

Language and emotional domains: the environmentally sustainable behaviour of digital youth

Yulia Petrova^{1*}, *Zarema Temirkhanova*², *Gulbariat Saidova*³, *Rashiya Isaeva*², and *Nargilya Gadzhieva*³

¹Rostov State University of Economics, 69, B. Sadovaya Street, Rostov-on-Don, 344002, Russia

²Dagestan State Technical University, 70A, Imam Shamil Street, Makhachkala, 367015, Russia

³Dagestan State University of National Economy, 5, Ataeva Street, Makhachkala, 367008, Russia

Abstract. Revolutionary technological development has been assumed to be the cause and basis of the same revolutionary changes in the modern environmental perception of youth. The purpose of the article is to show the changes in youth's sustainable perspectives on environmental issues via information and communication technologies and the changes in sustainable behaviour. The methodology of this study presents the analysis of related topics and qualitative research based on the online questionnaire. The collection of data helped to show that over 80 per cent of modern digital youth use information and communication technologies to raise their awareness of environmental concerns and their preference for the environmental issues that attract them the most by watching or reading the news online. The model of three variables "awareness – attitude – behaviour", was proposed. This model can be used to explain influencers and modes of action in the emotional domain of environmentally sustainable behaviour among young people. The study of changes in sustainable behavior based on the example of language and emotional domains in the era of information and communication technologies and may supplement existing research. Research may be of interest to philosophers, psychologists, sociologists, linguists and those concerned with the environmental issues.

1 Introduction

People's everyday lives have always embraced language and emotions. These fields of science have changed as humanity has expanded. Digital technologies have modified social interaction and the transmission of information, creating new media and models of communication. Information and communication technologies (ICTs) contribute to satisfying the need for digital communication and obtaining information [1], create the language picture of the virtual world on a global scale, have a significant impact on the emotional domain, where digital communication is an important component of speech that

* Corresponding author: julia-pp@yandex.ru

influences the perception of information and involvement in the real subject of environmental questions for the modern digital youth society. This study has a narrower scope, targeting the problem of scale and direction of social changes in youth's sustainable views on the environmental problems [2] under the influence of ICTs, as well as some important emotional and language tendencies, involved in this process.

The linguistic image of the virtual world at the global level, have a significant impact on the emotional component of youth [3]. ICTs have a major impact on how and what people do, how relate and interact with each other and how do they get information from ICT, and what kind of information is a priority for them today?

The ICT refers both to the various types of communications networks and to the technologies used in them. The Internet is global, so the information issues on the Internet today [4] – developing the global Internet sustainable society combining important emotional and language areas. The global disasters of 2022 affected every sector of our lives, no matter what language people speak, or what emotional attitude they have. People cannot think, communicate and experience emotional distress after such environmental disasters as: floods in India and Nigeria, drought in Uganda and earthquakes in Afghanistan, caused thousands of victims [5]. In 2023, the earthquake in Turkey and Syria resulted in over 3,700 deaths and thousands of injuries [6]. Articles containing information about these environmental catastrophes very often reflect a very high emotional impact.

The ICTs of the 21st century have created a new digital environment, greatly accelerating change. The purpose of the article is to show the evolution of the perception of modern youth which leads to changes in the sustainable perspectives of young people on environmental issues through ICTs. The study consists of two parts. The first part of the research systematizes and summarizes studies that examine social changes under the influence of dynamic parameters made by ICTs, causing changes in environmentally sustainable behaviour among digital youth. The second part presents data from a questionnaire survey conducted to summarize the impact of ICTs, effecting on youth behaviour towards the environmental problems and environmental awareness through ICTs, which provide a wide range of information on various subjects with reference to the emotional domain as a state of feeling and emotional aspect of consciousness that changes young people's interests, perception and behaviour with respect to environmental aspects.

2 Materials and methods

The study analyses the information from 33 sources, including scientific articles, informative articles, dissertations, reports on the related topic and images with open access policy in the public domains. The qualitative part of the study is based on a questionnaire carried out in December 2022 among university undergraduate and graduate students to quantify young people's views about the role and importance of social media platforms. The participants were male and female students of Don State Technical University, aged 18-22 years old. The respondents were informed of the anonymity, the absence of processing of personal data, and the confidentiality of the information derived from the survey and the storage of investigation data for a maximum period of 4 days. The server's questions were framed around a model that assumes respondents use ICTs with people with similar interests.

