Review of: "[Essay] The Algorithm; Mind of a Virtual Era – Our Code of Codes"

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Dr. Aragno's essay very poetically highlights for us, once again, the established difference between computer intelligence and human intelligence: computer intelligence is based on fixed calculations and is not linked to physical sensations; human intelligence is a convergence of "perception, attention, emotions, and *meanings,* accrued via layers of constant new sensorimotor learning experiences", it "originate[s] in biological beginnings and continue [s] to issue from a lifelong, sensory-motor matrix.

The essay also points out the difference between human language and words used by computers: human language is alive, words tend to change their meanings, they are "fitted to context, colored by purpose, delivered with inflexions in tone, volume, rhythm, innuendos, implied or specific, in expressive verbal sequence. By contrast the algorithmic word spurts quick and cold, clean and clear, but sense-less, aseptic, without context, mediation, or purpose".

The essay reminds us that humanity needs to be constantly aware of these differences. This is an important reminder, similar to the reminders on cigarette packs that smoking may lead to lung cancer. Dr. Aragno eloquently lists all the potential dangers of becoming screen-addicted and of confusing computer communication with human communication.

Surprisingly, the modern situation (new code changing human cognitive habits and abilities) is presented without its historical context. In reality, the invention of writing wrought sweeping changes in human societies, the invention of the printing press wrought more sweeping changes in our cognition, and so did the invention of radio, sound recording and television. Dr. Aragno even writes "But never has there been a tool that supplements, extends, surpasses, and *supplants,* our mental faculties". However, every communication technology does supplement and extend our mental faculties, though none of the previous ones has so far supplanted them.

I suggest that we avoid catastrophizing. Socrates, after all, was concerned that the invention of writing would bring the end to education and to human memory, but we see that it did not happen. Neil Postman and many other thinkers were concerned that television would bring an end to children's social skills and thinking abilities, which also did not happen. If history is any indication, digital technology will follow the path of all previous communication technologies: it will bring changes, but will not destroy us. We do, of course, need to make an effort in this direction.

I was disappointed that instead of offering solutions or mitigating tools Dr. Aragno limited herself to listing the potential pitfalls. The list of pitfalls is old news. A practical and necessary current project is developing a list of mitigating tools, for example specific recommendations for school curricula: emphasis on long form reading, on ability to follow complex and

nuanced arguments, on understanding the pressures of different communication technologies. Such mitigating tools are being explored and promoted by numerous organizations and scholars.

First, organizations such as American Academy of Pediatrics, Healthy Media Choices https://healthymediachoices.org/author/healthymediachoices/, Media Education Lab https://mediaeducationlab.com/, and others have numerous resources for children and adults. Dr. Aragno correctly says that "for the young, the new humans growing up relating to 'behind the screen,' the merger presents a hazardous trap"; it would be nice to remind the reader that we are already working on tools to avoid this trap.

Secondly, it has been established that the dangerous consequences of digital technologies are dangerous mainly for vulnerable populations: children whose parents neglect them and people prone to mental illness. Mentally healthy children with caring parents continue to be involved in sufficient physical face to face activities, and develop adequate skills to resist the temptations of digital media. It is a mistake to generalize.

Thirdly, a whole discipline - Media Ecology - is dedicated to studying these phenomena, but was not mentioned in the essay, e.g.

- Neil Postman in *Technopoly* analyzed the changes in human cognition connected to each communication technology
- Marshall McLuhan in *Guttenberg Galaxy* described the difference between an "oral" person and "literate" person; in *Understanding Media* he developed the concept of our tools being the extension of our senses - reading, writing, and computer technology being extensions of our brain. McLuhan also cautioned that tools amplify our abilities but can make the human organs weaker. This is mentioned in Dr. Aragna's essay independently of McLuhan.
- Gorman and Polski in *Digital media may cultivate awareness and responsibility in users: A case for optimism*report on the results of a survey showing that it is quite possible for young people and for adults to learn to avoid the traps of tribalism, negativity and unreality. They advocate for an accumulative approach to media and line up some key principles for the curriculum of the future https://intellectdiscover.com/content/journals/10.1386/eme_00099_1
- Albrecht and Tabone in *The Arts and Play as Educational Media in the Digital Age*specifically address how schools balance the digital and the physical in their curriculum https://www.amazon.com/Educational-Media-Digital-Understanding-Ecology-ebook/dp/B08B5DFKKC
- etc.

Overall, the essay offers some important reminders, but it could offer more constructive guidelines in addition to sounding the alarm.