INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact Factor: 6.078
(Volume, Issue - V7I2-1299)
Available online at: https://www.ijariit.com

Gadgets and gamification digital devices from SMS to SHS (Smart Health Solutions)- The app revolution

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ABSTRACT

In the wake of the worldwide phenomenon of technology overtaking every aspect of our lives and the huge surge in the overall usage and application of technology in everyday life. There are two facets that have emerged as striking features in the global tapestry of the social media and techno-connected societies and communities across the world. Number one is the total re-haul in the way people work and live, which can be termed as 'Lifestyle' in the broader sense. The second is the invasion of technology into every aspect of that life, as smart devises, gaming consoles, Applications and special Apps and gadgets have bombarded us from every direction. Looking at it from various perspectives gives a wide spectrum of view-points and each has its own merits and demerits, yet the most important and striking feature has to be the impact of the digital era on the health. And that's the view point that is more pressing and urgent in the current global context. The upside and downside of the Digitalization of every aspect of life as a direct result has triggered both a socio-economic upheaval and a global health crisis simultaneously. The Upside being digitalization of almost everything around us and the ease and simplified solutions which comes at the touch of a button, we can call it digital empowerment, the downside being Sedentary lifestyle induced debilitating epidemics of obesity, Diabetes, Cardio vascular diseases and many physiological and psychological problems for people across profiles and ages. However, there is a major awakening to the crises and many Governments, companies, communities and people have realized the value of healthy lifestyle and responded with a dramatic sense of responsibility and commitment towards healthier choices and interestingly enough, fitness is the latest priced possession and status symbol. But far from being an elitist phenomenon, it is fast becoming a pop culture and at least in that spirit has become a major calling for people across spectrum to get fitter. Again, technology in the form of smart phones, wearables, gadgets and intelligent devices is at the forefront of this paradigm. The question though, with regard to the efficacy and effectiveness of the devices and solutions and the innumerable wearables, Apps and technologies that are available in various forms and formats is still at large and their role as a definitive solution for health and fitness requirements is a work in progress, which, unless it involves the right blend of the expertise, experience and education, cannot become an empowering tool. We need to find the right ones that will enable us to use the available technology without overwhelming us and fit within the scheme of specific requirements and aspects that we seek feedback and inputs for and thereby enhance the effectiveness and amplify the experience.

Keyword: *Artificial Intelligence, Analytics, Connectivity Connected, Digital Devices, Diagnostic tools, Enabled /Embedded /Empowered Solutions, Electronic ecosystem, Fitness Quotient, Gadgets and Gamification, Health Care Solutions/Health Drive, Wellness Quotient*

1. INTRODUCTION

The past two decades saw a tremendous economic growth spurt that was powered by Information technology, starting from software as a solution to software as a service and ranging from software for warfare to software for corporations and businesses, software for personal use and enterprise management to energy management and connecting people within the organization to connecting Organizations, societies and the people from across the World in the world wide web and social media. Towards the early part of the last decade the mobile phones and devices became 'smart' and e-commerce took over. However, the most telling transformation happened when the device could assume new functions with the introduction of downloadable Apps and ever since they have dominated the electronic landscape where App enabled gadgets, products and services have now become a ubiquitous part of everyday life for almost everyone in almost all of the developed and developing countries and societies. The personal devices have acquired new dimensions with App enabled, wearable and personal devices and gained great powers thanks to the seamless connectivity and electronic eco-systems that are available to everyone for their specific needs and requirement at reasonable rates.

From entertainment to video sharing and food ordering to commute, the various utilities and usages have been evolving at a rapid rate but the biggest impact yet has been that of health and fitness.

The fitness and wellness industry has been at the cutting edge of this Digital Devices upheaval and there has been an unprecedented adoption of technology-based products and services in every industry across profiles and it is a Global phenomenon that has arrived well and truly even in countries like India and China. With such wide acceptance and adoption rates it is but inevitable that the devices exert a considerable amount of influence and impact on the persons using them. From simple pains and aches to strained eyes and headaches and frozen shoulders to mobility issues the digital devices now have emerged as one of the major causes for Digital Device induced Injuries and complications ranging from sore fingers and inflamed wrists to Stress, and strained relationships to behavioral issues to more serious issues like addiction, Digital Device induced oxidative stress, indirect impacts like Digital Devices Induced Sedentary Lifestyle complications like obesity, Diabetes and High Blood pressure. But there are many good uses and applications of the Digital devices which if used in the right context and quantity can bring about a positive and powerful impact on the Lifestyle, health and wellbeing of a person. The mere reminder to stand after every 1 hour, to breathe and walk after an hour of inactivity to reminder for hydration and food and more important functions like monitoring activity, heart rate, BP and Blood glucose levels and stress levels and cardiac health in a closed loop system can radically change the way health is taken care and fitness is practiced.

Therefore, it becomes rather important to understand the various facets and usage modes and the ways in which the Digital devices can be utilized and applied in the pursuit and practice of healthy living and with the gadgets now becoming such an integral and inevitable part of everyday life it can become the best tool for transformation. A thorough study of the overarching facets and features and their inherent and confounding effect has to be compared with the various impact studies of the Digital Devices and chart out an analytical and objective outlook comprising the various applications and gadgets that can together offer an effective, connected and simple platform for monitoring and maintaining a healthy lifestyle and healthful Life.

The Problem

Mere availability of Devices and Information did not necessarily make the past two decades greatly informed in terms of scientific thought and Behavior.

