THE IMPACT OF CYBER- ACTIVITY ON HUMAN DEVELOPMENT

Marzanna Farnicka[1]   [1]*University of Zielona Góra, Al. Wojska Polskiego, Poland*

ABSTRACT

The following article focuses on the impact of cyber-activity on individual as a risk' factor in development. The first part describes cyberspace users according to developmental theories. In the second part, some psychological changes in human mind caused by cyber-activity are presented (socio-psychological and cognitive-emotional consequences). Next, an analysis is carried out taking into consideration certain psychological conditions (attachment, temper, own experience) and motives for undertaking cyber-violence and cyber-bullying by young people. In the conclusion, programmes for mental health protection are presented. This study contributes to the existing literature concerning developmental psychology. This study, originating in a new formula, is a proposal of an analysis of risk among adolescents and as such, it may prove a useful tool in describing young people' cyber- and other - activity profiles. In the paper, criteria for systemic analysis of the functioning of Digital Immigrants and Digital Natives were presented. Also, a description of individual strategies and their changes in time, space, activity, energy and information were proposed. This paper presents some psychological changes in human mind caused by cyber-activity, together with their socio-psychological and cognitive-emotional consequences. Aditionally, some psychological conditions, such as attachment, temper, own experience, and the motives for undertaking cyber-violence and cyber-bullying by young people were taken into consideration. The Programme Keep It Tame was presented as a way of protection of adolescents' mental health.

Contribution/Originality: This study contributes in the existing literature concerning the developmental psychology about consequences of changes in developmental environment. The paper's primary contribution was finding the criteria for systemic analysis of the functioning of Adolescents from the pentabase perspective (time, space, activity, energy and information).

1. HOW TO DESCRIBE THE MODERN DEVELOPMENTAL CONTEXT?

Today, thanks to the use of cyberspace, the world may not only 'compress' – come closer, but also 'expand' – become more distant. Network participants can create their own worlds to suit their needs. The created worlds may be alternative to reality, and the network user may switch back and forth between the real and the virtual domain while retaining his or her core identity. A person may not feel psychologically attached to the actual physical location where that person is staying; on the other hand, someone staying physically close to us may actually live in a world that is unattainable and distant, because it is artificially created. Lack of readiness and competences for

living in a globalized world may cause a globalization shock leading to apathy and resistance, a certain aversion (Nieman, 2011) or even loss of access to culture (Salzman, 2001). Fast technological changes drastically alter the conditions of human development. As the life environment has been changing rapidly, recognized models of development (e.g. the adequacy of the concept of developmental tasks, (Baltes *et al.*, 2006; Arnett, 2007; Trempała and Cieciuch, 2016) or notions used in psychology (Sampson, 1989; Kowalik, 2015) are being questioned. Developmental psychologists undertake the problem of insufficient knowledge and lack of efficient tools for the measurement of psychological processes connected with functioning in a world that is variable and unstable in different contexts (amusement, virtual, family life, professional life, etc., cf. (Farnicka and Liberska, 2016).

2. THE CONSEQUENCES OF CYBERSPACE FOR AN INDIVIDUAL MIND

Digital usage has not only altered the ways in which we communicate, organize information, search for knowledge and accumulate it, but also modified our time-spending habits. As a result, we witness changes not only in the way people think about the world (content), but also in the thinking process as such. What follows is the change in the way people feel and also the way in which they organize their functioning in society. Rapid, dynamic changes allow human development researchers to observe coping strategies adopted by two consecutive generations. Thanks to the creation of cyberspace, something technologically new, a generation gap has occurred in terms of ability to use that aspect of space. The emergence of that difference has made is possible to ask questions about the characteristics of the adaptation processes and adaptation skills that prove the most effective in face of new challenges for the generation of Digital Immigrants, and also to compare classical knowledge about various aspects of behaviour with the changes as observed in Digital Natives. Table 1 below presents differences observed by various researchers in the functioning of persons using cyberspace as the main life environment and for those for whom that space is less natural[1]. Due to the fact that the present-day science and norms were developed in the 20th century, the comparison of changes always relates to a certain 'earlier' time, adequate for the generation of Digital Immigrants. The presented differences depict changes in ways of functioning in space (material and social), using time, specific attitude (information) and energy involvement.

