

The 'Science' and 'Research' of Screen Based Technologies: Helping Concerned Parents Navigate Psychological Health and Wellness the Digital Age

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IN ADDITION TO MY OWN, there are numerous earlier books written of the educated layperson calling on the need for caution as it applies to unmitigated usage of screen based technology (phones, pads/pods, laptops, computers and consoles; Baureline, 2008; Carr, 2011; Rossen, 2012; Turkle, 2011; Weiss & Schneider, 2014).

That news that excessive or otherwise unmitigated screen usage can be affiliated with anxiety, depression, the obsessive-compulsive spectrum, defiance, conflict, ADHD, and other emotional, behavioural, and conduct disorders in children should come as nothing new. Early literature primarily out of Asia, where excessive usage was declared a national health issue in 2008, was rather unified in finding that psycho-social problems were directly related with problematic or otherwise excessive usage (Beard, 2008; Caplin & High, 2011; Jang, Hwang, & Choy, 2008; Kim et. al., 2006; Lin & Tsai, 2002; Ryu, Choi, SEo & Nam, 2004).

Despite the Passage of nearly decade, however, many of us have not yet been shaken out of our Western cultural denial that excessive usage has potentially gross negative individual and cultural consequences, and why. What we are not talking about, and I believe we should be, is what I refer to as 'the pull': how screen based technologies seemingly puss us in and keep us there and how the medium, for many, now serves a purpose far beyond mere communication/socialization, research/information, or entertainment, as touted. Screens and technology also serve to mediate emotions and, as such, affection socio-emotional and cognitive development at its core. Children (and parents too) are now unwittingly turning to otherwise wonderful technological tools for regulation, and this is where problems arise. One may find this innocuous, but as yet another summer passes with children glued to devices seemingly uninterested, or otherwise bored with any other form of play or social interaction, and parents using the same devices as electronic babysitters or anti-tantrum

devices, it is time we re-open our eyes to the big picture (Swingle, 2016a).

Screen based devices, and all the programs and apps they run. function on varied reinforcement schedules (just like gambling) and, accordingly, our uninterrupted and unlimited accessibility to both the content and process provided by said technologies is affecting our brain wiring and in turn our homeostasis, health and wellness, and human interaction in general (Swingle, 2016a).

We are also not talking about the pull of popular media. This summer, as I again worked with many parents seemingly powerless to unglue their children from screen based devices, the technology itself appeared to save the day. I am referring of course to Pokémon Go; the augmented reality game exalted for its ability to get kids off the couch, unite people, improve geolocation and mapping skills, and other such wonderful wonders.

As the midsummer halo of Pokémon Go started to lose its luster, however, another phenomenon occurred: Not so subtle news feeds of 'gaming is good for you' started to stream online as well as on radio and television. For example "If you played Mario card 'even for only 5 hours' you will have better hand eye coordination" (Morning Show, Peak Radio, Vancouver, July 22) and on August 8th "Positive link between video games and academic performance" appeared in The Guardian as well as "Online gaming can boost school scores" in Daily Science. This was the 'science' and 'research' reaching many professionals, parents and educators too.

DUAL DELUSIONS

Many game producers, promoters and gamers themselves argue strongly that gaming is good fro children. While there are surely positives, as with any modality, many professionals, including myself are most concerned with the growing one-sidedness of the promotional argument.

The effect is polarization (and apathy): Groups of people who are vehemently against, those who are blindly for, and many, mainly parents, who give up fatigued with confusion.

As a practicing clinician, it is easy to become upset at the technology industry and media alike for side stepping concerns and unabashedly promoting the benefits of technology, in particular gaming for children. Apart from mass confusion, the unfortunate result is a polarization of laypeople and professionals alike: Those who are pro-tech accusing those of us raising cautionary flags as modern day luddites or otherwise anti advancement. Those who are con, accusing individuals of a zombie like pursuit of a new tech Utopia that will destroy us all much like the Trojan horse of myths past. The truth, of course, as always, lies somewhere in the middle. There are wonderful applications to technology that benefit us all, and many that are also arguable great fun, but also many things of which we should be most cautious. It is time for open conversation and honest debate based on concrete and unvested research.

In an effort to aid clinicians in navigating their clients through the 'science' of gaming technology, I have listed ten of the most common misleading twists often used to cloud true query. The language is accessible with its own twist of humour in hopes that those seeking psychological services can also benefit. My motive, I trust, is transparent: In my own clientele, I have often found excessive gaming, and screen based devives in general, to be a contributor, if not a cuase, of the primary ailment for which a parent seeks psuchological or counselling services for a child; namely learning disabilities, conduct and bejavioural disorders, anxiety, and chronic insomnia. There is further much data and historical research to support clinical anecdotal evidence (ibid).

All ten points can be summed up in what I refer to as the Promotion of Dual Delusion:

- a) That gaming is never harmful, and
- b) That it is good for children.

