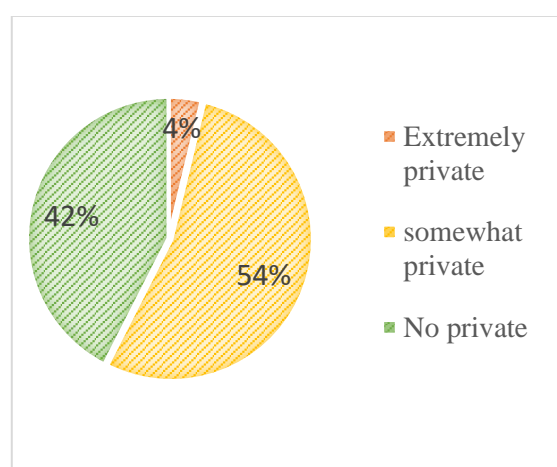spond to their mobile phones very privately, while 4% of students keep the information on their mobile phones very private (refer to Figure 5). These students may use their mobile phones unnecessarily and show many signs of addiction. Parents stated that their children try to use their cell phones privately and that they express disapproval or sometimes do not allow someone else in the family to check their cell phones.

Table 4. Students' efforts to protect privacy in cell phone use

Efforts to Protect Privacy in Cell Phone Use	Yes		No		Sometimes	
	N	%	N	%	N	%
Allowing others in the family to use their mobile phone	39	48.75	27	33.75	14	17.5
They get upset with their family members using their phones	18	22.5	26	32.5	36	45
Even at home they keep their phone locked.	46	57.5	31	38.75	3	3.75
They hide their phone using from their family	19	23.75	20	25	41	51.25

Considering the answers given by these students, in Table 4, it was revealed that 33.75% of the students do not even allow others in the family to use their mobile phones and 32.5% of the students feel upset if someone else in the family uses their mobile phones. 57.5% of these students use a lock on their mobile even at home. Among these students, only 25% use their mobile phones openly with their families. Considering these facts, it is clear that the adolescent students

who have been researched are more inclined to use their mobile phones personally.

In this research data was collected about the activities of these students using mobile phones. Data was also collected on the extent to which these students are engaged in those activities. It was presented in Table 5.

Table 5. Mobile phone activities of adolescent students

Activity	Always		Usually		Sometimes		Rarely		No	
	N	%	N	%	N	%	N	%	N	%
Sending text messages	9	11.25	43	53.75	15	18.75	13	16.25	0	0
Sending pictures	0	0	33	41.25	21	26.25	18	22.5	8	10
Chatting through groups	2	2.5	30	37.5	17	21.25	23	28.75	8	10
Surfing the Internet	9	11.25	45	56.25	7	8.75	8	10	11	13.25
Watching YouTube	7	8.75	43	53.75	13	16.25	11	13.75	6	7.5
Facebook browsing	5	6 .25	27	33.75	11	13.75	9	11.25	28	35
Surfing other social networks	9	11.25	23	28.75	13	16.25	19	23.75	16	20
Playing mobile games	7	8.75	19	23.75	17	21.25	13	16.25	24	30
Playing online mobile games	8	10	21	26.25	17	21.25	16	20	18	22.5
Making calls	9	11.25	31	38.75	17	21.25	16	20	7	8.75
View updated news	15	18.75	29	36.25	19	23.75	13	16.25	4	5
Engaging in online learning	44	55	32	40	4	5	0	0	0	0
Surfing the Internet to learning needs	37	46.25	34	42.5	9	11.25	0	0	0	0

More than 50% but close to 50% of these students usually send text messages, surf the internet and watch YouTube. Almost 40% of students usually do online learning, browse the internet for learning needs, make calls, and chat through groups. Among the surveyed students, none reported refraining from sending text messages, participating in online learning activities, or browsing the Internet for their educational needs. But there are very few students who do not make calls, do not surf other social networks, do not watch YouTube, do not chat through groups, and do not send pictures. This data shows that there is a group of students in Sri Lankan society who use a mobile phone only for learning purposes. This is a very complex and sensitive issue and as a developing country, it shows the need for a concessional program for technical assistance for the educational welfare of Sri Lankan students. Another noteworthy point regarding the internet usage of these students is that 65% of these students use Facebook. Eighty percent of students surf on other social networks. Facebook as well as other social networks are software that do not fulfill any educational needs of these students and it is problematic for students to surf such software frequently. This wastes the time and money they could have spent on education. Through the Internet and YouTube, students have access to educational as well as non-academic approaches. This is also a matter for the attention of adults, educational institutions, as well as the government, and this situation can be controlled to some extent by introducing separate packages for students who cannot enter unwanted entries.

The findings from these students about their internet usage were presented in Table 6.

