

Digital Divide: A Technological Generation Gap

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Abstract: *Generation Z and Millennials grew up in our digitalized world. Due to their increased digital expertise, compared to the rest of the population, they use digital technology as an integral part of their lives. Technology has an obsoleting impact on those without the proper skills; thus, older generations have to face the need to keep up with technological advancements. Digital communication changes the way we handle our emotions in an online environment. Emotions have been tied to social media usage, especially for adolescents. Due to the individual and age-related differences in emotional regulation, emotional intelligence (EQ) and self-control are crucial elements of the successful and controlled online presence of each generation. This quantitative research aims to analyze the possible differences between the generations regarding their habitual and problematic smartphone usage and compare the impact of EQ and self-regulation on each generation's behavior in the digital world.*

Keywords: *generations, Millennials, Generation Z, Gen X, digital natives, generation gap, digital divide, emotional regulation, digital media use, internet addiction*

1 Introduction

Nowadays, most of the population uses digital media and digital tools to deal with everyday challenges. We order our food online, we download our learning materials, share our photos via Facebook and Instagram, and stay connected with friends even from the other side of the world. The younger ones born into the digitalized world and learned to use smartphones and tablets before they even learned to read and write at primary school. The older generations started to use digital advancements in their midlife and had to develop new digital skills to be able to perform at work. On the other hand, the increased loneliness at older age motivates the enhanced social media use. In many cases, this is the only role of smartphones and social media in the life of older generations: in this way, they can stay connected to the world and foster relationships.

Numerous studies examined the role of social media and smartphones in the life of Generation Z and Millennials, but less focused on older individuals who may use

the advantages of digitalization but have different motivations. Our study aims to identify the technological generation gap between the generations and expose its connection with other variables. Our explorative, quantitative study has been built around the following research question(s): Is there any significant difference between the different generations regarding their emotional intelligence (EQ), social stress, self-regulation, habitual, and problematic mobile use?

2 Technological generation gap

The word generation is derived from the Latin word “generare” and means of people born roughly in the same period [1]. Previous studies define the groups differently based on culture (Figure 1).

	1950	1960	1970	1980	1990	2000
China		Post-50s generation (1950-1959)	Post-60s generation (1960-1969)	Post-70s generation (1970-1979)	Post-80s generation (1980-1989)	Post-90s generation (1990-1999)
India	"Traditional" generation (1948-1968)		"Non-Traditional" generation (1969-1980)	Gen Y (1981-onward)		
South Korea		"475" generation (1950-1959)	"386" generation (1960-1969)	Gen X and Gen Y (1970-onward)		
Japan	1st Baby Boomer (1946-1950)	Danso generation (1951-1960)	Shinjinrui generation (1961-1970)	2nd Baby Boomer (1971-1975)	Post Bubble (1976-1987)	Shinjinrui Junior (1986-1995) Yutori (1987-2002)
Russia	Baby Boomers (1943-1964)		Gen X (1965-1983)		Gen Y (Gen "Pu") (1983-2000)	
Bulgaria	Post War generation (1945-1965)		Communist generation (1965-1980)		Democracy generation (1980-onward)	
Czech Republic	Baby Boomers (1946-1964)		Generation X-"Husak's Children generation" (1965-1982)		Generation Y (1983-2000)	
South Africa	Baby Boomers (1943-1970)		Gen X (1970-1989)		Gen Y (1990-2000+)	
Brazil	Baby Boomers (1946-1964)		Gen X (1965-1980)		Gen Y (1981-2001)	
U.S.	Baby Boomers (1943-1964)		Gen X (1965-1980)		Gen Y (1981-2001)	

Figure 1
Classification of generations based on different cultures
Source: Hole et al., 2010 [2]

The growing number of people born after the world war and before 1960 created the generation of Baby Boomers. This age group has significant problems to find their place in the new and increasingly digitalized world and feel these changes as a loss of security and predictability [3]. People born between approximately 1960 and 1979 were named the Generation X or Gen X. During their adolescence, the manual typewriter has been replaced by computers, and they had to face the fact that manual work would slowly decrease and being replaced by technological advancements [4]. Generation Y or Millennials was born into a digitalized world [5]. Workplace safety, known from their grandparents' stories, does not mean

much to them, and the vast amount of opportunities opposes their desire for stability. They are the first generation whose communication moved into the online world, and they need to construct a desirable image on social media [6] to stay socially connected. Generation Z or Gen Z was born after 2000, and 99% of them use smartphones. 89% of 15 years old teenagers have social media profiles [7] and favors immediate consumption and experience [8].