Games can be great fun if they are one of the many things children do. But this is a far cry from the notion that gaming is 'good'.

TEN THINGS PARENTS LEARNED IN SCIENCE CLASS THE GAMING INDUSTRY WANTS THEM TO FORGET: (AKA LOST LESSONS FROM RESEARCH 101)

1. **Partial Truths Told as Whole Truth: 'Gaming is good.'** *Yes,... but it is reversely related to amount of time on devices: The longer you are on screens frequently, the less 'benefit'*

you have. In fact, excessive usage can be harmful for social, cognitive, and emotional development.

2. **Generalized and Decontextualized Research: 'Gaming makes you smarter.'** *Yes, but... positive findings are often from data on professional gamers and on children who otherwise excel. Generalizing to the rest of us 'normal folk', who also develop ADHD, learning difficulties, etc. is rather misleading.*
3. **Cherry Picking Research: 'Gaming improves spatial planning.'** *Yes, ... but this is selective: Improved spatial planning can be found on some measures but not others. It also, often has no beneficial effect in the 'real world'. In fact, sometimes it is exactly the opposite! (It can negatively affect geolocation, spatial orientation, and object location).*
4. **Representing Partial Truths: 'Boys who game together are socially well adjusted.'** *Yes, ... if it is side-by-side and one of many things boys do together. It can be exactly the opposite if they play for long periods of time, in isolation, or on MMPO's.*
5. **Exaggerating Claims: 'Games are Prosocial.'** *Yes, ... because it is the current dominant activity of children. Any dominant activity will have positive social components.*
6. **Intentional Misleading: 'Violent gaming is pro-social because it increases guilt.'** *Yes, ... but this was from a study on a game about terrorism tested on Americans (where the Americans were playing as terrorists).*
7. **Fearmongering: 'It is socially harmful for children to not game: Children who don't partake will be left out.'** *Yes, ... but only if there is no other 'play' alternative. This is a form of parental fearmongering to increase product sales and popularity.*
8. **Leaps in 'Correlation': 'First person shooter games teach the skills required for surgery because they improve hand eye coordination required for the manipulation of surgical tools in laparoscopic surgery.'** *Yes, ... but HUH??? Yes, this was an actual promoted 'correlation'! Even if it were completely true, anyone with a grain of social intelligence would probably not want the person trying to save their life to have learned their skills by virtually killing people!*
9. **Shading the Big Picture of a Larger Problem: 'Pokémon Go is great because it is getting kids and adolescents off the couch.'** *Yes, ... but how come kids are on the couch so much in the first place? This was probably due to Minecraft, Pokémon Go's equally enrapturing predecessor that completely took over the universe of children's 'play' under the guise of learning and creative construction.*
10. **False Research or False Claims: 'Games improve learning, cognitive function and neuroplasticity.'** *Sorry, no 'Yes, ... but' here. This claim (and others) were blatant*

misrepresentations (Luminosity's unfounded claims of improved learning, intelligence etc.)

(Swingle, 2016a)

BACKGROUND AND SUPPORTING LITERATURE

Research and statistics are often referenced as providing supportive evidence for the use of screen based technology and the development of social skills, spatial coordination and generalized knowledge acquisition. The rather funny, (as in ironic) fact is scholars often quote the same statistics as positive, negative or neutral. When reputable scholars read the small print of research (that very rarely make it to press), many benefits have been firmly debunked as minimal, inconsequential (benefits so small they don't 'do' anything), flawed (which I share with parents as a kind way of saying wrong), reversely related to amount of time (the longer you are on screens the less 'benefit' you have) and downright misleading (Swingle, 2016a).

Just like lawyers and legalese, promoters are taking advantage of the fact that most reporters, parents, and many educators too, don't 'speak statistics' and don't read, or don't have access, to full journal articles (without paying the thirty odd dollars to PubMed and the like). This permits extreme jumps in the reporting of 'findings' that make those of us who do have access or thoroughly read this rather secretive language of math scratch our heads and then start smoking from our ears.

The August newsfeed of an article written by Posso (2016) published in the *Journal of Communication* mentioned in the opening paragraphs is a perfect example. This study made international headlines no doubt due its impressive sample size of 12,000 teens. This study claims that '*it is possible that a number of skills associated with online gaming correlate positively with generalized knowledge and skills tests in math, reading, and science*' and provided author suggestions that educators should take lessons from video games in terms of how to teach kids best deserve higher scrutiny than the headlines provide.

What was not so widely publicized was

- a) They did not test if any of the skills of games were the same as in math, science and reading
- b) That the 15-17 point score increase is approximately a 3% change,
- c) The more you play the effects reverse, meaning teens that self-reported playing 'every day' had reduced test scores while teens that played 'almost every day' had a small positive effect.

So essentially, the results don't show if games teach a skill and, if you play every day, your scores go down. A more accurate headline might have been: Teens that act like

modern teens, playing games here and there and do other things too, are probably well adjusted and hence probably do slightly better on tests". As many a wise soul are saying: Don't get sucked in by the headlines.