Similarly, the abundance of the gadgets, apps and devices has not meant the effective usage and benefit for the users.
The major concerns being

1. Digital Device Induced Health Complications (Direct/Indirect)
2. App Inundation: Making sense of IT (Information Technology)
3. AI- Revolution: Natural Dissonance -The Artificial Intelligence Age
4. Empowerment and Convergence: The connectivity conundrum

Understanding Way of the Wirelessly connected World

In 2015, the mobile ecosystem generated 4.2 per cent of global GDP, a contribution that amounts to more than $3.1 trillion of economic value added. The pursuit starts with the observable and available studies around the problem and the relative lack of holistic perspective is the striking feature that emerges as the reality from the realms of the Virtual World. In that context, a whole new study area emerges around the impact of Digital Device and its Impact. The Digital Device Induced complications on Health both as a direct as well as an indirect factor is something of immense value as it could shed lighter and help moderate, regulate and modulate the devices for ones' own benefit in the smartest and safest possible manner.

Digital Device Induced Health Complications (Direct/Indirect)

- Digital Device induced Injuries and complications
- Digital Device Induced Relationship Issues
- Digital Device Induced Addiction and behavioral issues
- Digital Device Induced Stress and Sleep Disorder
- Digital Device induced oxidative stress
- Digital Devices Induced Sedentary Lifestyle complications like obesity, Diabetes and High Blood pressure

Digital Device induced Injuries and complications

Some have dubbed texting "the new drunk driving" — and for good reason. New research suggests that texting while walking can also be dangerous, as it rounds up all the head and neck injuries that occurred due to cell phone use over a 20-year period. According to the United States Department of Transportation, distracted driving led to 3,166 deaths in 2017. Of these deaths, 599 affected pedestrians, cyclists, and others who were not behind the wheel of a car at the time of the accident. Although distracted driving includes more than just texting, "dialing or text messaging on a cell phone or any wireless email device" was responsible for 401 fatal crashes in 2017. However, texting while driving is not the only way in which cell phone use can be distracting and potentially dangerous.

Texting while walking can also lead to accidents, and with 96% of people in the U.S. owning a smartphone, researchers set out to ask what percentage of head and neck injuries are attributable to cell phone use. Roman Povolotskiy — from the Department of Otolaryngology-Head & Neck Surgery at Rutgers New Jersey Medical School in Newark — is the first author of a new paper that investigates this. Its results appear in the journal JAMA Otolaryngology-Head & Neck Surgery.

Digital Device Induced Addiction and behavioral issues
Psychological effects

Overuse or dependence on technology may have adverse psychological effects, including Isolation
Technologies, such as social media, are designed to bring people together, yet they may have the opposite effect in some cases. A 2017study in young adults aged 19–32 years found that people with higher social media use were more than three times as likely to feel socially isolated than those who did not use social media as often. Finding ways to reduce social media use, such as setting time limits for social apps, may help reduce feelings of isolation in some people.

Depression and anxiety
The authors of a 2016 systematic review, Trusted Source discussed the link between social networks and mental health issues, such as depression and anxiety. Their research found mixed results. People who had more positive interactions and social support on these platforms appeared to have lower levels of depression and anxiety. However, the reverse was also true. People who perceived that they had more negative social interactions online and who were more prone to social comparison experienced higher levels of depression and anxiety. So, while there does appear to be a link between social media and mental health, a significant determining factor is the types of interactions people feel they are having on these platforms.

Physical or Physiological health effects
The use of digital devices with the high screen time and high technology use may actually increase the relative risk of physical issues and includes:
- Eyestrain
- Digital devices and use of gadgets for long durations may lead to eyestrain.
- Digital eyestrain might include blurred vision and dry eyes.

Such eyestrain may also lead to episodes of pains in other parts of the body, such as the head, neck, or shoulders, back and joints, tendons and ligaments. Factors that may lead to eyestrain,
- Screen time
- Screen glare
- Screen brightness
- Viewing too close OR too far away
- Poor sitting posture
- Underlying vision issues
- Taking regular breaks away from the screen may reduce the likelihood of eyestrain.

Digital Device Induced Stress and Sleep Disorder
The recommend amounts of sleep in every 24-hour period:

Age	Hours of sleep
4–12 months	**12–16, including naps**
1–2 years	**11–14, including naps**
3–5 years	**10–13, including naps**
6–12 years	**9–12**
13–18 years	**8–10**
18–60 years	**7 or more**

A person who is not getting enough quality sleep and it may experience a range of including:
- fatigue
- irritability
- mood changes
- difficulty in focusing and remembering
- Reduced vitality

2. REVIEW OF LITERATURE
Megan Teychenne et.al, (2019) in their study on "The association between sedentary behavior and indicators of stress: a systematic review" Recent research and various studies trying to establish inverse relationship between digital devices / social media induced sedentary lifestyle and the impact on behaviour and stress is eye opening and at the same time disturbing, the reports suggest alarming trends people have been using more time on their phones and devices than human interations. The Covid-19 induced pandemic, the quarantine, lockdown and the work from home and social isolation has further alienated individuals and families from social groups and has had a profound effect on the physiological and psychological health and wellbeing of people. The average screen time has gone up along with waking hours and work hours while the actual self and social interaction time, including family has gone down to an alarming level despite the covid-19 induced restrictions. According to a 2017 study comprising young adults aged 19–32 years were found that people with comparatively higher digital devices and social-media usage time were found to be three times as likely to feel being socially isolated than those who did not use similar screen time or social media as often. The

authors of another research which discussed the link between digital device based social networks and existing mental health and mental wellness issues, such as, Depression and Anxiety. And their research actually found some mixed results. Those who had more positive interactions and social support on these platforms seemed and appeared to have much lower levels of depression and anxiety. Interestingly enough, the researchers found the reverse to be true as well. People with basic levels of stress even if they had negative social experience and interactions online were found to be more prone to social comparison experienced higher levels of mental health issues like depression and anxiety. An obvious and established link between, social media and mental health, a significant determining factor is the types or kind of interactions these people feel while they are on these platforms