The differences between the generations are significant, in which technological progress plays a significant role. The experience of the elderly is already unimaginable for the younger generation, for example, the drastic change in the process of forming relationships without messaging applications. This phenomenon is called the “generation gap” in the literature, which faithfully reflects the gaps between generations [1].

3 Role of emotional regulation in the digital age

According to Van Deursen's findings [9], older people are less likely to use digital technologies, and they prefer to use social media just for communication purposes and show a more regular smartphone usage pattern. Older people spend less time on the internet, and experience less social stress than the younger ones. They are better in self-regulation while getting older might result in increased social isolation, and it can strengthen the need for belonging, which can be satisfied by smartphones and social media.

3.1 Self-regulation

Nowadays, more and more activities have moved to the online world. Self-regulation has an essential role in social media “etiquette” (e.g., boundaries of self-expression via Facebook and Instagram during online communication). It can be defined as the ability to control one's behavior, thoughts, and emotions. Emotion regulation can also refer to processes such as the tendency to focus one's attention on a task and the ability to suppress inappropriate behavior under instruction. Thus, emotion regulation is a highly significant function in human life, and every individual engaged in some form of it almost all the time, because controlling destructive thoughts and emotions is essential [10]. Poor emotional regulation is associated with different kinds of problematic behaviors [11]. Based on previous studies, internet and mobile-phone addicts are more likely to have problems regarding decoding emotions and facial expressions as well; thus, regulation of emotions plays an essential role in avoiding problematic smartphone usage. Individuals with difficulties in coping with negative emotions prefer to turn to the internet [12], and social media use, unlimited browsing of Instagram, can become a “safe place” for adolescents [13]. Pressure from peer-groups can cause significant social stress for teenagers, but the older generations have to face the consequences of the cruel world of social media as well through FoMO (Fear of Missing Out) and constant comparison [14]. Decision making becomes more

complicated with age, and spontaneous use of cognitive, emotional regulation skills increase as well [15].

3.2 Social stress

Social stress or fear of negative evaluation (FNE) can be defined as distress over negative evaluations by others, and the expectation that others would evaluate one negatively. FNE is related to anxiousness and even social avoidance. It is essential to distinguish between FNE and social anxiety. In comparison, FNE is related to the fear of being evaluated negatively in social situations, social anxiety in an emotional reaction to this type of situation. Social media is increasingly used to construct a desirable image, which is a strong motivational factor in sharing any content [16]. Socially anxious individuals prefer to use social media and their smartphones than communicate in person with others [17]. Individuals with high FNE scores were more affected by social endorsements of others than non-socially anxious people [18]. Many people are firmly attached to their smartphones, and if it is out of immediate reach, that causes stress and increases the feeling of FoMO as well [14].

3.3 Emotional Intelligence (EQ)

Emotional intelligence (EQ) is the ability to understand and manage one's own emotions and those of the people around them. There are currently several models of EQ: there is a clear distinction between ability or competence-based EQ and personality trait-based EQ. The latter can be defined as behavioral dispositions and self-perceived abilities [19], while the ability model focuses on the individual's ability to process emotional information and use it to navigate their social environment. This model defines EQ as “the capacity to reason about emotions and of emotions to enhance thinking. It includes the abilities to accurately perceive emotions, to access and generate emotions to assist thought, to understand emotions and emotional knowledge, and to reflectively regulate emotions to promote emotional and intellectual growth” (page 197.) [20]. EQ has four dimensions: (1) ability to control emotions, (2) ability to understand emotions and apply emotional knowledge, (3) ability to integrate emotions, (4) perception and expression of emotions. Based on previous studies, EQ positively correlated with better social relations for children and adults, better academic success, and increased job performance [21]. It can help reduce the probability of problematic internet use or mobile addiction [12].