2.1.1 Selection of students

Students were selected on such subjective criteria as accessibility, typicality, equal representation which meets the general requirements of the study. There was no need for representative selection and a procedure for probability estimation within the scope of the

study. The authors understand that it is impossible to make scientifically based generalization by means of such selection because the properties of such selection do not reflect the properties of the universe of all students, but the survey was conducted to confirm and/or refute the hypothesis put forward in the study that ICTs contribute to satisfying the need for communication and obtaining information, create the language picture of the virtual world on a global scale, have a significant impact on the emotional domain, where communication is an important component of speech that influences the perception of information and involvement in the real subject of environmental questions for the modern digital youth society. To achieve the purpose of the study, the survey was conducted to provide an opportunity for logical conclusion confirming the hypothesis of the study.

2.1.2 Data collection

To collect the data, a URL link to a web page survey questionnaire was sent to the students <https://www.surveymonkey.com/>, via messengers such as: Vkontakte (VK), WhatsApp, Telegram. The total number of students that received a link and invitation to take part in the survey, more than 70% took part, namely 87 respondents. This is a good indicator of student activity, and a sufficient number of questionnaires to work with the hypothesis put forward in the study.

2.1.3 Categorization of responses and percentage content analysis

For better understanding of the collected data, the percentage method was used in the analysis (part of 100%) according to the formula $P = A1 / A2 * 100\%$, where A2 is a constant value – the number of respondents who took part in the questionnaire and answered all the questions in two parts of the questionnaire – 87 students. A2 has a variable value, which depends on one of the respondents' chosen answer options to the question.

3 Results and discussion

Graphs (Figure 1 and Figure 2) based on respondents' responses are given below.

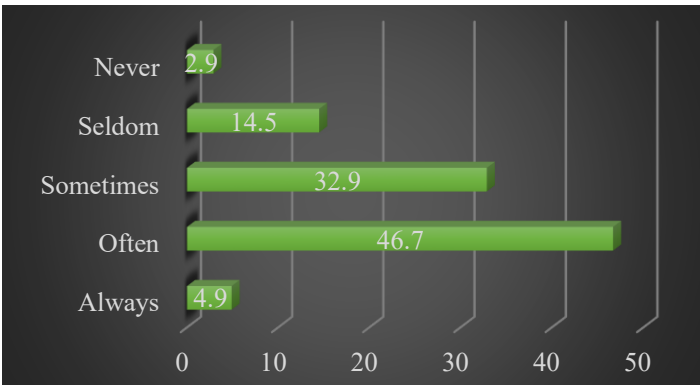


Fig. 1. Question 1. How often do you use ICTs to raise awareness of environmental problems?

Understanding the effects of environmentally sustainable behavior, and the importance of protecting the Earth is essential to raising awareness on environmental issues. Over 80%

of the respondents use ICTs to make them aware of environmental problems. The absence of any temporary, territorial or other restrictions for communication, sharing and getting new information, emotional tendencies provided by ICT is considered important, and helps keep up with the latest news and events.

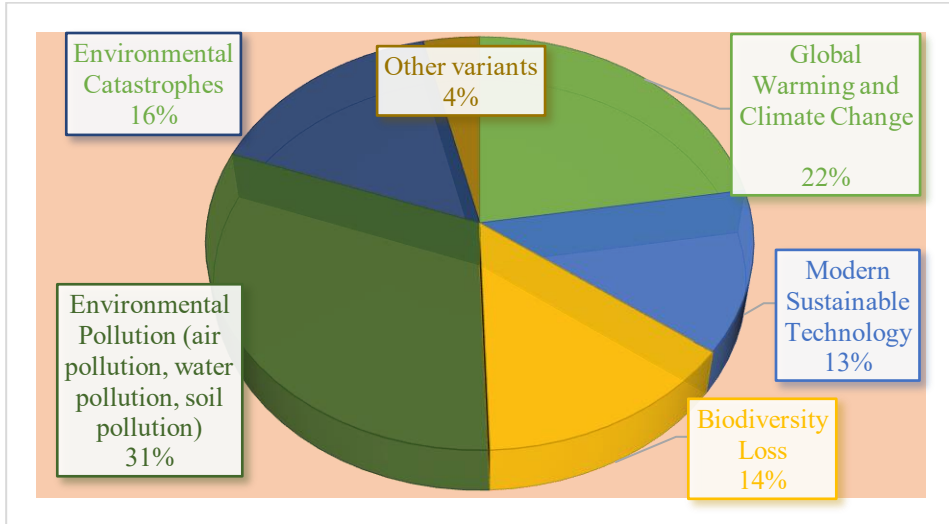


Fig. 2. Question 2. What are the environmental challenges that attract you the most by watching or reading the news in internet?