In a study done by Ozguner F1 et.al., (2005) on "Mobile Phone-Induced myocardial oxidative stress: protection by a novel antioxidant agent caffeic acid phenethyl ester" found that electromagnetic radiation (EMR) or radiofrequency fields of cellular mobile phones may affect biological systems by increasing free radicals, which appear mainly to enhance lipid peroxidation, and by changing the antioxidant defense systems of human tissues, thus leading to oxidative stress. Mobile phones are used in close proximity to the heart, therefore 900 MHz EMR emitting mobile phones may be absorbed by the heart. Caffeic acid phenethyl ester (CAPE), one of the major components of honeybee propolis, was recently found to be a potent free radical scavenger and antioxidant, and is used in folk medicine. The aim of this study was to examine 900 MHz mobile phone-induced oxidative stress that promotes production of reactive oxygen species (ROS) and the role of CAPE on myocardial tissue against possible oxidative damage in rats. Thirty rats were used in the study. Animals were randomly grouped as follows: sham-operated control group (N: 10) and experimental groups: (a) group II: 900 MHz EMR exposed group (N: 10); and (b) group III: 900 MHz EMR exposed+CAPE-treated group (N: 10). A 900 MHz EMR radiation was applied to groups II and III 30 min/day, for 10 days using an experimental exposure device. Malondialdehyde (MDA, an index of lipid peroxidation), and nitric oxide (NO, a marker of oxidative stress) were used as markers of oxidative stress-induced heart impairment. Superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GSH-Px) activities were studied to evaluate the changes of antioxidant status. In the EMR exposed group, while tissue MDA and NO levels increased, SOD, CAT and GSH-Px activities were reduced. CAPE treatment in group III reversed these effects. In this study, the increased levels of MDA and NO and the decreased levels of myocardial SOD, CAT and GSH-Px activities demonstrate the role of oxidative mechanisms in 900 MHz mobile phone-induced heart tissue damage, and CAPE, via its free radical scavenging and antioxidant properties, ameliorates oxidative heart injury. These results show that CAPE exhibits a protective effect on mobile phone-induced and free radical mediated oxidative heart impairment in rats.

The important observation is the threat that mobile phones with 900 Mhz EMR poses for the cardiac health when the phone is placed in close proximity to the heart.

Similarly, G. Krishna Kishore et.al (2018) in their research, "Effect of 1800-2100 mhz mobile phone electromagnetic radiation on mice hippocampal ca3 neurons" found out increase in interaction through the mobile phone may have adverse effects on the brain, especially on the hippocampus. So the radiation emitted from the mobile phone and its adverse effects is a serious concern in the society. In this study we have focused on the effects of chronic exposure to Mobile Phone Radio Frequency-Electro Magnetic Radiation (MP RF-EMR) on hippocampal CA3 neurons in swiss albino mice were investigated. 18 Swiss albino mice were divided into 3 Groups (Control, 30 Mins exp/3 Months & 60 Mins exp/3 Months). After the exposure the mice were euthanized, perfused transcardially, brains were extracted out and processed for histological procedures. Cresyl Violet stained hippocampal CA3 Pyramidal neurons shows a greater number of viable neurons which is healthy, compactly arranged with clear nucleus in control group, whereas radiation exposed group neurons show darkly stained, unhealthy, scattered and irregular with a smaller number of viable neurons. The findings indicate that chronic exposure to mobile radiation leads to change in structural integrity of hippocampus also alter the cognitive function like learning and memory.

Anil Sani, et.al, (2018) studies the "Effects of Electromagnetic Radiation of Mobile Phones on Hematological and Biochemical Parameters in Male Albino Rats." The study focused on the mobile phone emitting 900 MHz Electromagnetic Radiation (EMR) may be mainly absorbed by kidneys because they are often carried in belt. Exposure to Electromagnetic Radiation (EMR) emitted from mobile phones is able to induce hepatic, renal and splenic tissue damage. The degree of damage increased with time of exposure to EMR. Radiofrequency of electromagnetic radiation from mobile phones also induces oxidative stress in rats. It can be concluded that there is no change in terms of behavior after exposure but there is increase in weight of animals which is seen to be affected by increase in exposure period. Among the hematological parameters, the values of RBC, HGB and MCH were observed to be higher in animals exposed to EMR. The values of biochemical parameters showed less increase in animals exposed to EMR than control group. Thus, indicating that long time exposure might pose detrimental effects to blood components, liver and their functions.

3. OBSERVATIONS

What is observed is many men and women keep the mobile phones in their pockets and women especially those with slightly lesser exposure to the sophisticated social group tend to keep the phones tucked to their blouses and hence closer to their heart.

The other question is what is the Mhz EMR of most of the regular phone brands that are sold.
Regarding the MHz of the Mobile phones
Here is how the networks and frequencies relate to each other:

- 4G (LTE) is either at 800, 1800 or 2600Mhz
- 3G (WCDMA) is either at 900 or 2100Mhz
- GSM is always at 900Mhz

Table 1.1: Showing the risk factors in relation to phone brands.