Table 6. Reasons for Internet use of adolescent students

Reasons for Internet use	N	%
To see interesting things	28	35
To watch confidential things	3	3.75
To know daily information	42	52.5
For educational purposes	56	70

Table 6 reveals that the majority of Sri Lankan adolescent school students are interested in finding daily information, and universal information, and watching news using the Internet and YouTube. Nearly 30% of these students utilize the Internet and YouTube to satisfy their curiosity, watch funny videos, and explore movies and stories. This only serves to

entertain them and makes them prone to mobile phone addiction. Therefore, the intervention of parents, adults, and teachers is necessary to limit these conditions. However, 70% of these students use the Internet for education, and 77.5% (see Table 7) use YouTube for education. This is a positive situation to raise the educational status of these students. Proper guidance can lead to more success and increase their interest.

Table 7. Reasons for YouTube use by adolescent students

Reasons for YouTube use	N	%
Know news and daily events	41	51.25
To know universal information	55	68.75
Watch secret videos	03	3.75
To watch funny videos	18	22.5
To watch movies and stories	24	30
To watch lessons	62	77.5

According to Table 8, 20% of the students said that the mobile phone has affected their academic performance, 16% said that it reduced their bond with their family, 18% said that it reduced their time spent with their family and 20% said that reduced face-to-face meetings with friends and 6% caused conflicts with friends. This situation directly affects the personal development of these students. Research findings indicate that although not the majority, this condition affects nearly twenty percent of students. That is, it should be understood that the problem has reached a situation that requires the intervention of authorities and elders.

Table 8. Problems faced by the by students.

Problems faced by the students	SA	A	NI	DA	SDA
Affected academic performance	8 (10%)	12 (15%)	32 (40%)	20 (25%)	8 (10%)
Reduced contact between family members	4 (5%)	12 (15%)	10 (12.5%)	36 (45%)	18 (22.5%)
Reduced time spent with family members	4 (5%)	14 (17.5%)	20 (25%)	28 (35%)	14 (17.5%)
Reduced face-to-face meetings with friends	4 (5%)	16 (20%)	22 (27.5%)	20 (25%)	18 (22.5%)
Caused conflicts with friends.	4 (5%)	2 (2.5%)	16 (20%)	22 (27.5%)	36 (45%)

Note: SDA=Strongly disagree, DA=Disagree, NI= No idea, A=Agree, SA=Strongly agree.

There were several limitations of this research. Those limitations are that the research sample is limited to Ibbagamuwa Education Division of kurunegala Education Zone. Limited to only two schools in Ibbagamuwa Education Division. Limited to Grade 12 students studying Advanced Level Technology stream. Only 80 grade students participated in the research. The sample was limited to 20 teachers and 20 parents.

CONCLUSION
The data collected in the conducted study on mobile phone usage patterns of adolescent students were analyzed. According to the data analysis, the following conclusions were reached. The analysis of the collected data concluded that mobile phone usage among adolescent students has increased rapidly in the year 2020 and all students are currently using mobile phones. It was concluded that these students frequently use mobile phones and weaning them from using mobile phones is an impossible task and what can be done is to get them to use mobile phones effectively. Another thing that could be concluded was that adolescent school students often try to keep their mobile phone private and use it privately. The students used in the research use mobile phones to get the information needed for their studies and to engage in their studies. The use of mobile phones by students for non-academic activities was also at a very high level. Another point that could be concluded from the data analysis was that the use of mobile phones by these students has had some effect on weakening the relationships between their family members as well as social relationships. Moreover, the use of mobile phones has led to health problems for the students. Additionally, it can be concluded that the parents' lenient policies regarding their children's mobile phone use, coupled with their limited knowledge about mobile phone usage, are the main reasons why students' control over mobile phone usage is

slipping away. However, it was also concluded that mobile phones can be used to increase the academic performance of students and for this purpose, it is important to introduce data packages at affordable prices so that students can explore online learning and use other learning materials. But it was concluded that it is essential to introduce special mobile phones with separate software for the use of students as well as to provide systematic training to both students and teachers on how to use mobile phones to increase learning performance.

According to the above conclusion and the information obtained from the data analysis, the following suggestions are made to guide adolescent students to use mobile phones effectively.

Implementation of a series of training programs for students and teachers on the effective use of mobile phones for academic purposes at the school level. Among these,

directing students to use mobile phones for academic purposes under the guidance of teachers and minimizing the unnecessary mobile phone activities of students as much as possible.

Conducting an awareness work program on the use of mobile phones for parents by raising the awareness of parents and directing students to use mobile phones under parental supervision.

According to the facilities available in the school, students are directed to use classroom tab computers in a planned schedule.

Implementation of projects to encourage students to learn through inquiry. Implementation of these work programs at subject level, class level, and sector level.

Apply for concessional data packages for students in consultation with communication institutes and arrange for sponsorship of communication institutes to get data scholarships for students.

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