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TÉLÉMATIQUE

SMARTPHONE FOR SCIENCE: A DEPOSITORY OF APPLICATIONS ALONG WITH MALWARE

SMARTPHONE FOR SCIENCE: UN DEPÓSITO DE APLICACIONES JUNTO CON MALWARE

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ABSTRACT

Pros and cons are two facets of the same coin. This fact is intensely associated with the use of electronic gazettes as teaching tools. Previously teaching tools used were simple, cost –effective & bankable. Technology improvement added a new era in life, simultaneously the things converted to costlier even exorbitant. Simple mobile phones converted to smartphones & the use of smartphone as teaching tool made education imparting process more effective. There are a large number of educational apps available for each subject. However these apps may become cause to malfunctioning of mobile/smart phone. According to a study by cyber security company, NowSecure, 10.8 percent of apps leak sensitive data over the network, 27.7 percent of mobile applications have at least one high –risk security flaw and 50 percent of apps send data to an ad network along with phone number, IMEI (International Mobile Equipment Identity) number, call logs and location of mobile. This paper inquires about the availability of science teaching apps for mobile & other electronic gazettes accompanying the negative effect of downloading these apps in mobile phone. Methodology used is the analysis of information & data available on internet. The aim of this paper is to grab attention of users toward using secure educational applications.

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Key Words- Teaching tool, mobile phone, smart phone, educational apps, data.

RESUMEN

Los pros y los contras son dos caras de la misma moneda. Este hecho está intensamente asociado al uso de gacetas electrónicas como herramientas didácticas. Anteriormente, las herramientas de enseñanza utilizadas eran simples, rentables y financiables. La mejora tecnológica agregó una nueva era en la vida, al mismo tiempo que las cosas se volvieron más costosas e incluso exorbitantes. Los teléfonos móviles simples convertidos en teléfonos inteligentes y el uso de teléfonos inteligentes como herramienta de enseñanza hicieron que el proceso de impartición de educación fuera más efectivo. Hay una gran cantidad de aplicaciones educativas disponibles para cada tema. Sin embargo, estas aplicaciones pueden convertirse en la causa del mal funcionamiento del teléfono móvil/inteligente. Según un estudio de la empresa de seguridad cibernética NowSecure, el 10,8 % de las aplicaciones filtran datos confidenciales a través de la red, el 27,7 % de las aplicaciones móviles tienen al menos una falla de seguridad de alto riesgo y el 50 % de las aplicaciones envían datos a una red publicitaria junto con el teléfono. número, número IMEI (identidad internacional de equipo móvil), registros de llamadas y ubicación del móvil. Este documento indaga sobre la disponibilidad de aplicaciones de enseñanza de ciencias para dispositivos móviles y otros boletines electrónicos que acompañan el efecto negativo de descargar estas aplicaciones en teléfonos móviles. La metodología utilizada es el análisis de la información y los datos disponibles en Internet. El objetivo de este documento es llamar la atención de los usuarios sobre el uso de aplicaciones educativas seguras.

Palabras clave: herramienta de enseñanza, teléfono móvil, teléfono inteligente, aplicaciones educativas, datos.

INTRODUCTION

The roots of social media lies in between the different types of communication methods adapted from ancient times. As the time passed, the pigeons converted to Larry- the twitter bird. The usages of social media converted from conveying important information to spreading vague content, rumours etc.. Earlier the thought of intermingling social media and education was conceptual. In the period of pandemic, online education became an important medium of imparting education. Online learning could be of formal or informal type. Formal online education consists of online classes run by teachers and

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tutors. Simultaneously to this system an informal style of teaching in the form of social media works. By definition," Social Media is a collective term for websites and applications that enable users to create and share content or to participate in social networking." Social media i.e. different google groups, apps are the examples of social media. The social media apps dominating presently are-

1. Douyin
2. Facebook
3. Facebook messenger
4. Instagram
5. QQ
6. Sino weibo
7. Tiktok
8. Wechat
9. Whats app
10. Youtube

Albeit the use of social media is thought to be limited to posting snaps, making online friends, sharing thoughts & feelings only. But the intellectual community started to use it as a tool to impart education. Apps are becoming larger and larger in number and gradually are becoming an essential part of life. There are apps related to each facet of life like- education, business, books & references, tools, lifestyle, food & drinks, shopping, personalization, music and audio, gaming ,entertainment, maps and navigation, medical, photography, sports, puzzle, adventure, beauty and fashion, word, weather, casino, comics etc.