Brand	MHz	Risk Level 900MHz

Apple iPhone	800Mhz (Band 20) 900Mhz (Band 8) 1800Mhz (Band 3) 2100Mhz (Band 1) 2600Mhz (Band 7)	= > Than Risk
Samsung	800Mhz (Band 20) 900Mhz (Band 8) 1800Mhz (Band 3) 2100Mhz (Band 1) 2600Mhz (Band 7)	= > Than Risk
4G	800,1800 or 2600 MHz	➢ Than Risk
3G	900 or 2100 MHz	➢ Than Risk
GSM	900MHz	Risk

Findings: All three studies suggest that almost all the devices pose risk if kept closer to the heart/body.
Digital Devices Induced Sedentary Lifestyle complications like obesity, Diabetes and High Blood pressure.

- Negatives of Digital Devices

Recent evidence suggests that people who multitask by switching frequently between digital devices may be more at risk of developing unhealthful eating habits and obesity.

- Positives of Technology:

1. Breakthrough Technology

Approaching obesity from new directions. A company called Modius have created a wearable device that stimulates the eighth cranial nerve, helping people to lose weight. The Modius brain stimulation headset. Yes, that might sound like the science fiction I was hoping for, but it is grounded in solid neuroscience. The hypothalamus, deep within the brain, helps decide when and how to lay down fat. The Modius device is able to stimulate one of the cranial nerves that runs fairly close to the surface of the skin, sending a current through to the brainstem. From there, the stimulation moves on to the hypothalamus, reducing appetite and encouraging the body to move toward a leaner state. The eighth cranial nerve is also called the auditory vestibular nerve because it plays a role in our sense of balance. According to one of Wired Health's staff members — who volunteered to try the brain stimulation device — it makes you feel a little dizzy. It's not unlike the after effect of a glass of wine, apparently. It can also make the user feel a little sleepy, in the same way that rocking a baby stimulates the vestibular system and makes them woozy. This is not a miracle cure by any stretch, but for people who find it difficult to lose weight who are active and eating well, this may provide a much-needed edge. Although the brain stimulation technology is, in this instance, cutting edge, the theory behind it was first uncovered by NASA in 1972, although they didn't realize it at the time. It took another 30 years to understand that stimulating the vestibular system causes a reduction in body fat.

2. Electronic Devices Linked to Poor Sleep and Obesity

Nearly 3,400 Grade 5 students were asked about their nighttime sleep habits and access to electronics through the REAL Kids Alberta survey. Half of the students had a TV, DVD player or video game console in their bedroom, 21 per cent had a computer and 17 per cent had a cellphone. Five per cent of students had all three types of devices. Some 57 per cent of students reported using electronics after they were supposed to be asleep, with watching TV and movies being the most popular activity. Twenty-seven per cent of students engaged in three or more activities after bedtime. Researchers found that students with access to one electronic device were 1.47 times as likely to be overweight as kids with no devices in the bedroom. That increased to 2.57 times for kids with three devices, with similar results reported among obese children. More sleep also led to significantly more physical activity and better diet choices, researchers found. So far, the findings suggest a correlation between multitasking habits related to digital devices and mobile phones and levels of distractibility, and the risk of obesity due to the time and posture and the impact of being sedentary.

4. DISCUSSION

Making sense of IT (Information Technology)

To make sense of Information Technology, first we need to look at Information and Technology as two aspects that though different should sync up to the specific requirement and solve specific problems in the desired methods and modes. There needs to be culture of understanding and knowing the system first and its function next, and finding the right context and means to for application. But the lack of relevant knowledge and requisite expertise has meant that the devices are more fancy than functional, they are more of a cool factor and an accessary than a compliment to what is necessary and hence they are neither tools nor solutions.

Gadgets and Goodness

We have gadgets from across the world flooding our markets and online stores, there is Fitbit, Garmin, Samsung and Apple watch and every smart phone comes with either attachable devices and wearables or inbuilt Apps and add-on services related to Fitness and Wellness. That's where there is such a shallow sense of utility and application, the little domain expertise there is a high priority need to conduct deep rooted studies and research and help develop simple, usable protocols and open up real possibilities for the gadgets and devices to become relevant and useful on a consistent basis. The current research scenario in the wearable gadget and tech enabled devices for tracking human activity is being tied into the lifestyle and preventative health care analytics and the information is used for predictive analytics and medical or health interventions which can help in averting major illnesses and disease management. It also provides the requisite basis for creating a bespoke health profile and health management tool-based system for optimal healthcare. The various research and surveys indicate to the downside of so many devices and so little understanding of them posing the challenge as to how best to make use of it and the general lack of insight and cultural disinclination

towards preventative or supervised activities has made it a fad and less than 10 percent of people actually end up using the gadgets or devices after a few days or weeks. The value of the devices in terms of utility is losing sheen as much as it is gaining market share as a lifestyle product but fast changing into a novelty device. The statistical analysis and the better understanding of the usage-user to application is missing and that is where more and more research and in-depth studies is required. Similarly, the other flipside is the lack of practical implications and the best practices. Though the internet is full of information about the products, the efforts are largely to attract sales, the product related queries and a support system for analyzing and rating the devices for the efficiency and utility is amiss. And the first-time users are never in a position to fully understand or utilize the inherent benefits of such devices.

