Mobile Phone Usage and Academic Achievement among Primary and Preparatory School Children

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Abstract

Background: In the past decade, there has been a significant rise in the amount of an individual subscribing to mobile phone services, and this technology is now widely utilized by teenagers. **Aim:** this study aimed to examine the effect of mobile phone usage on students' academic achievement in primary and preparatory school children. **Method:** analytic comparative cross-sectional study was conducted on 400 school children in primary and preparatory private schools in Dakhlia Governorate using a multi-stage stratified cluster sample. **Tool:** a self-administered questionnaire that covers socio-demographic characteristics details, mobile phone usage habits, and attitudes towards its hazards was utilized. The school achievement was obtained from school records. Data collection lasted from October 2020 to January 2021**. Results**: showed that 94.3% of the school children were using mobile phones, mostly the smart type, 50.7% used their mobile for one hour or less per day, and 39.8%wre taking mobile phones to school; 61.5% had a positive attitude towards mobile phone use. Higher percentages of those having very good and excellent grades were not taking their phones to school (p=0.007). Using a mobile phone at school has a detrimental effect on grades, and mobile phone use is very common among primary and preparatory schoolchildren. **Conclusion:** The use of mobile phones appears to have a beneficial effect on students' academic performance but using them in school may have an adverse impact on their grades. **Recommendation:** stricter rules regarding the use of mobile phones in the classroom are necessary, along with a focus on promoting their use for educational purposes and the learning process.

Keywords: Academic achievement, mobile phone, school children.

Introduction:

In the last decade, there has been a notable rise in the utilization of mobile phones, attributed to their widespread popularity and user-friendly interfaces, alongside the continuously advancing technology that expands their array of practical features and applications. Today, mobile phone apps cater to a diverse range of purposes beyond basic voice or text communication, including educational tools **(Reed et al., 2017; Gavali et al., 2017)** and medicine **(Kaner et al., 2017; Rico et al., 2017; Varleta et al., 2017).**

Over the past ten years, there has been a significant increase in the number of mobile phone subscribers in Egypt. Users reached 96.7% of youth in the 18–29 age groups, according to the statistical yearbook **(CAPMAS, 2017)**.

Communities have evolved due to increasing mobility, longer travel lengths, and the possibility of being exposed to threats, which has resulted in a high incidence of mobile phone use. People, in particular parents of school-age children, must therefore be able to always contact their kids and from any location. As a result, they would feel more comfortable knowing that their children are safe **(National Academy of Science, 2012).**

Most today's adolescents are greatly impacted by the content they view on social networking sites, to the point where it is easy to observe the effects on their behavior, both in and out of the classroom. The persistent decline in academic performance, the increase in dropout rates, and the majority of the deplorable, immoral, and antisocial behaviors that students today engage in; such as tardiness, massive failures, exam malpractice, and inappropriate clothing codes **(Muhammed, Umaru & Ahmed, 2016).**

Significance of the study

The benefits of this technology have been the subject of numerous studies due to its widespread use, especially among teenagers. Educational, psychological (**Movvahedi et al., 2014; Sharma et al., 2017; Vernon et al., 2017),** and even addiction and dependence are some forms of negative effect of mobile use (**de-Sola et al., 2017).** However, some research disproved these risks (**Mohan et al., 2016)** or even showed that teen smartphone use has positive benefits (**Vilchis-Gil et al., 2016; Haug et al., 2017; Law et al., 2017).** Thus, the current study is an effort to provide additional data to resolve this controversy and highlight the importance of nurse at schools to enhance student's awareness toward useful usage of mobile phones at class and the negative uses they must avoid during their usage, so they can achieve the highest benefits from these phones at the educational process.

Aim of the study

The aim of this study was to examine the effect of mobile phone usage on students' academic achievement in primary and preparatory school children.

Subjects and Method

Research Question

To fulfill the aim of this study, the following research question was formulated:

H1: Is there a correlation between students' academic achievement and their usage of mobile phones in the classroom.

Research design and setting:

This study was carried out using a cross-sectional analytical research design. It was conducted in the Dakhlia Governorate's morning primary and preparatory private schools.