Table-1. Analysis showing differences in functioning of individuals in the digital age and before it

Area	Before 1981	At present
Space-related habits	Reading books, magazines, watching TV	Drop in those activities, looking for information on the Internet
	Contact with nature, physical activity	Decreased physical activity
Social functioning	Face-to-face meetings, personal involvement Building relationships – long-term processes, e.g. friendship	Speed; e- commerce, e-shopping, e- conferences, information on goods taken from the net without personal interaction Building cluster-type relations, task-oriented or ad-hoc/occasional groups
Social contacts	Face to face, by phone	Networks, social networking sites, e-mails
Cyberspace control and energy	None	Addiction, compulsion
Attitude to technology - information	Concentration on utilitarian aspects	Using gadgets, electronic toys
	Technical novelties feared, as they disturb the usual mode of functioning	New things welcome with interest
Functioning mode	Linear performance of tasks	Multi-tasking, parallel processing
Values and gratification	Long-term gratification as a value	Short-term, instant gratification prevails
Learning	Learning based on memory and concentration	Learning based on attractiveness and change

Source: author's own work based on Small and Vorgan (2011)

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[1] The material for the differential analysis was collected on the basis of the work by Small and Vorgan (2011).

The analysis of the differences in human functioning that we may observe thanks to the existence of cyberspace is a source of questions concerning deeper consequences of that phenomenon. Analysed below are selected changes that may be examined as results of transformations in the surrounding world caused by the technological leap.

3. CHANGES IN COGNITIVE, SOCIAL AND PHYSICAL FUNCTIONING

An average representative of the generation of Digital Natives spends about eight and a half hours in cyberspace[2], of which 6 hours are spent on the Internet and the remaining time is devoted to using the phone and playing games that do not require constant on-line presence. Employed persons who use modern equipment to communicate have been observed to develop stenographic skills and to understand and use a new language that is a lexicon composed of abbreviations and emoticons.

It has also been observed that computer games influence cognitive processes of their users. Peripheral vision and attention switching function are improved, multi-tasking dominates, mental reactions and decision-making processes are speeded up (Kearney in: Small and Vorgan (2011)).

Another noticed change is a different mode of cognitive functioning in the learning process. Digital Natives often complain about unattractive form of traditional teaching. Single- or even dual-channel message mode employed by teachers (e.g. book or presentation) is boring and too slow for their expectations, which is connected with excitement seeking and concentration time (shorter attention span). A following example may serve as an illustration of young people' needs connected with content attractiveness: while watching an educational programme on TV, Digital Natives are also listening to music, handling their phones and taking part in an online chat, because as recipients they know that the motion picture can be stopped at any moment that is of interest to them.

Those transformations, connected with new communication possibilities, have brought about changes in the frequency and form of face-to-face social contacts and the time devoted to cultivating bonds and building social competences. A new style has been observed in interpersonal and intergenerational communication, based on texting, e-mails, sporadic necessary telephone calls to family and friends; also, certain anonymity, little activity related to social co-operation and overcoming frustration in relations with persons from the so-called 'group of further friends'. The possibility of instant gratification of social needs on the Internet instead of regular social training in a given group of people in fixed time sequences (family rituals) is a threat to the development of communicative skills, emotional intelligence that is based on recognition of multidimensional non-verbal signals, as well as self-confidence in intimate relationships. A dropping number of interactions between people, and particularly between parents and children undermines the process of transmission of culture and prevents intergenerational support, which is detrimental for long-term functioning of relationships, families and groups. Being in a long-term relationship requires such traits as empathy and ability to cope with emotions, frustrations and mutual interdependence.

The time spent on offline physical activity undertaken for pleasure is also getting shorter. This phenomenon is illustrated by the latest experience with a game that forces physical activity of young players[3]. Young people spend hours outdoor solving mystery after mystery. However, the motivation behind that is not the pure pleasure derived from physical activity. A digression can be made here that the subjectivity of activity and will becomes an object in a game. Still, cyberspace is not the only place in which, by individual decision, subjectivity is treated as an object (Fromm, 2005).

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[2] Data taken from Mobirank (2016). The study was conducted in 2015 in 34 countries worldwide.

[3] Young players are looking for hidden objects or figurines with the use of maps. In order to win points, they need to be physically present in the place marked on the map (which is verified by GPS).