AI- Revolution – The Artificial Intelligence Age

The great upside of the advent of Artificial Intelligence or Machine intelligence has enabled the Scientific community to come up with real time feedback loops which literally monitors and records every single aspect of human activity from sleep – wake cycle to travel and lifestyle to activity index and quality of sleep. Such enormous data was earlier impossible to decipher and make sense of, but with the advancement in the technology and storing of information along the wireless fidelity and cloud computing has made it easier to record, compile, sequence and present data in a usable and efficient format which makes it easier to be used as a source of critical information that can actually help in making better decisions which can go a long way in making lives better. The downside of the AI and the technology is the lack of concerted efforts in making it utilitarian and simple to use. The other challenge is the huge costs and the subscription fees and database management costs and the constant and inevitable efforts that come with such capital-intensive technology and the Data privacy and safety questions that arise with sharing such critical information. Unless it becomes a unified drive by a few powerful governments and MNCs like with the case of the Bluetooth technology wherein Toshiba, IBM, Sharp and came together to create and make the technology accessible and affordable to people, its true impact and potential can never be realized. Likewise, seemingly utopian concepts like free Wi-Fi, Suspended Balloon enabled Wi-Fi and Google's free Wi-Fi and JIO's free Internet tend to fall by the wayside with the passage of time and the whole scenario becomes a failed attempt or assumes commercial proportions like the case of JIO. Having assessed that, it is also possible to make it a radical tool like the Google Search or Google Maps with incredible possibilities if the influential organizations and governments come together to encourage the research and development and making it a product for the masses across the world and of course with the licensing fee and other revenue streams that helps sustain and grow the technology for the future. A long-term universal application format with the social, legal and confidential aspects being covered along with collaborative efforts to make it functional and effective is required if AI were to become an integral and impactful technology for enhancing the health of the users.

The connectivity conundrum

Before we look at the utility and application of the gadgets in their gamified formats for the Healthcare Industry, it is important to understand the whole spectrum of technology and its various avatars that has now become mainstream and part of everyday life for billions of people across the World. What started as a simple handheld mobile device in the form of a compact phone for making calls and sending texts has assumed epic proportions with the cell phone or mobile phone now becoming the single most important tool for mankind from a lifestyle point of view. The Nokia phones which came in as affordable and reliable no-frills phone ruled the roost till the smart phones became a phenomenon. The Apple iPhone and Samsung Smart phones changed the way people communicated and interacted and with each passing year the phones became more efficient and came to be called smart phones. Then the smart became intrusive and people now rely more on the phone than on human interactions and connections. There is a deep discord and disconnect that has creeped into the very lives of modern humans which is attributed to the mobile phones and its innumerable applications which in itself has become a global phenomenon and the sure but strategic use of social media and social networking has made it an inescapable labyrinth which consumes people, time and energy making them ever more reliant and yet even more disconnected from the social structure and familial relationships that so defined our societies and lifestyle. Everything is available with a tap of an App and command, from groceries to books to food and commute, the mobile phone has made humans immobile and connectivity has disconnected us from the community and Social media has disrupted Society as we know it and everything has become virtual. The reality and real connections and relationships hang in the balance as people seek comfort and community vicariously within the web based on the likes on facebook and Dps and sharing jokes and jibberish which has consumed unbelievable hours and incredible proportions. The upside being the world and all connected and willing to connect people in your fingertips, the downside the 5.5 Billion Man hours that India alone has spent on an App called Tik Tok and the cost apart from lost creativity and useful enterprising activities, the dangerously tragic phenomena like The "Blue Whale challenge" was reported to be an online "suicide game" aimed at teenagers which set 50 tasks over 50 day and was the reason for many horrific deaths and the mass shootings and stabbings that consumes innocent lives. The utility is in clarity and necessity and unless there is a concerted effort to re-assess the scenario and look at the truth and find the traction that's required to upstage such a cascading effect, it will continue its monstrous usurping of humanity. The simplicity has to be combined with sanity and the surmise has to be sanctified at least in terms of knowing its true utility rather than utility in terms of applications and games and movies and everything else that is only secondary to the wellbeing and safety of people. The applications and the social media, network and streaming services have made some beneficial and meaningful contributions by bringing in news, information, various content and entertainment programs and shows to one's living rooms and mobile phones and gadgets, yet an unregulated and unmonitored system that takes away the responsibility and accountability of the sources and creators of the content will supplant the civility and discretionary behavior of the society and individuals to lead a better, responsible and productive life. The smart phones biggest selling point has been its ability to simplify the everyday activities and making it accessible and easy for people to connect communicate, share information and function in real time and thus becoming the swiss army knife of utilitarian devices. But just like the swiss army knife each of the features within the device or some of them can be used for devastating and destructive purposes. A mere look at the tag lines of the various technology devices and services tells a rather interesting and disturbing story.

- NOKIA PHONES: *'Connecting Lives'* (Nokia – Mobile phone to mobility devices). It did connect a lot of people.
- FACEBOOK "Its quick and Easy, "Its Free and always will be". Facebook was accused of amplifying fake news and allowing Russian trolls to deceive American voters in the run-up to the 2016 election and has many controversies and public information misuse.

- YOU TUBE *"Broadcast Yourself"* described as a phrase that shows how pervasive the site is in the everyday lives of people in the twenty-first century. And people have actually fallen for it.
- WHATSPP: *"Simple. Secure. Reliable Messaging."* The context is good and to some extent brilliant to connect people, but it has opened up a Pandora's box and everything from fake news to instigating mob mentality to invoking nightmares and influencing national elections and creating pandemonium and anxiety and widespread fear and platform to communicate to unleash terror and broadcast downright inhuman acts these devices and services have become the Frankenstein's monster on the modern age and with such large unmonitored and unregulated platform at their disposal people have used it for more negatives than positives and a whole generation of people and rather generations of people of all background now stand addicted and afflicted with the negatives of wrongful use of technology.

