

ERD 2016: Education, Reflection, Development, Fourth Edition

The Flynn / Non-Flynn Phenomenon and the digitized Educational System

Claudia Talasman-Chiorean^{a*}

* Corresponding author: Claudia Talasman-Chiorean, chiorean@fspac.ro

^aPhD Research Assistant, College of Political Sciences, Babes-Bolyai University, str. Traian Mosiu, nr. 71, Cluj-Napoca, Romania

Abstract

<http://dx.doi.org/10.15405/epsbs.2016.12.12>

Forced to adapt to new realities, the human mind has evolved in a qualitatively superior way from a historical stage to another. This principle is affirmed and demonstrated in several studies known as The Flynn Phenomenon. As a response to these principles, The Non-Flynn Phenomenon claims that in our modern heavily digitized society, IQ has decreased due to the minimal contribution of the human mind in dealing with the new existential problems of humanity. The current trend of substitution of specific human elements by gadgets, software tools or created digital spaces is increasingly obvious. Between The Flynn and non-Flynn Phenomenon, education plays an important role. Education aims efficient use innovative technical means. And this trend may be the solution for the continuous development of IQ. The new technology involves increasing interest, maintaining motivation, widening of the informational horizon, if used properly, without excesses, in combination with other methods and modern and applied educational resources.

© 2016 Published by Future Academy www.FutureAcademy.org.uk

Keywords: The Flynn Phenomenon, The Non-Flynn Phenomenon, digitized society, IQ, education.

1. IQ and Human Evolution

Throughout human evolution, progress has been one of the functional, adaptive constants that man has consistently promoted. Whether we talk about progress at the technical, cultural, social or civic level, the human being has constantly been trying to find new, useful, easy resources in order to get a ratio of maximum benefit and minimal effort.



This is an Open Access article distributed under the terms of the Creative Commons Attribution-Noncommercial 4.0 Unported License, permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

1.1. The Flynn/Non-Flynn Effect

Studying the IQ in conjunction with the historical evolution of man has revealed an increase of 13.8 points between 1932 and 1978 for the American population of the same age. This phenomenon has been observed according to studies conducted in 1984 by Prof. James Flynn of the University of Otago, Dunedin, New Zealand. In response, recent studies, grouped under the name of The Non-Flynn Effect, show that the acute tendency of the IQ, studied on the Norwegian population, is declining. We are talking about IQ from the following sense of the term: Intelligence quotient or IQ (originally, the acronym of the expression: intelligence quotient). This is a concept and a score derived from various standardized tests trying to measure intelligence. The average intelligence quotient of a human being is 100. The highest IQ factor of a man that we know of today exceeds 240.

William Stern defined intelligence as the individual's general ability to consciously adapt his thinking to new requirements: it is the spiritual capacity to generally adapt to new requirements and conditions of life. The first psychometric tests of measuring intelligence were developed by Alfred Binet in the early twentieth century. (Wikipedia)

The Flynn Effect is one of the most surprising and intriguing findings in the psychological research literature. Flynn (1984) analyzed 73 studies (N=7431) by comparing the scores of several intelligence tests made over time, by suggesting the existence of "massive gains" in IQ in the American population, and by calculating a level of growth of 0.33 points per year from 1932 until 1978. The same level was found in other industrialized nations analyzed by Flynn in 1987. This increase seems to be reflected in the abilities to solve problems more than in other intellectual abilities, the Raven Progressive Matrices test being a good support for The Flynn Effect.

Possible Causes:

The debates in this controversial area of research were made around the so-called causes of the effect. The possible causes suggested in the literature have been:

- familiarity with intelligence tests (Jensen, 1998) because it can be a source of bias in testing. However, this cause was challenged on the grounds that much of the population has never completed an intelligence test,

- changes in education and nutrition (Lynn, 1990) since the children who are born now start school earlier than their parents and grandparents and spend more years at school and are more likely to pursue higher education; but early educational experiences promote the increase of intellectual functioning,

- changes in family characteristics – parents have more time and resources to educate their children, the quality of the family environment having a significant impact on the cognitive development of children, demonstrated by the longitudinal study conducted by Espy, Molfese and DiLalla (2001),

- genes-environment interaction – several studies have shown an increased life expectancy, a reducing infant mortality and an increasing average height of the population in industrialized countries,
- the use of technology in everyday life, because people have moved from direct interactions with reality to interactions mediated by symbolic representations (Fernandez-Ballesteros & Juan-5 Espinoza, 2001). The latter ones reduce the role of psychomotor skills and enhance the role of cognitive skills, so technology stimulates learning and cognitive development.

1.2. IQ Nowadays

Recent studies show that since the '90s, IQ levels have stagnated and then they have declined. This trend was discovered by Richard Lynn and was recognized even by James Flynn. It is believed to have suffered a decline in genetic potential underlying intelligence, people having reached the maximum level of intelligence. The study conducted by Lynn in Finland showed a decrease of 2 IQ points from 1997 to 2009 among the male recruits for the IQ test developed by the Finnish army. It was called Peruskoe (basic test) and consisted of three subtests of shapes, numbers and words (Dutton, Lynn, 2013).