4. FUNCTIONAL CHANGES IN THE NERVOUS SYSTEM

Multi-tasking, quick changes of stimuli, high level of neural activity force our brains to adapt to such a functioning mode. Developing new connections and changing the frequency of activation of certain areas, we adapt and tune to the challenges faced by individuals living and working in cyberspace. For the brains of Digital Immigrants, those changes have the adaptive nature and are proof of our learning capacity and neuroplasticity. For most people, those changes take place imperceptibly. However, some people experience the so-called 'burnout', manifesting itself in attention deficits (also called distractedness).

Different processes occur in the generation of Digital Natives, for whom such a mode of functioning is a natural alternative that they practice since birth. In their case, researchers focus more on studying the development of those neural areas and connections that are rarely activated in cyberspace, and had earlier been developed in off line activities, first of all during social interactions and solving complicated tasks in memory. One of the problems that may serve as an example is social spontaneity and the ability to empathize. Speaking from the neurological point of view, this relates to the simulation of the activity of the amygdaloid body responsible for initiating and maintaining eye contact. Research by Ybarry indicates also that everyday social contacts are also crucial for the development of memory, not only for the elderly but also for young people (after: Small and Vorgan (2011)).

Brain activity studies with the use of magnetic resonance carried out with test participants online or using digital technology revealed the manner in which neural activity is activated and inhibited. Certain characteristic and slightly surprising results of that research are presented below.

According to research carried out to date, the analysis and use of both spoken and written language activates the Broca's area in the frontal lobe. Meanwhile, writing and reading emoticons activates primarily the right inferior frontal gyrus previously associated with non-verbal communicative skills (Small and Vorgan, 2011).

Due to quick gratification of needs on the Internet and the possibility of providing stimuli that match expectations, the limbic system is activated. Frontal lobes and parietal cortex, the activation of which helps us plan, control and inhibit cognitive and emotional arousal, are less often activated.

Questions about the consequences of presence of little children in cyberspace resulted in the emergence of hypotheses connecting a different mode of their cognitive, social and emotional functioning with changes in brain functioning. Problems so far labelled as concentration deficits or psychomotor overexcitability disorders are now proposed to be treated as a new model of cognitive functioning.

An example of such an understanding of the changes in the way in which children function is the phenomenon of 'Indigo Children' introduced by Carroll and Tober (1999). The term applies to children who are highly talented but socially maladjusted. What makes those children unique, apart from their problems with discipline, observing norms and respecting authority, is their exceptional creativity, intelligence, intuition, exaggerated self-esteem, and frustration and boredom connected with functioning in traditional social systems (school). The numbers of such children are growing and this was probably the reason behind linking their exceptional features with functional changes in the brain resulting from the use of modern technology. Classically understood, the symptoms listed above would suggest cognitive deficits, hyperkinesis and behaviour disorders, as well as disturbances from the autistic (Asperger syndrome) or psychotic (hebephrenia) spectrum. A frequent danger resulting from the search for new functioning models is the delay of the correct diagnosis and first of all therapy that would enable a child to function with success in the social world (Chan and Rabiwitz in: Small& Vorgan, p. 105).

5. CONSEQUENCES OF NEW DEVELOPMENTAL ENVIRONMENT IN DIGITAL NATIVES GENERATION- RISK' FACTORS

The basic risk factors from the point of view of an individual development in adolescence are total anonymity and loneliness. Nest is the fear of losing privacy or fear of being rejected in the real or the virtual world.

Another risk is the power of influence of various contents that can be found on the net. Every now and then, reports occur in the media about strange Internet-spread diseases, hysteria cases or even Internet group suicides. As an Internet user has control over the content found online and the intensity of that content, we can say that such a person creates his or her world of values and accepted behaviour and may fail to notice other aspects of reality or his/her own functioning. Such [self-imposed] limitation of access to information is a threat to building one's identity, self-esteem and proper judgement of reality. An example of that problem is the popularity of various blogs and sites related to solving various life problems, from treating influenza to treating cancer and from passing a chemistry test to healing a broken heart. Internet blogs or forums are under no professional verification, being only controlled by moderators or admins with regard to compliance with the rules. They are often hidden, not accessible for everyone (e.g. for parents or friends). At this point it is worth noting that the problem relates not only to the question of safety and reliability of information but the development of deeper structures of human psyche, such as awareness building and self-limitation of one's development (narrowing the field of exploration by excluding other dimensions of life or functioning).