LITERATURE

The researcher reviewed the research papers online with the help of keywords "Educational apps, mobile phone, teaching tool, malware". The articles available online related to these keywords were also reviewed for having the clear insight to content.

Ababneh M. et al [2020] discussed usage of social media in education. Avraamidou L. (2008) discussed prospects for the use of mobile technologies in science education. Chem M. (2022) discussed the effect of social media on the development of students' affective variables. Dollarhide M. (2021) presented effects of social media and top apps. Ekanayake S. Y. et al (2016) discussed support of mobile phones in a private network for science teaching. Ekanayake S. Y. et al (2014) presented Mobile phone images and video in science teaching and learning. Ekanayake S. Y. et al (2015) proposed

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integrating of mobile phones into teaching and learning. Ekici M. et (2020) suggested developing science process skills through mobile scientific inquiry.
A. O. Mulani et al [2017] suggested FPGA based implementation of DWT alongwith AES based watermarking. A. O. Mulani et al [2022] proposed realistic reusable low-cost non-invasive glucose monitoring system is developed using 802.11a Wi-Fi module. A. O. Mulani et al [2019] designed AES algorithm using Xilinx SysGen, implemented on Nexys4 and simulated using Simulink. Mandwale A. J. [2015] discussed different kind of implementation of Viterbi decoder along with their performance. P. R. Kulkarni [2015] suggested an algorithm which combines the information of low frequency DWT coefficients and the watermark image.
Godse A. P. et al [2009] text book on Embedded Systems give detailed view of Microcontrollers and real time systems. H. S. Deshpande et al [2015] suggested area optimized implementation of AES algorithm. A. O. Mulani [2019] discussed High-Speed area-efficient implementation of AES algorithm on reconfigurable platform. A. Kamble et al [2022] proposed Google Assistant based Device control. Boxey A. et al [2022] suggested Face recognition using Raspberry Pi. V. B. Utpat et al [2022] discussed the machine vision approach to form a quality grading analysis system. J. P. Patale et al [2023] presented the detailed survey on Estimation of Electric vehicles. S. Takale [2022] suggested DWT-PCA based watermarking. A Mandwale et al [2014] proposed implementation of convolutional encoder. B. Gadade [2022] suggested automatic system for car health monitoring. Y. Maske et al [2023] developed a Biobot system to assist Covid patient and caretakers.

RESEARCH METHODOLOGY

In this paper, quantitative data is used to put the point strongly. ‘Smartphone’ and ‘mobile phone’ are the terms used interchangeably. Researcher used content & data available online to describe the issue.

CRITERIA OF SELECTION-

The researcher focused on the articles published from last decade till present. As the idea of teaching through mobiles has been started only after the emergence of online teaching.

INTERPRETATION OF DATA-

The usage of these apps is not limited to adults only but the kids of alpha generation are using apps very smartly. Government is generating a huge amount of money as revenue from these applications. The number of apps available on internet are increasing day by day. (Table-1)

Table 1 - No. of apps since last quarter 2020 -2022

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Year - month	Number of available apps
2022-09	2,683,925
2022-06	2,654,747
2022-03	2,591,578
2021-12	2,605,000
2021-09	2,783,000
2021-06	2,886,000
2021-03	2,980,000
2020-12	2,950,000
2020-06	2,960,000
2020-03	2,870,000
2019-12	2,800,000

Source- www.statista.com

According to Statista, there are 263,682 number of educational apps , among these 13,551(5%) apps are paid and 250,131 apps are free. Apps with above 50 K downloads are 19603 (7%). The average price for an app is $ 6.47.

Table 2- Worldwide mobile education app downloads (in millions)

Quarter & year	App store	Google play
Q1 2020	470	466
Q4 2019	291	351
Q3 2019	335	406
Q2 2019	276	389
Q1 2019	322	398
Q4 2018	287	396
Q3 2018	310	407
Q2 2018	242	299
Q1 2018	289	321

Source- www.statista.com

The use of mobile phones is not limited to chatting, talking only but has extended to camera, calculator, stop watch, mp3 and a tool to teach. (Table-3)