Another study by Woodley and his colleagues consisted of a meta-analysis including 16 studies in Western countries conducted between 1889 and 2004 in order to generate estimates of the decline rate in IQ. Depending on the reaction time of individuals, the results showed a decline of -1.16 IQ points per decade. The reaction time (the necessary time for the body to react to a stimulus) is considered a quality measure of general intelligence. Dalton (1883) was the first to suggest reaction time as an elementary cognitive measure and a mental processing speed indicator. This decline, found both in the reaction speed performances and in the Finnish intelligence test, was justified by exposure to environmental neurotoxins and neuro-genetic fertility.

Another hypothesis for the decline in intellectual coefficient was given by a researcher at Stanford University, Dr. Gerald Crabtree, who supports the role of gene mutations in IQ decline. He believes that inevitable genetic changes and modern technological advances (which can directly include digitalization as well!) underlie IQ decline in recent years. His recently published study explains that of the approximately 5,000 genes considered as the basis of human intelligence, a series of mutations over the years have forced modern man to lose his intellectual capabilities.

The results of these studies, and of others made in order to emphasize the increase or decrease in IQ, are controversial and primarily highlight the difficulty of measuring intelligence. Researchers show the decreasing tendency of genetically influenced components to a greater extent than in the case of environmentally influenced components, which is a surprising result.

2. The Neurological Studies and Digitalization

In the 2000s, researchers Jean-Luc Velay (a CNRS researcher at the Laboratory of Cognitive Neurosciences from Marseille) and Marieke Longcamp (a lecturer) discovered a surprising effect of digitization on brain functioning.

When a completely immobilized person is looking at a letter which they learnt to write by hand, the motoric control areas of the brain are activated. This means that a bond has been created between the read image and the movement the person is making with their hand in order to write this image.

The two researchers exemplified their materials by analyzing the results obtained by two groups of children. One group was made of children used to writing on a tablet, while in the other group children were used to the traditional way of writing. In the end, the researchers showed children some letters and asked them if those were the same as the ones they had just written. The group which used the

handwriting had significantly better results because, as a conclusion of the experiment, “activating motoric memory leads to the mental recognition of letters”.

These results obtained after examining the effects of digital literacy learning can be correlated with studies focused on the lowering tendency of IQ (non-Flynn phenomenon) in the context of accentuated digitization.

3. Instructional and Educational Systems and Digitization

The role of educational systems becomes significant for the evolution of humankind through the decisions they adopt. The tendency to adapt to new realities requires the educational system to adopt techniques, tools, procedures, practical methods of training inspired from the digital area.

A relevant example in this respect is the Finnish educational system. Known to the world as a highly performing educational system, Finns show the following results of their students: 3rd place in the PISA tests in which 65 countries participated, a more than 90% pass rate of the Baccalaureate, over 65% of the high school graduates going to university.

Meanwhile, in Romania, underfunded education obtained in the PISA tests 46th position out of 65 participating countries and at the Baccalaureate or National Assessment, only one in two students recorded a pass.

In Finland, things are totally different. The Finnish educational reform was started 40 years ago. Methods have been constantly improved and adapted to the evolution of society. Education is free for those who opt for the state system, be it pre-university or university system.

National curriculum is rather indicative, there is only one national test, and only the best students become teachers, this profession being greatly appreciated and better paid than other social categories (wages are between 2,000 and 6,000 euros). The relationship between teachers and students is based on open communication and collaboration. Classes are few, short (45 minutes), efficient and homework does not exceed 30 minutes. Students can choose, starting from primary school, optional subjects depending on their skills and hobbies.¹

The measure meant to be adopted in 2016 in schools in Finland is replacing handwriting by typing. Finnish students will not learn to write by hand anymore, hand-written lessons being replaced by typed ones, BBC writes. In some countries, handwriting starts to become “old-fashioned”, and Finland is advancing towards the digital age and is giving up ink in favor of the keyboard because “typing fluency skills are an important national competence,” says Minna Harmanen from National Council Education. This will be a major cultural change, but typing is more relevant to daily life, says Hamanen. There are some concerns that the measure would be to the disadvantage of children who do not have computers at home or of schools which do not have enough computers. “For most teachers it is enough students to distinguish lowercase letters from capital letters”, said Susanna Huhtala, Vice-president of Native Language Teachers Association. However, Huhtala emphasizes that handwriting helps children

¹ <http://www.gandul.info/stiri/cei-mai-bun-sistem-de-invatare-din-lume-scoate-materiile-clasice-din-programa-ce-vor-studia-elevii-finlandezi-14032831>

develop fine motor skills and train their brain functioning and suggests calligraphy lessons to be replaced with drawing and needlework classes.²

Although the risk of impaired brain functioning exists, digitalization of education is still considered by Finns a successful formula for an effective educational system. The latest technologies promise to improve teaching methods and to ensure all children that type of customized education that only the children of wealthy families used to have access to until now.

