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8-9 March, 2021

CONFERENCE PROCEEDINGS



Sharing the Passion for Learning

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Distance Education in COVID-19 Times
MOOCs & Open Educational Resources
Blended & Mobile Learning
e-Learning
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DIGITAL TRANSFORMATION OF EDUCATION

Data Science & AI in Education
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INCLUSION & MULTICULTURALITY

Special Educational Needs
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ACTIVE & STUDENT-CENTERED LEARNING

Gamification & Game-based Learning
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Soft Skills Development
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MODEL FOR CYBER ETHICAL AND TRANSPARENCY ISSUES IN EDUCATION: A SHORT OVERVIEW

S. Denchev, T. Trencheva

University of Library Studies and Information Technologies (BULGARIA)

Abstract

Introduction: The characteristic features of the information society (IS) are many and those that most significantly distinguish its virtual nature include abstractions such as independence of distance and location. At the same time, along with the positive nature of the IS, the bad aspects and expressions emerge of an increasingly complete emanation of real life in the virtual, cybernetic dimension. Instances emerge of social polarization and exclusion, new virtual cultures with low and even negative contributions. In this regard, questions arise concerning the ethical behaviour of participants in the cyber dimension of current and future social development.

The purpose of this paper is to contribute to the emerging dialogue on the direction, content, and techniques involved in cyber ethics and transparency education. The principle contributions of this work include a discussion and short overview on the definitions of cyber ethics and transparency, then a description of a multi-level, multi-discipline approach to cyber education with the goal of providing all educated individuals a level of cyber education appropriate for their role in society.

Methodology: The paper opted for an informetrics approach, and more specifically content analysis, to investigate the inter-relationships between computer ethics, internet ethics, cyber ethics and transparency. The data sources for this study included Google Trends, Google Scholar and the Web of Science citation indexes. Different search queries were used, depending on the structure of each data source, to extract the relevant data sets. The research methodology includes also the so-called Architectural Approach, which forms the main contemporary toolbox of modern change. In general terms, Culture of transparency and in particular Cyber ethics, as an emanation of ethics in the virtual cyber space, should also be considered in relation to current social practices. All technological, political, economic, etc. processes that involve a cyber-related component should be evaluated in their ethical aspect with respect to their total positive or negative impact on society.

Originality: The paper offers model for training in Ethics and forming Culture of transparency in a cyber university environment. The value of the paper could include curriculum development of programs dealing with ethical issues that arise when developing and using computers and related technologies.

Conclusion: Cyber ethics, as an emanation of ethics in the virtual cyber space, should also be considered in relation to current social practices. All technological, political, economic, etc. processes that involve a cyber-related component should be evaluated in their ethical aspect with respect to their total positive or negative impact on society. Overall, this paper serves as a call for further discussion, debate, and effort on the topic of cyberethics and transparency in education as well as describing our innovative generative model.

Keywords: Cyber ethics, Culture of Transparency, Curriculum, Higher Education.

1 INTRODUCTION

The development of the Internet has clearly shown the synergy effect of the mix of contemporary information and communication technologies apart from illustrating their huge impact on modern society, which we call today 'information society'. The characteristic features of this information society are numerous but the most outstanding ones include abstractions such as the independence of distance and location. In the virtual world, the size ceases to be such a significant factor, there is an improvement in communications globally, which to the ordinary user takes the form of an information torrent. At the same time, alongside the positive character of information society, during its turbulent development, there appear negative aspects and manifestations of the ever so saturated emanation of real life into the virtual dimension. There are instances of social polarization and exclusion, new virtual cultures emerge with low and even negative level of contribution.

On the basis of contemporary socio-philosophical theories of information and communication activities, the theories of positioning events in time intervals and the theories of social organizations, we could construct a conceptual primary model for information accessibility in the context of: purposeful action in conditions of resource and time deficiency; the evolution of human intellect; the concept of organizational knowledge and culture management. If a thorough contrastive analysis were made not only by researchers, but also by the representatives of different social strata, we would be able to see the basic components of the general conceptual model of information access, formed by social practice and disclosing the basic mechanisms of solving problems and making decisions in the course of social development [1].

Cyberspace is the global space of virtual reality, a parallel world to the physical world. The significance of this cyberspace has grown exponentially over the last three decades. It is present everywhere and at all times, penetrating the physical space with a huge impact on culture, religion and especially in education [2].