Many questions arise and many are yet to be posed to the right people and many more answers are needed. Yet, we have to see the bright side and move towards better use and application of technology taking into count, the many positives that have emerged from the technology and its right use, there has been great many simple and effective apps on the phones that fall under the utility and productivity category and they have impacted live and made in simpler and easier for tasks, from location and map services, to news and search to mobility and service and product delivery services to banking, booking and broadcasting good information like TED Talks, webinars, podcasts, and information like e-Books and Learning Apps and the many productivity Apps. In the Health and Fitness parlance, just as the overall improvement in the healthcare system with the latest technology in Diagnostics, access and advanced care has not necessarily meant the improvement in the services, process and benefit to people and the system has not changed enough to ensure proper health or affordable healthcare. The evolution of which has led to the Health and Fitness Apps. So, it is left to all the stakeholders to become more responsible, reasonable and respectable towards the tools, the technology and the overall impact by the interaction of all.

The New Paradigm

(Devices, gadgets and Analytics based Intelligent Decisions) The Smart phone now is a central theme that orchestrates our life in the connected city space. From operating our bank accounts to making payment through gateways to becoming the de-facto go to device and now the prospect to becoming a survival device with the potential to determine the way in which our health journey will go, the smart phone with its Apps and attachments is now a technological master key that could be used to unlock our health potential. The connected devices and the consolidated effort in making them our health allies has opened up the possibility for better use of technology.

- From Diagnostic Database to Evidence Based Treatment,
- From Activity Tracker to Heart Rate Monitor,
- From Virtual Games to Gamified Reality,
- From Instant reports to Looped sharing,
- From Breathing Alerts to Heart Attack Alarms,

And monitoring dropping Blood pressure levels to varying Blood glucose levels, the gadgets can now compile our life information in mega and Giga byte pieces for vital tracing and tracking down health scares and making timely medical interventions along with the pros and cons available for ratings and rationalizing and thereby empowering us with the ability to respond and react as per the requirement and finding expert panel advice for any disease and illness well before it manifests into danger. What makes it so powerful is the Artificial Intelligence and Deep learning along with the cloud storage and instant global retrieval that the great technology platforms and the Man-Machine collaborations bring along. With the right technology backed by the right Organizational set-up and Legal construct it won't be hard to make this a viable and reliable healthcare solutions platform. According to the FDA, Digital Health which they define As, "The broad scope of digital health includes categories such as mobile health (mHealth), health information technology (IT), wearable devices, telehealth and telemedicine, and personalized medicine". These technologies can empower consumers to make better-informed decisions about their own health and provide new options for facilitating prevention, early diagnosis of life-threatening diseases, and management of chronic conditions outside of traditional care settings. various device and service platforms today track and monitor various aspects like Activity, the broad scope of digital health includes categories such as mobile health (mHealth), health information technology (IT), wearable devices, telehealth and telemedicine, and personalized medicine. From mobile medical apps and software that support the clinical decisions doctors make every day to artificial intelligence and machine learning, digital technology has been driving a revolution in health care. Digital health tools have the vast potential to improve our ability to accurately diagnose and treat disease and to enhance the delivery of health care for the individual. Digital tools are giving providers a more holistic view of patient health through access to data and giving patients more control over their health. Digital health offers real opportunities to improve medical outcomes and enhance efficiency.

They further suggest. How Are Digital Health Products Used?

Providers and other stakeholders are using digital health technologies in their efforts to:

- Reduce inefficiencies,
- Improve access,
- Reduce costs,
- Increase quality, and,
- Make medicine more personalized for patients.

Patients and consumers can use digital health technologies to better manage and track their health and wellness related activities.

Why Is the FDA Focusing on Digital Health?

Many medical devices now have the ability to connect to and communicate with other devices or systems. Devices that are already FDA approved, authorized, or cleared are being updated to add digital features. New types of devices that already have these capabilities are being explored. The FDA's Center for Devices and Radiological Health is excited about these advances and the

convergence of medical devices with connectivity and consumer technology. The following are topics in the digital health field on which the FDA has been working to provide clarity using practical approaches that balance benefits and risks:

- Artificial Intelligence and Machine Learning (AI/ML) in Software as a Medical Device
- Cybersecurity
- Device Software Functions, including Mobile Medical Applications
- Health IT
- Medical Device Data Systems
- Medical Device Interoperability
- Software as a Medical Device (SaMD)
- Telemedicine
- Wireless Medical Devices

Who Regulates Mobile Health Apps? If you are developing a mobile health app that collects, creates, or shares consumer information, use the tool on Federal Trade Commission's website to find out when the FDA, Federal Trade Commission (FTC), or Office of Civil Rights (OCR) laws apply:

WHAT ARE THE LAWS?
Does your mobile app collect, create, or share consumer information? Does it diagnose or treat a disease or health condition? Then this tool will help you figure out which – and it may be more than one – federal laws apply. It's not meant to be legal advice about all of your compliance obligations, but it will give you a snapshot of a few important laws and regulations from three federal agencies.

Health Insurance Portability and Accountability Act (HIPAA)
The Office for Civil Rights (OCR) within the U.S. Department of Health & Human Services (HHS) enforces the HIPAA rules, which protect the privacy and security of certain health information and require certain entities to provide notifications of health information breaches.