Excessive presence in cyberspace has got new negative consequences and poses threats to safe functioning of individuals. More and more often doctors link sleeplessness and obesity to night-time Internet activity and the new pattern of day and night, activity and regeneration (Akmed, 2010; Cogito, 2011)).

 According to statistics, about 20% of Internet users meet the clinical criteria of addiction. In simplified terms, one can say that the addiction process relies on dopamine release in the situation of excitement and gratification (Jakubik, 2002). Due to the fact that gratification on the Internet is irregular, strong gratification balances the influence of numerous disappointments caused by, for instance, losing a level in a game or receiving an e-mail with some negative information. As is the case with other types of addiction, Internet addiction involves mood swings, lowered tolerance to abstinence, withdrawal symptoms and relapses. The American Medical Association is currently in the course of studies to determine whether it is legitimate to officially recognize *Internet and computer games addiction* as a separate diagnosable disorder.

Another risk factor to individual development of new generation adolescences and also to the safety of small groups, such as families, is the threat connected with e-shopping, e-gambling and e-politics addiction. Problems with taking care of one's own money, spending control or control of one's economic or political actions stem from the fact that both the value of money and the perception of the responsibility for one's words in cyberspace seems lower that in real 'face-to-face' encounters ((Burgess, 2005; Tyszka, 2005; Farnicka, 2011)).

6. CYBER- ACTIVITY AND SOCIAL DEVELOPMENT

The emergence of cyberspace has brought about the occurrence of such antisocial phenomena as cyber-bullying, cyber-violence and cybercrime. Mapping a new developmental environment reveals the existence of numerous threats connected with those phenomena. As cyberspace is programmed – settled by people or human-made programmes, this section presents individual features and motives of persons who engage in activities that may be classified as cyber-bullying and cyber-violence.

Violence with the use of electronic media has become a social issue in many countries. A metaanalysis carried out by Gradinger (2014) shows that the motives of perpetrators of cyber-violence and cyber-bullying are most often anger, authority (sense of power), as well as free-time entertainment. Hitherto conducted research indicates that in case of combined motives (e.g. authority, power and anger) the risk of all types of aggressive behaviour in all the traditionally recognized channels (verbal, physical and indirect) increases. When motives such as anger prevail, one can suspect that a perpetrator will choose a single channel considered most effective under the circumstances (cf. Dixon (2011)). One may quote here the assumptions connected with the concept of frustration – aggression, i.e. that such behaviour stems from reactive motives such as the attempt to cope with anger, or instrumental motives serving the purpose of achieving authority, power or affiliation (according to the assumptions of the concept of

social learning to achieve goals). If the motive of play is involved, the development of such behaviour is hard to determine, as very few studies have been conducted from that angle. So far both the need of play and boredom have been treated as motives specific for violence activity on the net, as in real life such motives behind inflicting harm on others are treated as predictors of disturbances of psychopathic nature.

The research of Gradinger *et al.* (2015) that the rise of bullying and cyber-bullying is parallel. This may mean that the reasons for both types of behaviour should be sought in similar psychical processes of perpetrators and also in processes taking place in groups, or one may assume – after Menesini and Nocentini (2009) – that cyber-bullying is about the group's aggression towards an individual, but in a modified environment. Reports on cyber-violence show the consequences of such experience for psychical well-being, mental health, educational and social achievements, and interpersonal relations (Smith in: Dixon (2011)). Negative consequences of behaviour recognized as violating the norms and principles and encroaching personal boundaries affect not only persons who are directly involved in the process, but also those who witness it. The Czech researchers (Machackova *et al.*, 2014) draw our attention to the consequences of witnessing cyber-violence. Their study was conducted on a group of 257 school students aged between 11 and 19 (N= 257, age 11-19, average age 16, SD 1.9, 77% girls). The results reveal that in cyber-violence witnesses the level of support for the victim was dropping along with the increased number of attacks and the duration of the process of bullying. The researchers called this phenomenon the specific 'spectator effect'. Protective factors in that situation were empathy, sense of self-confidence and good relations with the victim. Those three factors increased the probability of help being offered to the victim. However, as pointed out by Russel and Brickell (2015) empathy is a specific double-edged tool that not always guarantees offering help to the victim, as due to their sensitivity level emphatic persons may have problems with undertaking actions aimed at getting the perpetrator into trouble. The research of Machackova *et al.* (2014) confirmed that proposition, indicating that the high level of the observer's empathy and the long-term process of violence cause lowering of the perceived attractiveness of the victim and, consequently, leads the observer to dissociate him- or herself from the victim.