Cyber ethics differs from ethics by definition only in that it refers to cyber space with all its peculiarities. Both ethics and cyber ethics should give us orientation as to what is right or wrong, good or bad on the basis of different world views and systems of values, sums of virtues and norms. Cyber ethics can be viewed in the same ethical domains of manifestation that include personal life, social relations, the environment, political, economic and cultural interactions. Applying different information technologies such as artificial intelligence in medicine, social media in social relations, methods for access to databases when organizing and conducting elections, recognition technologies in security, multimedia technologies in the digitization of cultural values have demonstrated this co-relationship. In practice, all real ethic manifestations include a cyber-aspect. Reversely, this means that all technological, political, economic and mostly educational processes that include a cyber-component must be viewed and evaluated in their ethical aspect with regard to their positive or negative impact on society as a whole and on each individual [3].

2 ETHICAL NORMS AND PRINCIPLES IN INFORMATION SOCIETY

The information policy of any country includes authority and governing organs, as well as all non-government objects and subjects, including citizens. This policy should be thought of taking into account the inevitable impact of disseminated information locally and globally. In conditions of total globalization, the information policy should meet the interests of certain subjects or communities, having in mind the fact that these are not only geographical interests but they also intersect with those subjects' interests and spheres of activity on a global scale.

Globethics.net published in 2013 a discussion paper entitled ETHICS IN THE INFORMATION SOCIETY: The Nine 'P's. These values were given in nine major topics of the information society, the Nine 'P's: principles, participation, people, profession, privacy, piracy, protection, power and policy, the ethical problems in education being in almost each and every one of them, namely:

- 1 **Principles of ethical values:** Knowledge societies can be sustainable, coherent, innovative and integrative if they are based not only on pragmatic opportunities or political or financial interests, but on ethical values.
- 2 **Participation:** Access to knowledge for all: Access to information, communication, education and knowledge is a basic right and public good.
- 3 **People:** Community, Identity, Gender, Generation, Education: People, human beings, as senders and receivers are the key actors of information, communication and knowledge. How to filter, digest and assimilate information and knowledge? How to use them for enrichment and not confusion, for identity building and not identity-loss, for respect of diversity and not increase of uniformity, for more equality instead of more inequality?
- 4 **Profession:** Ethics of information professions: Professions in the fields of information, communication and knowledge creation, processing, dissemination, control, renewal, preservation, archiving and policy-making have a special ethical responsibility in implementing core values.
- 5 **Privacy:** Dignity, Data mining, Security: Privacy is a human right, not a commercial concession.
- 6 **Piracy:** Intellectual property, cybercrime: Piracy is an old problem, with a new electronic face.

- 7 **Protection:** Children and young people: Through access to the Internet on computers, smartphones and tablets, young people are connecting with each other and wider society in ways that were previously unimaginable. A generation of children and young people have grown up for whom the digital world is taken for granted. Nevertheless, there are concerns that children, young people and young adults may face specific risks and hazards, including sexual exploitation, a lack of anonymity and potential addiction to online networks.
- 8 **Power:** Economic power of technology, media and consumers: The production, processing, dissemination, control and archiving of information, communication and knowledge need political power to set the legal frame and economic power to provide the necessary investment capital.
- 9 **Policy:** Ethics of regulation and freedom: Parliaments, governments, civil society and educated citizens are needed to ensure that regulatory measures support freedom of expression, freedom of association in information and communication technologies and the right to seek, receive and impart information and ideas through any media and regardless of frontiers [4].

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3 CULTURE OF INFORMATION TRANSPARENCY. CYBER ETHICAL PROBLEMS IN EDUCATION

The information policy in today's information society should consistently be synchronized with the positive trends of global development and lead to fully meeting the information needs of society in all spheres of its activity, leading to a rise in the standard of living and the efficiency of production and consumption, resulting in its socio-political and economic stability.

Drawing from the specific information policies of individual countries and starting from the common ground in them, we could look upon the socio-information environment as a natural conceptual framework for forming and development of information transparency culture, having communicative competence as a key element. An emphasis could be placed here on the new modern technological and communication paradigms that put the information user in the spotlight of events. The other peculiarity of the public information environment is connected with minimizing the gap between information users and its creators [8].

For the effective function of the information environment, the interactions between its various components should be directed towards organization of the usage of the information potential, so that it is of maximum benefit at a given time and particular situation, enabling goal achievement.

In the social information environment, directed towards the formation of information transparency culture, norms define mutually the expected rules, according to which the subjects of a community will perform particular actions in specific situations. This makes individual members or groups of members live up to the legitimate expectations of the community as a whole. On the one hand, this is connected with formulating rules and standards, ensuring the supply and access to socially significant information. On the other hand, this is connected with the creation of a strategy for the formation of information and communication culture of people, ensuring their active participation in social processes [9].