Federal Food, Drug, and Cosmetic Act (FD&C Act)
The FDA enforces the FD&C Act, which regulates the safety and effectiveness of medical devices, including certain mobile medical apps. The FDA focuses its regulatory oversight on a small subset of health apps that pose a higher risk if they don't work as intended.

Federal Trade Commission Act (FTC Act)
The FTC enforces the FTC Act, which prohibits deceptive or unfair acts or practices in or affecting commerce, including those relating to privacy and data security, and those involving false or misleading claims about apps' safety or performance.

FTC's Health Breach Notification Rule
The FTC's Health Breach Notification Rule requires certain businesses to provide notifications following breaches of personal health record information

NASSCOM data suggests that India's mobile games market will be worth $1.1 billion by 2020, and number of users projected to become 628 million by then. With this increased headroom for growth, major players in the gaming industry are more willing to invest a substantial amount in the country. Industry big-wigs like Alibaba and AGTech Holdings have already invested in the market. Tencent too has evaluated its opportunities in India. StomStudio partnered with mobile game publisher Gamesbond to create mobile games in India.

The way forward
Cloud gaming presents a massive market opportunity that prolongs beyond interactive entertainment. Web giants like Google, Microsoft and Amazon are already gunning for the share of the business and have already offered, or are in the process of offering products that are built to catch the fancy of the Indian youth. Gaming, in fact, remains the fastest growing sector for monetization even for Google.

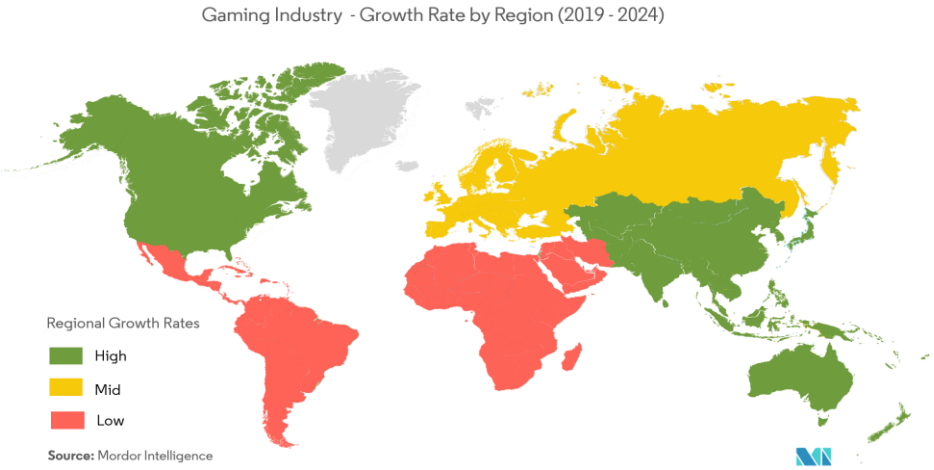


Fig. 1.1: Showing the growth rates of gaming industries around the world

Gaming. The next big healthcare trend?

The Games for Health Project has a lot of ideas of how gaming can lead to healthier behavior. Their organization's goal is to support "efforts to use cutting-edge games and game technologies to improve health and health care" and they also have an annual conference where people come together and discuss health care gaming initiatives. They came up with five main categories of games that can improve well-being:

1. Cognitive and Emotional Health
2. Participatory Health
3. Exergaming, Active Gaming and Fitness
4. Rehabilitation Games
5. Medical Education and Training.

Cognitive and Emotional Health
This category includes games that improve your brain's health or memory. These games can be used for the average person or can be used to treat learning disabilities and mental disorders.

Participatory Health
Participatory health is a way for patients to become more active in their own care. Many mobile apps have been developed to help patients keep up with medications and/or treatment programs in a fun, interactive way. There are also a variety of educational games for patients to learn more about nutrition and how to stay healthy.

Exergaming, Active Gaming & Fitness
Probably the most well-known of the categories is exergaming, also called motion gaming. Exergaming relies on technology that tracks body movement or reaction. Nintendo's Wii Fit, Ubisoft's Just Dance series, and Xbox Kinect are just a few of the many examples of this popular trend. Not only does exergaming make people more active and fight obesity, it can also be used as therapy for a variety of disorders and disabilities.

Rehabilitation Games
Exergaming is closely related to the fourth category of rehabilitation games. These games can be used for a variety of different physical therapy, occupational therapy, and rehabilitation programs. In an article titled "Serious games: key trends for the healthcare sector," one example discussed is Florida Southern College using the Wii Fit to rehabilitate athletes recovering from surgery or injury.

Medical Education & Training
While the first four categories focus on patient health, doctors can benefit from gaming as well. Video/ computer/ mobile games that are for educational purposes, also known as serious games, can help doctors with professional training (e.g. how to deal with patients in certain situations), surgical training, and a wide range of medical education topics. BreakAway, Ltd has created several serious games for health care, such as their game for dental students at the Medical College of Georgia that allows them to "practice dental implant procedures in a realistic, virtual, 3D, environment."

Serious games for health: three steps forwards
Serious games are educational tools which are more and more used in patient and health professional education. In this article, we discuss three main points that developers and educators need to address during the development of a serious game for health. We first explain how to develop motivating serious games by finding a point where the intrinsic and extrinsic motivations of end users can converge. Then, we propose to identify the features of serious games which enhance their learning effectiveness on the basis of a framework derived from cognitive science and called "the four pillars of learning." Finally, we discuss issues and solutions related to the evaluation of serious games.