Subjects:

All students enrolled in private primary and preparatory schools in Dakahlia Governorate for grade three and grade six during the study period were eligible to be part of the study sample. In a multiple regression study involving 20 independent variables, the sample size was determined to exhibit a medium effect size (r-square = 0.15), with a 95% degree of confidence and 90% power. 191 was the necessary sample size, per (**Cohen et al., 2003**). This was raised to 400 to account for a non-response rate of roughly 10% as well as a cluster sampling design effect of 2. To find the pupils, a multi-stage stratified cluster sampling technique was employed. Out of the eighteen districts in the Dakhlia Governorate, three districts were chosen at random for the first stage. These were the districts of Mansoura, Dekrnes, and Manzala. One private primary/preparatory school was chosen at random from each district for the second stage. In the third phase, two main grade 6 classrooms and two third preparatory grade classrooms were chosen from each school. Every student in the twelve classrooms that were chosen was chosen, with an average of thirty to thirty-five students each classroom.

Data collection tool:

A self-administered questionnaire was created, it included three essential parts. **The first part;** it had contained details regarding the socio demographic characteristics of school children, as; their age, sex, birth arrange, parents' work and level of education, place of residence, income, crowding index, etc. It moreover involved smoking, exercising, hobbies, history of chronic illnesses or disabilities, and more, etc.

The second part: included data about the utilization of a mobile phone. It inquired about the kind of device, the features utilized daily, messaging, gaming, the typical number of emails and texts sent each day, and the number of hours used each day. It also

inquired about using and bringing mobile phones to school.

The third part: consisted of an attitude scale with thirteen statements that represented how children felt about the risks associated with mobile phones and how it would influence their scholastic accomplishment. It divided to a three-point Likert scale, the response was: agree, unclear, or disagree.

Scoring system: for the Likert scale; these were rated on a scale of 3 to 1, with positive comments receiving a lower score and negative statements receiving a higher score, indicating greater agreement over the detrimental impacts of mobile phones. The overall grade point total and the ranked grades from the previous school year were used to determine the student's success.

Tool validity & reliability:

The instrument experienced intensive modification handle to guarantee its pertinence, comprehensiveness, and clarity by community and medical nursing professionals. Through the measurement of internal consistency, the reliability of the attitude scale was assessed, and the Cronbach alpha coefficient of 0.60 indicated adequate reliability.

Pilot study:

Was carried out on around 10% (40) of the study sample to test the clarity and feasibility of the created tool. It also provided an estimate of the time needed to fill out the tools, and to identify any difficulties or obstacles required to handle before applying it. And it was included in the study.

Procedure

Fieldwork: the researcher visited the chosen schools and met with the headmasters, clarifying the purpose and methods of the study and requesting their inclusion after

receiving the required formal approvals. Following that, two classrooms from primary grade 6 and two from preparatory grade 3 were chosen for the selection procedure. There were 199 students in primary grade 6 overall, and 201 students in preparatory grade

3.The students in each classroom that was chosen were informed about the purpose and methodology of the study by the researcher, who moreover requested their parent's consent to participate. They were given the data collecting form, and after perusing each question, the researcher asked each student to jot down their answer. At least two sessions were required for each classroom: one for clarifications and another for form completion. Each of the twelve classrooms that were chosen from the three schools underwent the same procedure twice. The scholarly accomplishments of each youngster that was chosen were decided by looking up their records at school. The process of gathering data

took place between October 2020 and January 2021.

Authoritative and ethical considerations:

After outlining the purpose of the study and the methodology, official authorization was obtained from the Ministry of Education as well as from the territorial executives of education in the districts that were chosen. The headmasters of the schools received these permits to arrange the process of gathering data easier. Before any data was collected, informed consents were signed by the parents or guardians of each student; this was fulfilled through the school administration. The consent form made participation completely voluntary and provided laypeople with an easy-to-understand explanation of the study's purpose. They had gotten confirmation that the data they given would be kept private and anonymous. Moreover, it would only be utilized for study. Before filling out the paperwork, school children gave their verbal assent as well.