In order to have a positive cyber impact on society, education must constantly adhere to the following three basic ethical recommendations:

- 1 Setting the ethical framework of behavioural values and virtues in cyber-space: freedom, non-violent communication, fairness, equality, sustainability, care and virtues like respect, integrity, transparency, honesty, etc.

- 2 Widening media education from technical skills to compulsory media education for values and virtues at all levels, including higher education and lifelong learning.
- 3 Strengthening the responsibility of individual users of cyber devices, from mobile communication to social media, the Internet in general, including interaction with robots and communication through artificial intelligence.

It is worth noting that knowledge and education on cyber ethics have a direct impact on human behaviour. Ethics education has a positive impact on students, i.e. knowledge of ethics can lead to a reduction in the abuse rate, and the computer science curriculum can be improved by including a module on computer ethics and social responsibility.

We live in an interesting world today with newly-emerging technologies that promise to totally impact the way human activity and enterprise will develop in the course of time. They include new technologies such as Artificial Intelligence, The Internet of Things and Blockchain. These new technologies (Artificial Intelligence, The Internet of Things and Blockchain) pose new challenges regarding the intersection between Cyber law and cyber ethics, which must be addressed in an appropriate way through adequate legislative and legal frameworks and actions in times that follow. No wonder the World Economic Forum's list of the 10 Latest Technologies for 2015 includes those that aim to resolve some ethical debates generated by an earlier generation of technologies, as well as others that will lead to new ethical and regulatory challenges [10].

4 STRUCTURAL AND FUNCTIONAL FRAMES OF THE GENERATIVE MODEL

The emergence of artificial intelligence poses new ethical questions and doubts which should be noted and considered in laws and other legislative norms that regulate cyber space. Should artificial intelligence be allowed to develop beyond the point of outdoing the human brain? Besides, should artificial intelligence be allowed to ethically not give in to human will and instead to take independent course of action that could possibly lead to catastrophic consequences to human society?

The increasing proliferation of robotic systems poses many ethical challenges, from the ethics of research and development of human-robot interactions to the programming of ethics for autonomous systems and the social impact of robotic technology in areas such as self-driving vehicles, the widespread displacement of human labour through automated and autonomous systems. Ethics is an ongoing and dynamic enterprise. When for instance new technologies emerge, there is a laudable concern firstly to 'create' their whole ethical system so as to 'cover them' [11].

Structurally, the proposed model does not differ much from the traditional educational models. In most countries around the world, the majority of school children and university students continue to graduate from educational institutions without learning anything about the connection between digital and critical thinking. However, in addition to tradition, we emphasize our efforts in the field of modern knowledge in information and communication technologies, which are an essential addition to the ability of learners to assess and make decisions and classify information in order to be able to identify themselves as individuals in the real as well as in the digital world.

In the context of the functional framework of the model, we believe that concerning the debate on digitalization in the education sector it should be immediately pointed out that the acquisition and introduction of advanced technologies only in educational institutions will not offer a solution to the more worrying educational problems that prevent the successful participation of these advanced technologies in the digital world. Therefore, in this framework, it's all down to the interaction between education and its natural requirements such as freedom, language ability and personal independence, not technologies themselves [12].

Freedom of education is both a necessity and a consequence, and the same is true of language skills and personal development. This cannot be expected of technological systems, but requires individual responsibility and cooperation. Therefore, it doesn't matter whether one receives knowledge and understanding from digital or analogue (printed) sources. What is required is competent classification and assessment skills. This can happen especially on the basis of one's own knowledge and the resulting local and/or global discourse for their better regeneration.

A major aspect of the model is the need for students to have sufficient freedom to practice critical thinking. To this end, however, existing structures need to be modified in such a way that this critical thinking skill can be applied repeatedly in the learning process and thus improved. In this regard, the

question arises about the content of education and the canon of knowledge, both in the real and in the virtual world [13-16].

5 CONCLUSIONS

Analyzed problems give reason to sum up that acquiring knowledge and skills in the field of Cyber ethic, necessarily requires reaching maximum levels of information literacy, which through information transparency permanently transform into information competency. In conclusion we must point out that digital transformation is not only limited to the technological sphere. It impacts to a great extent the whole virtual and physical essence of the global space around us. Thus, ethical questions and spheres of conflict arise, which have to be solved in the most appropriate manner. Ideally, the first aim is always a critical reflection on 'good life' even in the virtual world. The 'good' in it, however, should always be reviewed, defined and negotiated. Even in the information saturated mix of opinions, this enables the reflected independence of thought and a focus on the understanding, localization, differentiation and eventually the evaluation of changes on the 'new definitions' of 'good' that might be necessary in the process of transformation [17].