Top five environmental challenges among youth were distributed. First and second place went to issues related to environmental pollution and global warming. Two other points are urgent environmental issues as biodiversity loss and technology processes related to sustainable innovations [7], equally important are the consequences of environmental problems leading to catastrophes as earthquakes, floods, volcanic eruptions, hurricanes etc. The creation of such digital environment of youth sustainable society provides an opportunity for watching videos, reading actual environment news and research articles, take part or follow broad public discussions of environmental issues, look through reports, and all subjects which highlight the trend of environmental changes on the planet.

In general, technology is a product of a certain time in history and is an integral part of people's lives during that time. Information on different aspects is delivered through ICTs, both verbally and nonverbally through images using meme language [8], reflecting an emotional component, that draws attention to the environmental issues of young people. Society acquires new behavioural models and social norms and as a consequence creates new social structures in digital sustainable society. ICTs significantly accelerate change process. Estimation of the new digital environment of sustainable society, showing that the environmental awareness of ordinary people gives the opportunity and willingness to change minds. The internet gives unprecedented opportunities to expand knowledge across the spectrum of human activity and provides a large-scale information which is an integral part of our lives and is essential to the functioning of all critical sectors of our society. ICT is a transforming form of communication, creating a sustainable virtual global community [9], according to the gravity of the impact of change on environmental issues. An open access policy that extends to websites of statistical data, peer-reviewed scientific journals has enabled the collection of materials, generalize and classify information to study social changes towards the environmental problems, regarding ICTs as well as some important emotional domains and digital communication in new sustainable society.

Challenges and trends discussed in previous studies contributed to the study of determinism which regard technology as an independent force that stimulates social changes [10], transformed forms of communication into social sustainability, created a global virtual community, which is confirmed by a statistical forecast from the Advertising Research Foundation (ARF), according to which the number of social media users is expected to increase to 4.41 billion in 2025 [11].

In recent decades, models of positive youth development have been proposed in the scientific literature, they focus on capacity of individual abilities. These models include external and internal development assets, areas of sustainability, spirituality, engagement and other significant components for improving the quality of life of young people [12].

ICT has become a multidisciplinary field of scientific research in recent decades, with approaches divided into a sociocentric one, focused on quantifying the relationships between people within a given sustainable group, and an egocentric (personal) one, formed by the user or group and the relationships between them [13].

ICTs help create and maintain social relationships between people with common interests or activities, providing opportunities for creating profiles, uploading images and videos, commenting on actions taken by other members of the network or group [14]. Growing concerns about the damage humans are inflicting on Earth have led to widespread awareness of the need to mitigate the planet's ecology through Internet, where modern youth focus on sustainable development's social, and environmental components [15].

From achieving or not achieving the goals of creating a sustainable and healthy planet, the younger generation will benefit or lose the most, as they have more time to live on the Earth, as they should [16]. It explains why they are focusing more on sustainable development that meets the needs of the present without disadvantaging future generations and balances environmental concerns, and social well-being [17].

Emotion identification enables people to understand better the population sentiment toward particular events [18], because emotions are the key factors in decision making of the individual [19]. Communication is a complex issue that can be influenced by many factors, especially emotions [20]. Emotions in the online world are transmitted via speech, both verbal and nonverbal emotional communication in any social context. The communicative value of signalling emotions helps convey information in the right way, provides clues to the nature of interpersonal relationships, and thus provides stimuli for desired behaviour and emotional atmosphere [21]. Changes in the role and importance of the individual, increased activities change behaviour patterns. Eco-activists become facilitators of behavioural change in people. G. Thunberg's speech was "very emotional and science-based," said Alden Meyer, director of strategy at the Union of Concerned Scientists. "If I were a world leader, I'd feel very uncomfortable. But we haven't seen anything from the major national leaders, the G20 players. It's hard to say the summit moved the needle on the emissions curve" [22].

Emotions in the online world are also transmitted through messages, comments, images, tweets, likes and other means, forming an emotional component in social relationships [23]. For instance, one of the most popular way of communication is sharing images, within meme language which replace written and oral words and even whole sentences [24], and memes about environmental issues is a fact of life for today's youth, transforming emotional attitude towards urgent problems and spread through the internet in Figure 3.