Statistical analysis:

The statistical software program SPSS version 20.0 was utilized for both data entry and statistical analysis. Descriptive statistics were used to portray the data as means, standard deviations, and medians for qualitative variables, and frequencies and percentages for quantitative variables. To evaluate the internal consistency of the created tool and decide their reliability, the Cronbach alpha coefficient was computed. The chi-square test was utilized to compare qualitative category variables. Using multiple linear regression analysis and variance for the entire regression model, the independent predictors of the total grade points were found. We employed multiple logistic regressions to find the factors that were associated with academic failure. At p-value~−0.05, statistical significance was taken into consideration.

Results

The study sample involved 400 primary and preparatory school students; most of them (76.5%) were girls.

As shown in **Table (1),** their ages ranged from 10 to 16 years. Merely 1.8% of them were smokers, and relatively few had disabilities or chronic illnesses. More than two thirds of them reported participating in sports (65.8%) and hobbies (75.0%). The distribution of their academic achievement throughout the four grade levels was distributed fairly, with slightly more students receiving a fair rating (28.8%). Just 6.0% of them mentioned having failed school in the past.

According to **Table (2)**, less than one-fourth of parents of school-age children had a university degree, while the largest percentage of parents had no formal education. Mothers made up 84.3 % of the study sample and were housewives, while fathers were, 74.0 %. Most of the parents (85.3%) were urban residents, (55.6%) had a crowding index of

more than one person per room, and (62.8%) had a decent income.

Table (3) reveals that, nearly all school children (94.3%) owned a cell phone, with the majority had smart models with touchscreens (82.5%). Games (71.6%) and music (64.2%) were the most frequently utilized everyday functionalities, whereas email sending and receiving (16.4% and 17.0%) were the least frequently used. Most school children said they played games with both hands (63.1%) and texted with one hand (64.7%). One to ten SMSs were sent on average each day (61.3%). In the meantime, significantly fewer than half of them (47.7%) did not send any emails via phone. Fifty-seven percent of them used their phones for an hour or less a day on average.

About two-fifths (39.8%) of the students in the study sample bring their phones to class, as **Table (4)** shows. Most users (70.0%) were only using it in recess. Playing games (34.5%) and listening to music (32.1%) were the most common

applications used by school students, while emailing only being utilized by 9.3% of users. Less than two-thirds of school students (61.5%) disagreed with the negative aspects of cell phone use and had a positive view toward it.

Table (5) shows that, there is a statistically significant correlation (p=0.007) between students' usage of mobile phones in class and their academic achievement. It has been observed that a greater proportion of students who obtained very good or excellent grades have been found to have not brought their phones to class. In the meantime, there is no meaningful connection to earlier school failure.

Table (6) demonstrates a statistically significant relationship (p=0.01 and p<0.001) between students' attitudes on using mobile phones and their earlier school disappointment and scholastic progress. It is evident that a greater proportion of students with reasonable

and extraordinary grades and those who had previously failed showed a positive attitude toward mobile phones.

As children grew older and their birth order increased, they were found to be significant risk variables for earlier school disappointment in multiple logistic regression analysis as mentioned in **Table (7).** Conversely, having a mobile phone, living in an urban region, and having a mother with a higher educational attainment were protective factors against this sort of disappointment, with odds ratios (ORs) much lower than one.

Table (8) appears that, the recurrence of SMS sent daily, urban residency and parents' educational attainment were statistically significant independent positive predictors of the overall grade point multivariate analysis. On the other hand, unfavorable pointers included bringing a phone to class, having a working mother, and a higher scholarly year. Of the overall grade

point fluctuation, 27% can be explained by the model

Table 1: Students characteristics regarding; personal, health, and academic achievement (n=400)