4 Measure and Methods

The Hungarian participants filled in an online survey, which took approximately 15 minutes to complete. It was pilot tested with 4 participants (aged 14, 28, 45, and 64) to examine the clarity of the questionnaire. The survey contained general demographic questions (gender, age, educational background, employment) and more validated measurement tools as well. In case to improve the scales' Cronbach

alpha, a few questions may have been removed from the items after the pilot-test. *Schutte Self-Report Emotional Intelligence Scale (SSREI)* has been used to assess the level of emotional intelligence (EQ). This instrument consisted of twenty-seven questions rated on a 5-point agreement scale [22]. The items on the test relate to three emotional intelligence components: appraisal and expression of emotion, regulation of emotion, and utilization of emotion ($\alpha_{EQ}=0.89$). *Brief Fear of Negative Evaluation Scale (BFNES)* has been used to assess if the respondents felt stressed in the social context [23]. The main objective of this instrument is to measure social anxiety. It contained twelve items rated on a 5-point agreement scale ($\alpha_{Stress}=0.96$). *Self-Regulation Questionnaire (SRQ)* has measured the level of self-regulation [24]. It contained twelve questions, which can be answered on a 5-point Likert scale. ($\alpha_{Self-Regulation}=0.84$). To measure addictive smartphone behavior, the *Mobile Phone Problem Use Scale* has been used, which was developed by Bianchi and Phillips [25]. The twenty-six items cover to escape from problems, craving, negative consequences, and social motivations as well. 5-point Likert responses have been used. *Habitual mobile phone usage* was measured with an instrument adapted from Van Deursen [9]. The instrument contained eighteen items rated on a 5-point scale. Chronbach's alphas exceeded the required threshold of 0.7 ($\alpha_{Habitual\ use}=0.91$, $\alpha_{Problematic\ use}=0.92$) which implied high internal consistency of the smartphone behavior scales. The data were analyzed with SPSS 20.

5 Discussion of the Results

In total, 932 people who use smartphones answered the survey. The answers of individuals younger than 14 years old, and that ones which contained missing values have been excluded. It resulted in 844 answers (22.3% men and 77.7% women). The younger individual was 14, the oldest 78 years old (mean=39.06, SD=18.787). The generational distribution is shown in Table 1.

Table 1 Number of study participants per generation and their age

Generations	Mean	N	SD	Min.	Max.
Generation Z	16.99	235	1.803	14	20
Millenials	28.85	190	6.360	21	40
Generation X	50.69	271	5.885	41	60
Baby boomers	65.93	148	3.742	61	78
Total	39.06	844	18.787	14	78

Although the sample is not representative of the Hungarian populations, it suits the purpose of the current study. Concerning the educational activity, 60.4% of the respondents had no student status, 39.6% was a part-time or full-time student. The respondents' educational and employment background is shown in Table 2.

Table 2 Educational and employment background of the respondents

Education		Employment	
Primary school	23.70%	Not in employment	41.70%
High school	35.50%	Full-time job	35.90%
Bsc	27.60%	Part-time job	7.60%
Msc	13.20%	Retired	14.80%

5.1 Mobile use

Habitual (regular) mobile usage contains phone calls, writing or reading emails, checking weather forecasts, reading news on the internet, chat, and messaging with others. Habitual use is perfectly normal nowadays if the lack of these actions does not cause anxiety or distress for the individual, or excessive use does not lead to addiction. A high problematic mobile use score predicts mobile addiction or compulsive usage.

5.1.1 Habitual mobile use

The total score of the habitual mobile score reveals that there are significant generational differences. It ranged between 18 and 90 (mean=57.71, SD=14.627). Table 3 shows that Generation Z uses the mobile most frequently (score=63.32), which reflects that this generation was born into the technological and digital advancements, and their connection with their mobile seems to be a natural process. The score of Millennials is 61.44, which is quite close to Gen Z's. There is a more significant decrease between Millennials and Generation X who had to actively learn the use of mobile phones at one point in their lives. Baby Boomers have the lowest score, just 48.34, which reveals the score of older individuals who use mobile phones daily (we measured the mobile usage of older individuals who use the internet regularly because the online questionnaire was available via Facebook).