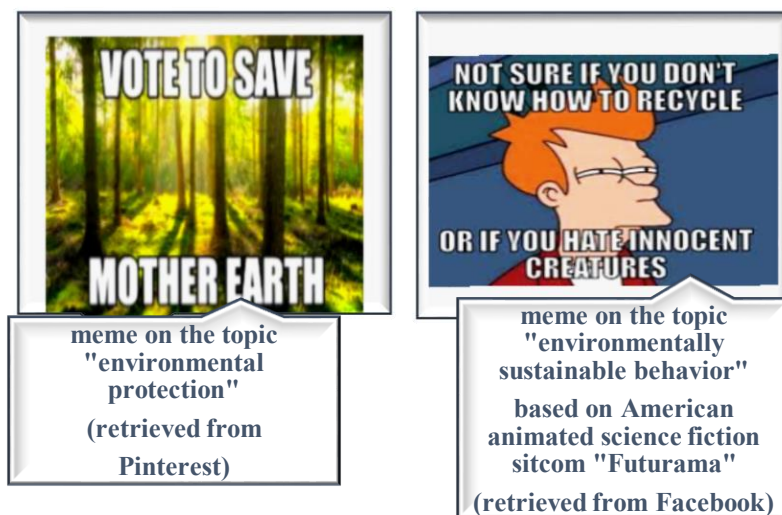


Fig. 3. The example of the language of memes about environmental issues.

The speed and scale of interaction in the online world heighten the emotional experience, keeping in mind the growing dependence on ICTs, research interest extends to gaining a clearer and more detailed understanding of modern digital youth society. The emotions received from virtual communication, the information received, help navigate through complex and dense environmental problems, where information literacy is changing the minds of youth online.

Despite extensive research on the Internet users' behaviour, there are relatively few studies on the environmentally sustainable behaviour of ICT users. The content of information and the speed of information obtained through the Internet are the main factors taken into consideration by practitioners who have already developed digital technologies. However, functionality and convenience in using ICT media are no longer a priority for modern developers. Today, more attention is paid to content as it contains the psychological aspects that influence the emotional environment of the information received by users. In this study, the online survey questions and analysis of related research literature were used to gather data on these influencing factors. Our model has shown that three main factors have a significant impact on the emotional domain, based on environmental issues and youth perception of these problems. These are: 1. raising young people's awareness of environmental issues through digital communication (awareness); 2. the emotional component of environmentally sustainable behaviour (attitude); 3. sustained social initiative focused on reducing energy consumption, using energy efficient light bulbs [25, 26] environmentally friendly housing construction products [27], consumption of recycled products [28], reducing private commercial vehicular traffic, energy use and air pollution via electronic shopping [29], consumption of green products [30] etc. (behaviour).

Such three variables "awareness – attitude – behaviour" in Figure 4 can be proposed. From this model, it can be concluded that the influence of the three variables is strong, as the emotional domain, which relates to the persistent environmental problems on our planet, depends primarily first of all on awareness. Because without awareness of the problem, there is no problem at all. Through digital communication, more than 80 % of the respondents are aware of environmental issues, changing or even transforming attitudes

toward environmental challenges, that cause the following changes in behaviour. The influence of the three variables is important (i.e. very positive or negative depending on the content of the news), the link between lasting awareness and the emotional domain is greatly reinforced, and the impact of internal and external stability on digital communication activity is significantly increased.

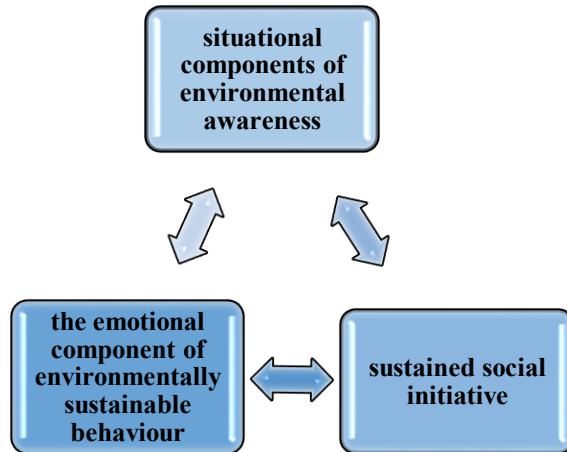


Fig. 4. The model of three variables "awareness – attitude – behaviour".

This model can be used to explain the influencing factors and modes of action in the emotional domain of environmentally sustainable behaviour among youth. Thanks to ICT, the segmentation of social experience is refracted and virtual communication receives a greater impetus through the social exchange of emotions [30]. This strengthening of social trends has a direct impact on digital youth, and make an integral a part of modern digital sustainable society in general. The current trend contributes to the formation of new sustainable communities with similar interests. The study shows the role ITCs in the lives of young people, as well as how they distribute their sustainable perception, through emotional domain and digital communication. The actions of users on the web, the words and images they use, the texts and videos they share, the opinions they express [31-33], determine modern digital sustainable youth society. ICTs contribute to satisfying the need for communication and obtaining information, create the language picture of the virtual world on a global scale, have a significant impact on the emotional field, where communication is an important component of speech that influences the perception of information and involvement in the real subject of environmental questions for the modern digital youth society.