Items	Frequency	Percent
Age:		
<=12	143	35.8
>12	257	64.3
Range	10.0-16.0	
Mean±SD	13.3±1.2	
Median	14.0	
Gender:		
Male	94	23.5
Female	306	76.5
Birth order:		
1	153	38.3
2+	247	61.8
Persistent chronic disease	41	10.3
Have disability	11	2.8
Smoking	7	1.8
Play sports	263	65.8
Engage hobbies	300	75.0
School achievement:		
Fair	115	28.8
Good	102	25.5
Very good	90	22.5
Excellent	93	23.3
Total Grade Point Average (max=100)		
Range	18.0-100.0	
Mean±SD	75.9±13.4	
Median	74.50	
Prior school failure	24	6.0

Table 2: Socio-demographic characteristics of students' parents in the study sample (n=400)

Items	Frequency	Percent
Father education:		
Nonformal	144	36.0
Basic	46	11.5
Intermediate	125	31.3
University	85	21.3
Father job		
Employee	104	26.0
Manual work/trade	296	74.0
Mother education:		
Nonformal	135	33.8
Basic	46	11.5
Intermediate	127	31.8
University	92	23.0
Mother job:		
Housewife	337	84.3
Working	63	15.8
Residence:		
Rural	59	14.8
Urban	341	85.3
Crowding index:		
1	177	44.3
>1	223	55.8
Income:		
Not enough	111	27.8
Enough	251	62.8
Conserving	38	9.5

Table 3: Utilization of mobile phone among students in the study sample (n=400)

Items	Frequency	Percent
Make of your phone	377	94.3
Type:		
Regular	40	10.6
Smart	18	4.8
Intelligent touchscreen	311	82.5
Multiple	8	2.1
***Daily use of several functions:**		
Making phone calls	163	43.2
Being called on the phone	183	48.5
Transmitting text messages	112	29.7
Obtaining text messages	200	53.1
Sending email	62	16.4
Receiving email	64	17.0
Browsing net	192	50.9
Seeking a study subject	134	35.5
Games	270	71.6
Audio	242	64.2
Texting using:		
One hand	244	64.7
Both hands	133	35.3
Playing games using:		
One hand	139	36.9
Both hands	238	63.1
Average daily SMS sent:		
None	113	30.0
1-10	231	61.3
11-25	22	5.8
26-50	11	2.9
Average daily email sent:		
None	180	47.7
1-10	156	41.4
11-25	30	8.0
26-50	11	2.9
Daily mobile usage hours:		
1 or less	191	50.7
2-3	74	19.6
4+	112	29.7

*More than one answer was allowed

Table 4: Use of cell phone at school among students in the study sample (n=400)

Items	Frequency	Percent
Bring your phone to school	150	39.8
Used in:		
Class	5	3.3
Recess	105	70.0
Both	40	26.7
*Used for:		
Being called on the phone	103	27.3
Receiving voice calls	113	30.0
Sending text messages	82	21.8
Obtaining text messages	104	27.6
Sending email	35	9.3
Receiving email	41	10.9
Browsing net	62	16.4
Searching for study topic	88	23.3
Games	130	34.5
Music	121	32.1
Attitude towards cell phone drawbacks:		
Agree (negative)	154	38.5
Disagree (positive)	246	61.5

*More than one answer was allowed

Table 5: Relationship between students' academic achievement and their usage of mobile phones in class.

Items	Take mobile to school				X^2 test	p-value
	No		Yes			
	No.	%	No.	%		
Prior school failure:						
No	215	60.1	143	39.9		
Yes	12	63.2	7	36.8	0.07	0.79
School achievement:						
Fair	64	61.5	40	38.5		
Good	44	45.8	52	54.2	12.13	0.007*
Very good	56	65.9	29	34.1		
Excellent	63	68.5	29	31.5		

(*) Statistically significant at p<0.05

Table 6: Relation between students' attitude towards mobile phone drawbacks and their academic achievement.

Items	Attitude				X² test	p-value
	Agree (negative)		Disagree (positive)			
	No.	%	No.	%		
Prior school failure:						
No	139	37.0	237	63.0		
Yes	15	62.5	9	37.5	6.21	0.01*
School achievement:						
Fair	34	29.6	81	70.4		
Good	45	44.1	57	55.9	24.11	<0.001*
Very good	51	56.7	39	43.3		
Excellent	24	25.8	69	74.2		

(*) Statistically significant at p<0.05

Table 7: Best fitting multiple variety logistic regression models for the factors determining previous school failure.