Many schools in the US and several European Nordic countries, as well as in Latin America and India, have abandoned teaching tools such as books, notebooks or the board in favor of devices and software products specially developed by the startups in the field. Representatives of educational units say it works.

Amplify educational tablet is used here. It provides the teacher the opportunity to block it when necessary, so that students look up and listen. *Aakash* tablet, developed by the Canadian Datawind IT company, is also in use.

Amplify is a tablet on which has been downloaded the curriculum for secondary schools at the initiative of Common Core State Standards in the US. It contains all the information children need to learn in most US states until the age of 18. The lessons which are structured as a game and taught on tablets allow children to make progress at their own pace and to receive instant feedback at every step.³

Other disadvantages are the high costs of such products and personal data protection issues, which is a real subject of concern for parents. In April, *inBloom*, a project funded by the Gates Foundation and the Carnegie Corporation, which aimed to make use of students' personal data in order to develop personalized teaching methods, was abandoned as a result of parental opposition.

In the recent years, personal interest for research on the effects of digitization on the human psyche has resulted in a series of studies on: *The Herding Behavior of the Prosumer Adolescent*, *The Selfie Phenomenon on Facebook*, *Self-esteem and the Selfie Phenomenon*, *Media and Virtual Environment*, "Reason and Thought" for a press event in the digital space, *Journalism Education*, *Students and Media* in the current context.

4. Conclusions

In a rapidly and continuously technologized society, the researches on the effects of digitization on the brain are more and more controversial. Given that digitalization is experienced as an unimaginable opportunity to get in touch with a huge volume of information in a short time, the analysis of this phenomenon in the context of education imposes itself as an absolute necessity.

A useful and necessary research would be to study these effects (decreased IQ since 2000) among young people. Known as avid users of digital spaces and techniques, they are even called generation 2.0, i.e. the generation of the Web. A future in which our children will not be able to think critically a

² <http://www.hotnews.ro/stiri-magazin-18652141-elevii-finlandezi-nu-vor-mai-invata-scrie-mana-lectiile-fiind-inlocuite-cele-tastare-calculator.htm>

³Information taken from *The Economist*.

life situation and to quickly find solutions to any given problems constitutes a real danger to the evolution and development of mankind in the long term. What Marchal McLuhan anticipated with the development of technologies by the phrase global village looks to achieve its purpose also in the leveling of registry reactions, at their level of variety, complexity and thinking. The whole world becomes a global village, in which the unity of thought, action, beliefs, values, and norms will be a fundamental premise.

In an exaggerated note, inspired from the conspiracy theory, one could put the following question: “Is anyone interested in our teenagers, the future productive adults, not to be able to think as well and deeply to the extent of the events they live?” Other questions may arise: “Weren’t these types of consequences anticipated?” or “Which solutions are going to prevent or mitigate the phenomenon?”, “Is the educational system a solution?”

One of the studies recently published by Prof. Anca Dobrean comes with a reasonable alternative in this academic / research-related dispute. Education with its purpose on efficient usage of innovative technical means may represent the solution for the continuous development of IQ next to increasing interest, maintaining motivation, widening of the informational horizon, etc., that the new technology involves.

Longitudinal studies conducted on groups of children who learn to write on tablets nowadays, could offer, in perspective, more answers about the effects of digitalization on the IQ of the young in a formal and non-formal educational context.

Is the human tendency to conserve effort and to get access to resources in an easy, quick and effective way in danger? Is there also a less anticipated reverse side, that of inhibiting development at the IQ level? If this prospect will be confirmed by further comparative studies made both in cultural spaces deeply marked by the phenomenon of digitization and in other areas, economically protected by the benefits of the new technologies where there will not be a drop in IQ, the prospect of mankind on the generous and exclusive advantages of the current technologies will experience a real restructuring with adaptive purposes.

References

- Flynn, James R. (2009). *What Is Intelligence: Beyond the Flynn Effect* (expanded paperback Ed.). Cambridge: Cambridge University Press. ISBN 978-0-521-74147-7. Lay summary (18 July 2010).
- Flynn, James R. (2012). *Are We Getting Smarter? Rising IQ in the Twenty-First Century*. Cambridge: Cambridge University Press. ISBN 978-1-107-60917-4. Lay summary (16 May 2013).
- Greenfield S. (2015). *Mind change: How digital technologies are leaving their mark on our brains*. Random House. Longcamp,
- Marieke, Marie-Thérèse Zerbato-Poudou, and Jean-Luc Velay. 2005. “The Influence of Writing Practice on Letter Recognition in Preschool Children: A Comparison between Handwriting and Typing”, *Acta psychologica*, p. 67-79.
- Sprenger, Marilee, (2010). *Brain-Based Teaching in the Digital Age*. ERIC. ISBN: ISBN-978-1-4166-0918-6
- Strangelove M. (2015). *The empire of mind: Digital piracy and the anti-capitalist movement*. University of Toronto Press
- Trimble, Abby J., “Exploring the Flynn Effect: A Comprehensive Review of the Causal Debate” (2011). *CMC Senior Theses. Paper 270*.

<http://revistasinteza.ro/impactul-tehnologiei-asupra-dezvoltarii/>