Research by Farnicka and Grzegorzewska (2016) aimed at separation of individual traits responsible for the undertaking of aggressive behaviour on the Internet among teenagers, has indicated the significance of attachment type (mother alienation) for the undertaken risk behaviour, both perpetrator-type and victim-type. The differences relate to the type of relationship with parents (secure or unsecure pattern), own experience of being in the victim or aggressor role, and the level of hostility. A separate model of determining factors for indirect type aggressive behaviour was also demonstrated (N=120, age 16-19). In the light of the presented results, the proper diagnostic process seems important in order to differentiate between assumed roles (aggressor/victim) and then apply suitable measures. In the case of indirect-type aggressors the focus should be on coping with hostility, self-control and emotional control skills and working on alternative ways of functioning in the family (particularly in the relationship with mother (R^2= .084, F=5.25, p<.001, beta trust in the relationship with mother (beta = - .21) and mother alienation (beta =.3). It should be mentioned that in the light of those results a person using indirect aggression may not display aggressiveness in any other form (in line with the assumptions made by Gradinger (2014). This may mean that undertaking aggressive behaviour on the net may have a stronger connection with the sense of rejection or unsafe attachment models. It may also point to the use of the 'cold' strategy (e.g. revenge), or acting for fun or out of boredom (cf. Gradinger (2014)).

As for cyber-violence victims, research results find them most often to be victims of other types of violence as well. Therefore, prevention and therapy should take into account various reasons and motives of such behaviour and should concentrate on coping with hostility, self-control and emotional control skills; such persons should work on the ways to function in close interpersonal relations (in the family, particularly in mother relationship).

The results of that research emphasize the significance of relation and attachment bond for undertaking aggressive behaviour aimed at harming somebody (even on the Internet). This stresses the role of socialization and the significance of interpersonal relations.

7. HOW TO COPE WITH NEW CHALLENGES?

In the face of numerous advantages that cyberspace offers and also threats that it poses, some challenges are worth mentioning that may increase the level of individual safety. Users themselves are responsible for their own safety; also, people who organize time for others (parents, teachers, doctors, corporation managers, etc.) are responsible for ensuring the safety of those under their charge.

The awareness of the impact of that developmental context on behaviour should encourage steps aimed at enjoying its advantages with prevention of its negative effects. First of all, this means the recognition of the multi-dimensional aspect of human existence and the necessity to function in numerous relations in many worlds, both digital and traditional. Therefore, individual knowledge and attitudes towards new technology become important. Presented below are some aspects in which online safety level may be increased to tackle such issues as addiction, fear, loneliness, communication and environment organization.

Individual competence should comprise fluency in digital technology usage (particularly in the field of data and content safety) and knowledge of threats such as addiction. At that moment, an individual should recognize and be alert to addiction symptoms, such as preoccupation and over-involvement, thoughts revolving around online activity, lower tolerance to being offline, longer periods of staying online and looking for pretexts to get online, lack of control and negative feelings when network activities need to be interrupted, situations when any attempts to change the activity model (skipping online activity) lead to unrest, irritation, mood changes, sense of emptiness and in consequence the online presence is even longer (relapses – the yo-yo effect). The symptoms listed above decrease individual well-being and may be subjective. However, functional disturbances connected with online presence - such as a real threat of losing one's job, position, or important personal relationship, lack of promotion at school, hiding the actual time spend on the net, using the Internet in order to alleviate negative feeling or run away from real-life problems - should be alarming both for the user himself/herself and for his/her family and friends.

Another effective method, apart from awareness, is the introduction of protective habits in Internet usage, including time limitation (protects against attention deficits and distractedness) and diversification of activities by including physical activity (protection against physical problems such as degenerative conditions of the spine, spine ache, sore eyes, obesity).

Loneliness, anxiety. Research indicates that the development of the sense of coherence and mindful approach to self-development processes are protective factors against disturbances that result from imbalance (Smokowski *et al.*, 2004). Positive bonds and successes connected with own activity also have a preventive function. Social interactions are an example of such gratifying activity. The process of communication between generations is a natural resource and conscious focus is required on building positive experience and relations between those two worlds and modes of functioning through supporting natural ways of communicating or, if necessary, specialist training such as social skills training, assertiveness training, empathy and listening training, etc.