Items	Wald	Df	p-value	Odds Ratio (OR)	95.0% CI for OR	
					Upper	Lower
Constant	3.445	1	0.063	0.00	0.063	0.00
Age	9.789	1	0.002	5.21	1.85	14.66
Birth order	6.589	1	0.010	47.63	2.49	910.02
Mother education	9.296	1	0.002	0.06	0.01	0.36
Urban residence	7.937	1	0.005	0.04	0.00	0.37
Use cell phone	7.384	1	0.007	0.03	0.00	0.37
Nagelkerke R Square: 0.63						
Hosmer and Lemeshow Test: p=1.00						
Omnibus Tests of Model Coefficients: p<0.001						
Non-significant variables: gender, grade, father education, mother work, crowding index, income, chronic disease, disability, exercise, smoking, allowance, hobbies, attitude score						

Table 8: Best fitting multivariate logistic regression model for the total grade points.

Items	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value	95% Confidence Interval for B	
	B	**Std. Error**				**Lower**	**Upper**
Constant	66.34	6.26		10.592	<0.001	54.00	78.67
Grade (school year)	-5.69	1.65	-0.20	3.440	0.001	-8.95	-2.43
Father education	1.79	0.76	0.17	2.350	0.020	0.29	3.29
Mother education	2.67	0.79	0.25	3.397	0.001	1.12	4.22
Working mother	-0.73	0.27	-0.16	2.710	0.007	-1.25	-0.20
Urban residence	4.97	2.06	0.14	2.411	0.017	0.91	9.03
Income	-2.64	1.33	-0.12	1.991	0.048	-5.26	-0.03
Take mobile to school	-4.80	1.55	-0.18	3.098	0.002	-7.85	-1.75
No. of SMS	3.01	0.97	0.17	3.112	0.002	1.10	4.91

r-square=0.27   Model ANOVA: F=12.78, p<0.001

Non-significant variables: age, gender, crowding index, chronic disease, disability, exercise, smoking, allowance, hobbies, attitude score, hours of use, media

Discussion

In this study, the effects of cell phone use on scholarly accomplishment were evaluated in students attending primary and preparatory schools. Overall beneficial effects on grade point averages and scholastic success are indicated by the studies. Their scholarly performance appears to suffer because of using cell phones in class, though. Nearly all students in schools use cell phones, according to the results of this study. In addition, they primarily use touchscreen-equipped high-tech smartphones. Given that numerous school students have a steady family pay and live in cities, it may be the case that these expensive gadgets are vital. Moreover, the **(CAPMAS, 2016)** research states that, 88% of Egypt's population has more mobile phone lines than there are people in the country. Similar to a study conducted in Spain, 90% of the study sample reported using a mobile phone, which is a similarly high rate of use **(Muñoz-Miralles et al., 2014).** Additionally, almost two-thirds of a sample of students in Rome, Italy reported using a smartphone **(Poscia et al., 2015).** That reflects the massive transformation toward technologies in all sectors including education.

The two most popular activities that school children in this research did with their mobile phones were playing games and listening to music. These are recreational tools that won't directly improve their scholarly accomplishment achievement. Furthermore, slightly less than two thirds of them expressed that they used both hands to play games, demonstrating a high level of manipulation skill and frequent use for this purpose. According to **Reolid-Martínez et al., (2016),** which conducted a study on teenagers in Spain, girls primarily used their phones for music listening and chat, while guys primarily used them for gaming. A study on French

pupils conducted in their teens uncovered a similar pattern of use, appearing that playing games and viewing videos accounted for more than half of the time spent using electronic devices such tablets and cellphones **(Royant-Parola et al., 2017).** From the investigator point of view, this emphasizes the negative reflect of mobile phones on academic achievements of students at schools

However, only about one-third of the school children participating in the current study mentioned using their phones for scholastic purposes, such as finding a study topic. Furthermore, approximately 50% of students utilized their phones to browse the internet, which may well be supportive for their studies. The truth that an awfully little rate of students in this survey used their phones for these positive objectives suggests that they did not see the benefits of this innovation. According to research conducted in Turkey, the vast majority of parents of school-age student expressed that;

their children's education depends on having access to the internet **(Dinleyici et al., 2016)**. That confirms the truth that technology and usage of mobile phones in education become a base and students depend on it in studying and education.