The second part of the study had similar flaws, which I would again attribute to confounding variables and type one statistical errors. This study also claimed that social media is bad for teens, lowering academic scores by 20 points. Again, these points account for a 4% difference and social media itself may or may not be the issue. The real issue may be many teens who are on social media often are on screens instead of in person-to-person contact, or otherwise in what I call face-to-face heart-to-heart contact. This can be associated with the development of depression. Therefore, the true issue could be that lonely or depressed teens have lower test scores. Alternate Headline: "Teen depression lowers test scores". Let's also not lose account of the possibility that many teens may be spending time on social media instead of studying. Therefore the true issue could be hours of study bring tests scores up or down. Alternate Headline: Not studying reduces test scores. (Not quite as exciting right?).

I am happy to say that the article in The Guardian did indeed point out some of these flaws, and that I too must be cautious of not committing the same 'academic crime' as the author, postulating unknown correlations. My point to fellow professionals, however, is solid: there are often many possible reasons for findings other than what is controlled for, and parents, not just psychologists and counsellors, need to know this.

False correlations, leaps in correlation, confounding variables, and type one and two statistical errors are nothing new in studies. What irks me is that they are not only now making it to journals, but also to public press where they are potentially falsely reassuring or otherwise misleading educators and parents desperately trying to make wise decisions vis-a-vis the role of screen based technologies in children's lives.

There are numerous studies that present balanced research findings and debunk many a study telling us otherwise (see Swingle, 2015, 2016a, 2016b for accessible overviews). One of my favourites is a meta-analysis by Boot, Blakely and Simons (2011). In this study, the authors reevaluated a series of studies routinely referenced in public media which proclaimed external benefits of gaming and found again that the studies were systematically and methodologically flawed. Specifically, the studies found that many gamers had superior perceptual and cognitive abilities, but there was no evidence whatsoever that these abilities were due to

gaming, nor that they transferred to skills other than gaming. When they tried to reproduce the work (without methodological flaws), they found they could not. Much as I have found in my clinical research, the only solid finding was that such brains are apparently disproportionately attracted to gaming. Boot, Blakely and Simons conclude that until further evidence proves otherwise, the only benefit of gaming it is that it is fun!

Lastly, we must be very cautious of the red herring. Red herrings not only misinform by taking us off the scent of true issues, but they can posture negatives as positives and naively have us believing that things that are substantially different are one and the same. Pokémon Go is yet another perfect example: Pokémon Go is currently being touted for improving mapping and geolocation skills when it may be training the brain in an entirely different manner. Emergent research from the University of Waterloo suggests that different areas of the brain are engaging based on the style of game play. Dr. C. Ellard, Professor of Neuroscience and director of The Urban Realities Lab, which explicitly studies navigation in real and virtual environments, has found that the way we play games, not necessarily the games themselves, determine which regions of the brain we engage. Consider the hippocampus and the caudate nucleus, for example. The caudate nucleus is used for following directions, such as those given by a GPS, and is often employed in search and destroy games. The hippocampus is engaged in orientation and geographical memory in the real world. Training the latter area of the brain will get you out of a forest when lost or to grandma's house when mom or dad forget to pick you up, however the former area of the brain will not help so much with these tasks. The difference may seem small, however, in fragile phases of children's brain development, repetitive engagement will strengthen one system and literally shrink another. We owe it to our children to know which skills gaming and screen based technologies are training in and equally training out. Apart from being unsettled by the concept of overdeveloping 'search and destroy' parts of the brain and taking sides on the raging debate of whether gaming is associated with the development of violence and aggression, there may be more subtle but equally important implications in real life applications. Specific to where I live, I openly query, for example, whether over-reliance on our phone's GPS coupled with the underdevelopment of relevant brain systems necessary for geolocation, may have something to do with increases in rescues for lost hikers in Vancouver's North Shore mountains.

When looking at which areas of the brain and which brain functions are engaged (e.g., reward circuitry, versus executive functioning, or attack and threat versus geolocation memory), we must keep in mind that much research is funded by the gaming industry and conducted on professional gamers within the industry, who arguably have brains very well developed by or for gaming — and then generalized to the rest of us. This is like testing the effects of alcohol on sommeliers, ignoring the fact that the effects of alcohol are notably different for them than the rest of us; including social and antisocial drinkers, alcoholics, and children.

So my message to parents and professionals alike is clear: by all means, play games and enjoy screens, have fun! — but not too much, nor too early (e.g., before age six). Ensure that gaming, and screen time in general, is one of many activities children partake in and does not override or otherwise forsake previous interests or face-to-face interpersonal relationships. Keep a sharp eye out for associations with excessive applications and emotional/behavioural or scholastic deficits. Should these become evident, a child's relationship with technology, and parenting thereof, will need to drastically change.■

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