5. CONCLUSIONS

Serious games are attracting growing attention in the health area. Developing a successful serious game is complex, and we proposed cues to avoid two classical pitfalls. First, in order to obtain a serious game played by its end users, we recommended to find a point where the intrinsic and extrinsic motivation of the players can converge, i.e., where the players can enjoy a future desirable outcome made virtually present in the game. Second, developers should consider the four pillars of learning described to avoid the development of a game which does not fulfil its educational objectives. Researchers in the field should continue to explore how

these four pillars of learning can be used to enhance serious game engagement and effectiveness. Finally, evaluation of serious games using a standardized framework will help to legitimize the enthusiasm observed in the health area for these tools.

GAMIFICATION IN THE FITNESS AND HEALTH CONTEXT

Gamification involves looking at a regular process and turning it into a process with gaming approach and techniques to initiate consistent participation and to ensure long-term usage and engagement

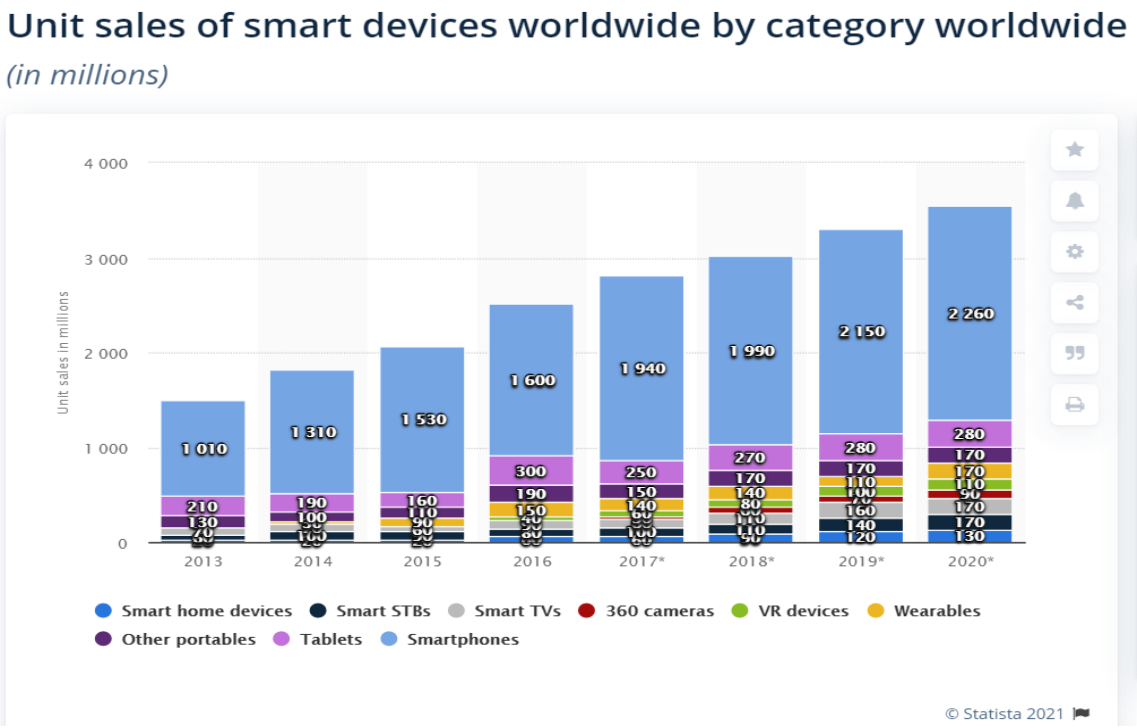
Here are some statistics of a US research:

- 69% of all the heads of families play on computer / video games consoles;
- 97% of youth play computer games video games consoles;
- 40% of gamers are women;
- One in four gamers is over fifty years of age;
- The average age of gamers is game player is thirty-five;
- And they have been playing for at least 12 years;
- Most of the gamers expect continuing playing such games

Game? What is a definition of a Game?

A Game involves both the Skill and technique as well as the actual play and time. The basic four elements are A goal/Task, a set of Rules, a looped feedback system and involves voluntary participation.

- The Task/Goal: It is the specific outcome that the players are playing/working towards. It provides the players with both a sense and inclination towards the game.
- The Rules: Rules are the ways in which the game can be played. It defines the ways and hence the possibilities and the limitations and encourages deeper understanding, creativity and problem solving.
- Feedback system: It is an indication to the players of how close or far they are towards achieving the goal. It can be in the form of defined points, levels, or indicators of progress and other indications suggesting the progress.



It also ensures everyone playing the game orient and acknowledge the aspects of the game the goal, as well as the rules and the whole feedback system. In the age and times where Digital literacy is considered a serious weakness and not having enough awareness in the digital space could mean a threat to your privacy and financial and other valuables and is vital to your functioning in the digital world. And despite the apparent threats people continue to post their day today life events to the most important ones on the social media and digital space to share and interact with other people looking for approval and likes from anyone in the friendship and acquaintance circle to outright strangers which can lead to complications and problems at multiple levels and in many ways. Yet, the digital invasion into our lives continues and here is a snap shot of the digital space between 2013 to 2020

Gadgets	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Smart Home devices	20	20	20	60	60	90	120	130
Smart STBs	60	60	90	80	100	110	140	170
Smart TVs	70	70	60	90	80	110	160	170
Other Portables	130	100	110	190	150	170	170	170
Wearables		30	150	150	140	140	110	
Tablets	210	190	300	300	250	270	280	280
Smart Phones	1010	1310	1530	1600	1940	1990	2150	2260

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