Most of the school students in the current study brought their cellphones to school, and around one-third of them utilize it there. Since most of them were playing games and listening to music, these students' use of their phones in class impossible to be for scholarly purposes. This study concluded that the school child's total grade point average was negatively correlated with carrying a cell phone to school. At the same line, **Ling and Helmersen, (2010)** discovered that using cell phones in class disrupts the rules and roles of both the school and the students. Similarities among studies reflect that permitting contacts exterior of the school setting tends to divert pupils and change

their focus and consequently affect their achievement.

According to the current study's discoveries, around two thirds of the school children had a favorable supposition of utilizing mobile phones. Regarding its disadvantages, which include time loss, diversion, physical risks, and moral dilemmas, they were largely at odds. Furthermore, there was a diminishing in scholarly disappointment among those with such an optimistic outlook. But the relationship between attitude and scholarly success, as measured by grades, appeared that this kind of attitude is a double-edged sword. As a result, a large part of school students with a positive outlook belonged to the group that received the highest grades, fair and exceptional. Because of this, an optimistic outlook may empower scholastic success, or conversely, it may result in a passing grade that might be linked to the negative effects of cell phones. They would pass more awful scholastically

because of this. Similar to the current study, a survey conducted on South African university students by **Cilliers et al., (2017)** found that, most of them had good opinions about using their phones to find information for their studies.

Moreover, with an Odds Ratio (OR) of 0.03, using a cell phone shows up to be protective against failing school. This recommends that employing a cell phone progresses scholastic execution. Concurring to a study conducted in Iran, exposure to mobile phone radiation improves the short-term memory capacities of primary school students (**Movvahedi et al., 2014**). Furthermore, two studies conducted on Nigerian secondary school students showed a significant correlation between the students' scholarly accomplishment and their use of mobile phones (**Rabiu et al., 2016; Jairus et al., 2017**).

Furthermore, it was discovered that the quantity of text

messages (SMS) sent daily was a profoundly significant positive predictor of their overall grade points, indicating increased scholastic execution. Their increased vocabulary may help to explain this. The results are consistent with a study conducted on Dutch primary school students, which found that text messaging improved their language and linguistic aptitudes (**Van Dijk et al., 2016**). It confirms the positive impact of utilizing the phones if it is used by the correct way and at the appropriate time.

Certain socio-demographic traits had an impact on students' scholarly execution as well. Given that students who are older than their peers typically have poorer scholastic capacities, it appears that older children and those with high birth order rank are more likely to fail school. The higher birth arrange could be explained, in portion, by the reality that second born get less attention at home than firstborns. The education of parents and living in an

urban zone were two other socio-demographic factors that the current study found to be associated with scholastic accomplishment. These had a favorable effect on the child's scholastic execution because of improved care, which may have been caused by the family's increased financial status.

On the other hand, a working mother had a detrimental impact on her child's academic performance. This may be the result of the mother's expanded workload at work combined with the fact that she spends less time with her child. These socio-demographic traits were found to interact with the way that mobile phones are used in a study of Chinese teenagers, which uncovered comparable correlations (**Jiang et al., 2014**). Similarities among studies showed how environment students live in and parents' occupation and interest with their children affect strongly on their way of education and to what extant students need very strict observation and guidance in

using their phones at school and education.

Conclusion

In conclusion, the study discoveries indicated that mobile phone utilization is widespread among primary and preparatory school students. Their execution in school appears to advantage

Recommendations

The study suggests tighter guidelines for schools when it comes to student cell phone use. It is advisable to propel students to upgrade their use of technology for educational reasons and applications that bolster their learning. To clarify the impacts of utilizing educational mobile apps on students' learning process, more inquiries about is required.

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