Table 3 - List of apps for science teaching

S.No.	Name of App	Used for	S.No.	Name of App	Used for
1.	The human body by tinybop	To learn about human body	20.	Pear deck	Quiz based on science
2.	Audio sky tour	To learn about sky	21.	e-bird	For amateur bird watchers(virtual lab)

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3.	physics prof	Library of physics equations	22.	Star walk	It tell about stars and planets(virtual lab)
4.	Tree of life-PRO	Evolution history of all species (2000)	23.	NASA Globe observer	To inform official scientific research
5.	Hudson alpha icell	To learn about bacteria and plant cells	24.	My shake	Models earthquake activity
6.	Solar system scope	to explore about other planets	25.	The elements	3 D image of elements with information
7.	tappity	Quizzes,games centered around science topics	26.	Periodic table	Information about elements
8.	Science practical simulator	Virtual lab	27.	Periodic table quiz	To find elements in table
9.	Science news daily	Latest science & technology news	28.	Daily random facts	Science based facts
10.	Cosmic watch	3 D graphics of celestial bodies	29.	Science dictionary by farlex	Phrases and words used in a scientific context
11.	The elements in action	Teaser videos that illustrates each elements unique properties /uses	30.	Quizizz	Queries based on science
12.	Sky view	It is a free augmented reality app	31.	Toca lab: elements	To teach chemistry
13.	Moon phases AR	3 D images of sun, earth, moon .their relative movements	32.	CHEMIST-Virtual chem. Lab	Virtual lab

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14.	Earth school science games	Science games	33.	Physics studio	World of physics in virtual lab
15.	Whack a bone	Name of human bones	34.	Starfall catalyst for students	Chemistry relaed challenges
16.	Twin science games	Useful for STEM	35.	EdPlace: science worksheet	Science worksheet
17.	Sky safari	To learn astronomy	36.	FavScientist	Talk about the greatest scientific mind (you tube)
18.	Amazing science facts	Fascinating facts	37.	NSF Science Zone	High resolution photos & videos from National Science Foundation
19.	quizlet	Quiz based on science	38.	DIKSHA- for school education	India's national digital infrastructure which provides learning material

The apps provide a critical link between companies and customers however this link could be captured & used as an opportunity for hackers. The statistics available are shocking:

- Almost 3/4 of apps would not pass even a basic security test.
- 83 percent of apps have at least one security flaw.
- Mobile security vulnerabilities are 91 percent for iOS and 95 percent for Androids.

Data security is essential for every organization & individual. Hence, along with downloading educational apps, it must be mandatory for teachers to have apps for mobile device management (MDM). The apps installed on mobile carry quality content, different styles of teaching- learning, attractive backgrounds to make learning easier. Simultaneously these are a good conductor of malwares also. (Table-4) Mobile malware is malicious software designed to target mobile devices having the goal to access the personal data. This threat is reality of virtual world. These are dangerous to phone sets

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and networks. Different types of mobile malwares are- madware, spyware, viruses, Trojans, phishing mails, browser exploits etc..

Table 4 - Issues generated due to presence of malware

Useful apps + Malwares (user makes their entry unwittingly)	financial issues	• could subscribe unwanted premium services • may add to click fraud
	security issues	• location of user could be traced • to have approach to personal IDs and passwords (whenever we allow to remind our password)
	gazette work speed issues	• may download other malicious files & apps • could have a complete control over device • could slow down the speed of gazette.

More than 3 million new malware samples were discovered in 2017 targeting the iOS . The first sign of presence of malware is slowing down the speed of mobile.

CONCLUSIONS

From the above analysis, it is clear that some precautions must be taken by the users to rectify malware related problems such as-Maximize the security feature (use PIN or password), Always use strong password, Always use authentic official store to download any new app, Be suspicious of surprise pop-ups, Uninstall an unwanted or suspicious app, Review the ratings & comments for any app to be downloaded, Minimize the permission asked by apps, Check your data usage time to time, if it is high than you use it, it shows the presence of malware, Use the updated versions of app & update the already installed apps, Install a mobile security app/ antivirus (Traditional antivirus software are no guarantee of retroactive security- detection of past infections), Avoid to use public Wi-Fi, Don't charge your phone battery at public charging stations (If necessary, use AC outlet only not USB charging ports).

As it has been a critical and important issue. Hence, it is mandatory to resolve the problems related to electronic gazettes which are being

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extensively used as teaching tools. Researchers could focus on the studies related to malware free educational apps. Government could provide secure internet connections to teachers.

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