Table 3 Habitual mobile use score of each generation

Generáció	Mean	N	SD	Min.	Max.
Generation Z	63.32	235	11.441	20.00	90.00
Millennials	61.44	190	12.764	22.00	89.00
Generation X	55.41	271	14.248	20.00	86.00
Baby boomers	48.34	148	16.413	18.00	87.00
Total	57.71	844	14.627	18.00	90.00

ANOVA posthoc test (Tukey) reveals that Gen Z and Millennials have no significant differences, but both generations differ from Generation X and Baby Boomers significantly ($p < 0.01$). Generation X has lower scores than Millennials

and Generation Z (mean difference: -6.12 and -8.00), while the difference between Baby Boomers and previous generations are significant as well (Gen Z: -14.97, Millennials: -13.09, Generation X: -6.96). It is a modest, significant negative correlation between habitual mobile use score and age ($r = -0.374$, $p < 0.01$), which means the older individuals are attached to their mobile phones less even if they use the internet daily.

5.1.2 Problematic mobile use

Problematic mobile use scores ranged between 26 and 112, while the highest possible score was 130 (mean=55.46, SD=16.850). Most of the individual used their phones without any addiction problems (96.4%), just 3.4% showed the sign of addictive behavior (an excessive amount of time spent on the internet or with messaging). The score of generations reveals the same pattern as in the case of habitual use: the mobile addiction score decreased with age (Table 4).

Table 4 Problematic mobile use score of each generation

Generation	Mean	N	SD	Min.	Max.
Generation Z	63.50	235	14.911	30.00	112.00
Millennials	56.43	190	16.088	26.00	104.00
Generation X	52.19	271	16.101	26.00	115.00
Baby boomerek	47.42	148	16.614	26.00	95.00
Total	55.46	844	16.850	26.00	115.00

ANOVA and Tukey posthoc test revealed significant differences ($p < 0.05$) between each generation. Baby Boomers and Generation X are the less prone to face problematic mobile usage, while the younger generations (especially Gen Z) spends much time on their phones. Regarding the correlation between age and problematic usage, the results revealed modest, negative significance ($r = -0.349$, $p < 0.01$).

5.2 Self-regulation & social stress

Self-regulation score was ranged between 9 and 45 (mean=31.84, SD=6.080) and increased by age ($r = 0.261$, $p < 0.01$). Figure 2 shows that high level of self-regulation can help decrease the social stress ($r = -0.440$, $r < 0.01$), mobile addiction ($r = -0.401$, $p < 0.01$) and reduces habitual mobile usage as well ($r = -0.287$, $p < 0.01$).

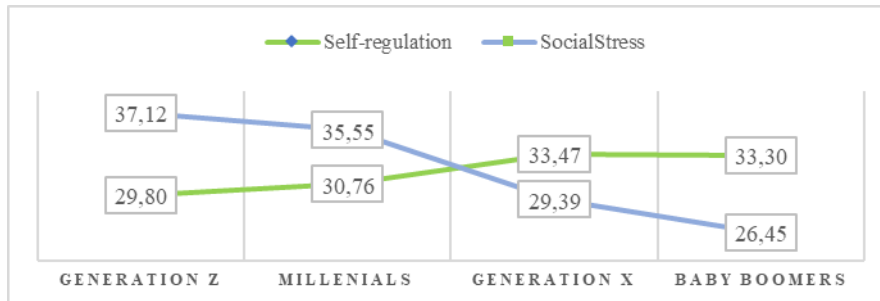


Figure 2
Comparison of average social stress and self-regulation scores of each generation
Source: own data

There is no significant difference between the score of Gen Z and Millennials ($p = 0.334$), but both generations differ from Generation X and Baby Boomers ($p < 0.01$). The same similarity appears in the case of Baby Boomers as well; they do not differ from Generation X significantly ($p = 0.992$) just from the Gen Z and Millennials ($p < 0.01$).