Organizing one's environment – early prevention, primary and secondary. At present, Digital Immigrants are mostly responsible for activities of that type. However, that responsibility will soon be passed on to the first generations of Digital Natives. Persons from that group should be required to 'keep their eyes on the ball' and ensure a proper dose of social training and face-to-face relations for both children and adults. Shaping social skills and personal competences should be a mandatory element in the educational process, and should be verified (for positions connected with group work) and systematically developed in adult life. Without proper shaping of communicative skills and their development we deprive ourselves of tools for solving intra- and interpersonal problems. Also, a proper amount of offline training not only enables intergenerational communication but widens the developmental context, and thus helps us build a stable identity and self-image.

Cyber-violence and cyber-aggression are often manifested as infringement of personal interests, dampening somebody's spirits or lowering his or her position in the group, all that achieved by using communicative techniques on the Internet. Most often such activities involve extortion, imposing something on the victim or

ignoring him/her, depriving the victim of information, ignoring, belittling or exaggerating certain features, behaviour or work results in a given social context. In this aspect, relevant research indicates that protective factors are personal traits such as realistic self-evaluation and the feeling of peace and happiness. There is a slogan in English literature promoting self-improvement: 'stability of mind in unstable times'.

The synthetic activities suggested below may be viewed as measures intended to shape up protective factors by equipping cyberspace users with social competencies, particularly in the sphere of interpersonal communication, constructive conflict solving, assertive protection of one's rights (as a communication technique) and coping with stress, implementation of suitable norms and procedures that will actually prevent cybercrime. Presented below are the descriptions of two different solutions that may serve as the starting point for development of own programmes increasing cyber-safety from the perspective of primary and secondary prevention.

8. THE 'KEEP IT TAME CAMPAIGN

Over the 15-year history of social media, reports about cyber-violence have been pointing to the consequences of that experience for psychological well-being, mental health, educational and social achievements and interpersonal relations. The survey conducted by Spears and Taddeo (2014) among teenage users of the N= 345 platform (ages 13-17) participating in the programme indicates that persons who consider themselves victims of cyber-bullying demonstrated higher levels of fear and depression than their peers and evaluated themselves lower in social relations. What is worth noting, persons with the best mental health, self-evaluation and self-confidence felt that the cyber-bullying problem did not concern them at all.

Campaign Keep It Tame (2012) developed by Barbara Spears aims at changing standpoints through inspiring intentions and provoking to act on the net.

The programme is based on four pillars: right to respect, right to self-acceptance, right to seek help and aspiration to be integrated.

In the first step, project participants are taught how to promote respect on the net. They may take care of themselves by using the icons that signal 'nasty' information or by deleting persons who damage their reputation from the contact list. In the second step, participants have at their disposal icons that cheer up and contain kind messages. Researchers observe the frequency of their use in Internet contacts. Studies carried out after one year and two years after the programme implementation indicate that the number of cases of cyber-bullying and ordinary bullying among participants has dropped, fear and depression decreased, while self-evaluation improved.

9. INSTEAD OF THE CONCLUSIONS

One of the ways to tackle and solve the problems discussed above is offered by the contextual approach. It is worth reminding here that in the contextual approach *developmental environment* and *developmental context* are two different things. Developmental environment comprises all the material and non-material elements that an individual potentially has access to and by which he or she is potentially influenced. The moment when those objects, events or situations enter the psychological reality of the individual, they become the context of his or her individual development (Brzezińska, 2000; Farnicka, 2011; Kowalik, 2015).

Berry (2013) presented the model of analysis of three basic characteristics of individual functioning in a social world. Those are: attitudes of cognitive processes, social competences and goal-directed social activity. Another (older) proposal is the method of systemic description of complex psychological phenomena in the penta-basis approach. Ganzen (1984) proposed that the functioning of a given *psychological object (process)* should be described in relation to the following four dimensions: time, space, energy and information. With the use of that method one can describe interactions of each dimension with the object (process) and the emerging relations structure based on five elements. Approaching the process from the developmental perspective, those elements interact in time with the

object and therefore researchers are able to observe and analyse the character of those interactions (at a given moment in time t, e.g. t1 or t2) or analyse the changes occurring in selected dimensions (e.g. between t1 and t2).