All in all, our Conceptual Generative Model for Cyber Ethical and Transparency Issues in Education seeks and finds the interaction between critical thinking, transparency and Cyber ethics. On the one hand, critical thinking requires values derived from ethical principles so that it is not arbitrary, but at the same time ethical principles require critical (over) thinking of real or expected changes. In this respect, even in digital times, people remain bound to participate in solving immediate social problems responsible and behaving ethically: to be curious, to be able to argue and, above all, to think critically about themselves and society.

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REFERENCES

- [1] S. Toleva-Stoimenova, D. Christozov, K. Rasheva-Yordanova, "Introduction of Emerging Technology into Higher Education Curriculum: The Case of Blockchain Technology as Part of Data Science Master Program", *In: Conference Proceedings of the 9th International Conference on Future of Education*, pp. 186-190, 2019
- [2] Ch. Stükelberger, J. N. K. Mugambi (eds.), *Responsible Leadership. Global and Contextual Perspectives*, 2007
- [3] S. Denchev, Alternative university educational models in the knowledge society. In: Contemporary strategies and innovations in the knowledge management, Sofia, Za Bukvite – O Pismeneh, 2014, pp. 55-69
- [4] I. Nicolae, Ch. Stükelberger (eds.), *Mining, Ethics and Sustainability*, 2014
- [5] M. Traykov, M. Trencheva, R. Mavrevski, A. Stoilov, I. Trenchev. Using Partial Differential Equations for Pricing of Goods and Services // *Scientific Annals of Economics and Business*, vol., 63(2), 2016, pp. 291-298.
- [6] S. Denchev. Information technology and challenges To the nation. *Annual of "Informatics" Section Union of Scientists in Bulgaria*, Volume1, pp. 3 – 12, 2008
- [7] E. Zdravkova, "Media literacy as a key competency for the safe and effective use of media", *ICERI19 Proceedings*, pp. 7467-7473, 2019
- [8] W. Dimitrov, "Studying Siem in Higher Education is an Important Task in Training Cyber Security Professionals", *INTED20 Proceedings*. pp. 348-357, 2020
- [9] S. Denchev, T. Trencheva. "Intellectual Property as a Basic Part of the University's Information Literacy", *ICEMS 2016 Proceedings*, DEStech Publications, pp. 74-78, 2016

- [10] W. Dimitrov, "Analysis of the Need for Cyber Security Components in the Study of Advanced Technologies" *INTED20 Proceedings*, pp. 5259-5268, 2020
- [11] E. Savova, T. Varadinova, R. Yotova "Knowledge Institution: the Role of Libraries for Preservation and Socialization of Documentary Cultural Heritage", *EDULEARN18 Proceedings*, pp. 5709-5712, 2018
- [12] E. Tsvetkova, I. Pavlova, K. Aleksandrova. "Universal contemporary information center – conceptual model and role in community building", *EDULEARN18 Proceedings*, pp. 3946-3953, 2018
- [13] T. Kiryakova-Dineva, M. Hadzhipetrova-Lachova, and Y. Chankova. "Intercultural Dialogue For Education In The Mediterranean Region". *EDULEARN17 Proceedings*, pp. 3920-3926, 2017
- [14] D. Stoyanova, E. Savova, I. Peteva, R. Yotova, "Academic Research Projects for Students Support and Motivation in University Information Environment", *ICERI18 Proceedings*, pp. 9706-9709, 2018
- [15] I. Trenchev, R. Mavrevski, M. Traykov, D. Stoykov, "Mathematical approaches for creation of complex 3D models and their application in education", *ICERI19 Proceedings*, pp 4909-4914, 2019
- [16] T. Todorova, I. Peteva, "Information Literacy Competency of LIS students in SULSIT with a Special Focus on Intellectual Property", *ECIL2013*, pp. 610 – 617, XXIV, 2013.
- [17] K. Rasheva-Yordanova, S. Toleva-Stoimenova, B. Nikolova, I. Kostadinova, "Informing and Digital Literacy in Conditions of Digital Divide", *ICERI17 Proceedings*, pp. 6827-6832, 2017