Regarding the social stress score, the results indicate significant differences between the generations. The average score was 32.41 (between 11 and 35, $SD=12.562$), which shows that most of the individuals have problems with the fear of negative evaluation, but the social stress is reduced by age ($r = -0.336$, $p < 0.01$) and EQ ($r = -0.220$, $p < 0.01$). It correlates with habitual mobile use ($r = 0.432$, $p < 0.01$) and mobile addiction as well ($r = 0.447$, $p < 0.01$). Results of ANOVA and posthoc tests (Dunnett T3) indicate significant differences between younger (Gen Z and Millennials) and older generations (Generation X and Baby Boomers).

5.3 Emotional intelligence (EQ)

The result of analyzing the EQ score indicates that the connection between age and EQ is very weak, but significant ($r = 0.141$, $p < 0.01$). The average EQ score was 104.75 ($SD=13.196$) and ranged between 51 and 134 (the possible maximum is 135).

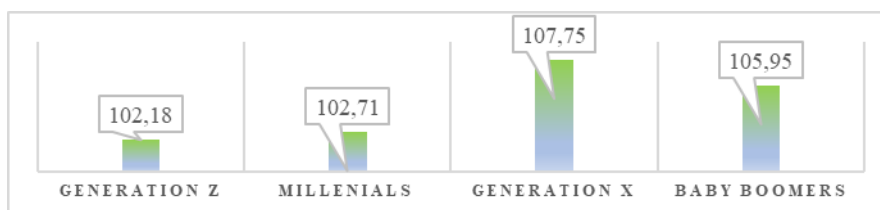


Figure 3
Average EQ scores of each generation
Source: own data

ANOVA posthoc test (Tukey) reveals that there is no significant difference between Gen Z and Millennials (Figure 3), but both generations have significantly lower EQ than Generation X ($p < 0.01$) and Baby Boomers ($p < 0.05$). The score differences between Generation X and the Baby Boomers are not significant. Baby Boomers' results follow the same pattern; they differ significantly just from Gen Z and Millennials (the digital generations). The higher EQ scores can reflect a better emotional expression and empathy in the case of the elders due to the more offline communication.

High level of EQ does not affect the daily mobile use ($r = -0.220$, $p = 0.530$) but can prevent the addictive behavior ($r = -0.127$, $p < 0.01$) and lower the level of perceived social stress ($r = -0.220$, $p < 0.01$). The result of the analysis indicates that the connection between EQ and self-regulation is significant ($r = 0.476$, $p = 0.00$).

Individuals with higher EQ can communicate better and handle the emotions of others more effectively. Higher EQ leads to better stress and frustration handling, and due to the stringer self-regulation, older individuals better at goal achievements as well.

Conclusion

The present study investigates the differences between the generations regarding smartphone use, EQ, social stress, and self-regulation. The results show that habitual and problematic mobile usage decreased by age, and there are significant differences between the generations. Self-regulation increased by age and negatively correlated with both habitual and problematic use. It helps reduce social stress, and we found substantial differences between the younger (Gen Z and Millennials) and older groups (Generation X and Baby Boomers). The average score of social stress showed that most of the respondents had problems with the fear of negative evaluation, but the impact was more influential in the case of teenagers and adolescents. A high level of social stress has been related to regular and problematic smartphone usage as well, which confirms previous studies' results [17]. Emotional intelligence (EQ), which increases by age, can help prevent addictive behavior but does not affect the everyday mobile use. The key is the self-regulation, which is significantly correlated with EQ. Individuals with better emotional regulation can manage their relations better in real life and online as well.

Younger generations spend an enormous amount of time online (especially on their phone), while their fear of negative evaluation is intense. This kind of stress reduced by age, and due to the increased self-regulation ability, older generations use smartphones wiser. They do not feel the pressure to construct a perfect image on social media and use smartphones mostly for information seeking and communicational purposes.

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