Each *object* has its intrinsic characteristics, which determines its mode of existence in each of the dimensions.

The time dimension may describe the current status of the object and its developmental tendencies. One should remember that time is a multidimensional phenomenon. Various time dimensions are recognized for an individual human being or for a given culture: time may have a biological, historical, or social aspect or serve to differentiate between orientations towards the past, the future, or the present moment. However, time is not only understood as the dimension that describes one aspect of the developmental context (Trempała, 2002). Time is universal unit/measure that we devote to performing something. It is within a given unit of time that one can observe variety vs. constancy and regularity vs. randomness of occurrence of certain phenomena. The way of understanding and the attitude towards the phenomena observed within specific time may be characterized with the use of such dimensions as: flexibility, quick pace of performing tasks, undertaking risks, welcoming change versus conservatism, preservation of law and order, traditions, caution, repeatability.

The space dimension reflects the situation of the 'object' in relation to other objects. This dimension not only points out to physical aspects of space, such as material conditions, locations (of events or tasks) and their specific nature, but also to psychological aspects of space, such as closeness vs. distance to others, openness to new experience or closing one's space, control or lack of control over space, loneliness or the presence of others.

The energy dimension indicates the nature of mutual relations between the 'object' and the environment and other dimensions. Various aspects of that dimension describe energy connected with: involvement vs. apathy (succumbing to the course of events or even inertia), activity vs. passivity, effort or resignation. The way of communicating with other objects is also characteristic for the energy dimension. One can observe that openness and permeability of boundaries may be describe space, but it may also relate to the energy dimension – if that openness or closing, permeability or its lack occurs as a result of actions (energy use) of an individual.

The informative aspect depicts and reflects cognitive orientations and the manner of analysing the environment. That relation line reveals the manner of functioning in reality in the following dimensions: separating – consolidating, looking for similarities – looking for differences, analysis – synthesis, specification – generalization. Those strategies characterize both the ways of organizing and processing information coming from the outside world and from inside a given psychological system and the undertaken and analysed activities. The presented dimensions have already been used for the analysis of various psychological phenomena, such as creativity, needs, personality, mental health, or some complex issues such as the educational system (Rongińska, 2013). Presented below is the systemic analysis of the functioning of Digital Immigrants and Digital Natives as examples of the individual's strategies (and their changes) of actions undertaken in order to best adapt to the changing life environment from pentabase perspective (table 2.).

Below is presented the table with criteria to analyse the way of functioning in the cyberspace. There are based on the pentabase model with the employment of this criterion, the very birth date (time) determines (cyber)space as the development environment and the manner of functioning in it (familiarity, being 'at home' vs. distance, being a guest). Nowadays adolescents use new technologies, but their usage has different energy aspect (proactive vs. reactive approach), information dimension (looking for differences and new things vs. looking for useful patterns and heuristics); the groups also differ in the sense of belonging to certain space and openness to its change. The systemic description of their functioning is presented in Table 2. That diagram was developed to depict the analysis of risk among youth and can be useful tool in describing the way of cyber- and other - activity of youth.

Table-2. Analysis of risks – factors among cyberspace users with the employment of the pentabase method

Energy	Information
• Involvement, pro-activity; Reactivity, following…; • Accepting, receiving; • High energy costs when changes occur - readiness for change; • Low costs of using and experimenting;	• Looking for differences, novelty-seeking; Looking for usefulness; • Looking for experiences, fun, satisfying many needs; • Life environment, analysing details; • Levelling out differences; • Looking for models;
Diagnosed Individual in the specific: Environment (Internet, home, school, work) and time (week, month, day, an hour).	
Time	**Space**
• Since birth, • Adequate speed – being up-to-date and on time – keeping up; • Risk; flexibility; novelty-oriented • Limited – from a certain point in time; • Too fast or trying to catch up with changes; • Order, caution, fixed routines, rigidity	• Familiarized – at home. Open to new things, welcoming change; - Guest: caution, avoiding changes • Proximity; • Social and personal dimension; - Various dimensions – often things that are necessary • Illusion of control; • Distance;

Source: author's own work based on Small and Vorgan (2011) and Rongińska (2013)

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