4 Conclusion

Technology has always been a product of a particular historical period and has always been incorporated into people's lives over that period of time. Integrating ICTs shows technological-human synthesis in all aspects of human life, and youth to a greater extent, which has always been and continues to be associated with technology. The key to transforming the environment is the forms and content of life, its institutional sphere, norms, values, mentality and other social aspects. The interest towards young people in the study is explained by the fact that the widespread use of ICTs among young people,

increasingly blur the boundaries of perceived information, which change the perception of modern youth and lead to changes in youth's sustainable views on the environmental problems under the influence ICTs.

Modern life is interwoven with ICT, thus contributing to the transformation of society towards sustainable development. An environmental crisis is first and foremost a crisis of worldview, thought, and consciousness, a crisis of every person placing their priorities above all else. The study of changes in people's sustainable behavior on the example of language and emotional domains in the age of ICT and can be a complement to existing research: new ways of communication, information acquisition, emotional area, digital sustainable society and more. However, the authors express the hope that the environmentally sustainable behaviour under the influence of new digital era can become the additional part for future researchers of this study.

Acknowledgement

This study was conducted among researchers from Rostov-on-Don and Dagestan, Russia. We would like to thank all the editors and reviewers, all the students who participated and helped to conduct the survey. This research did not get any financial support.

Conflict of interest

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication, and redundancy have been completely witnessed by the authors.

References

1. L. van Dam, L. Heijmans, and G. J. Stams, *Child Adolesc. Soc. Work J.* **38**, 149–155 (2021) DOI: <https://doi.org/10.1007/s10560-020-00730-z>
2. D. Isa and I. Himelboim, *Soc. Media + Soc.* **4(1)**, (2018) DOI: <https://doi.org/10.1177/2056305118760807>
3. G. Yue and G. N. Girma, *Concurr. Comput. Pract. Exp.* **31**, e5076 (2019) DOI: <https://doi.org/10.1002/cpe.5076>
4. N. Chopra, *GSTF J Comput* **3**, 48 (2014) DOI: <https://doi.org/10.7603/s40601-013-0048-3>
5. B. Navarre, 10 of the Deadliest Natural Disasters in 2022 Earthquakes and flooding claimed thousands of lives this year, *US News* (2022) <https://www.usnews.com/>
6. The Guardian. Turkey and Syria: at least 3,500 people confirmed dead after major earthquakes with number set to rise – latest updates (2023) <https://www.theguardian.com/>
7. Petrova, Y. *Int. J. Hum. Cap. Urban Manag.* **8(2)**, 291-302 (2023) DOI: 10.22034/IJHCUM.2023.02.10
8. L. Grundlingh. *Soc. Semiot.* 147-168 (2017) DOI: <https://doi.org/10.1080/10350330.2017.1303020>
9. J. Wang et al. *Springer Plus* **5**, 1019 (2016) DOI: <https://doi.org/10.1186/s40064-016-2702-7>

10. Yu. A. Petrova and O. N. Vasichkina, *The impact of the development of information technology tools of communication on digital culture and Internet slang*, in Proceedings of the 5th International Scientific and Practical Conference 2021 “Modern Science: Problems and Development Prospects, SAHD 2021, 31 January, 2021, Omsk, Russia (2021)
11. Statista, Number of social media users 2025 (2021) DOI: <https://www.statista.com/> [Cited 2022 December 14].
12. Qi, S., et al. Appl. Res. Qual. Life **17**, 421–446 (2022) DOI: <https://doi.org/10.1007/s11482-020-09878-3>.
13. A. Janssen et al. BMC Health Serv. Res. **18**, 444 (2018) DOI: <https://doi.org/10.1186/s12913-018-3242-3>
14. M. Diomidous et. al., Acta. Inform. Med.: AIM – J. Soc. Med. Inform. of Bosnia & Herzegovina **24**, 66–68 (2016) DOI: doi.org/10.5455/aim.2016.24.66-68
15. A. Chiabai, D. Rübhelke, L. Maurer, Environ. Dev. Sustain. **15**, 81–100 (2013) DOI: <https://doi.org/10.1007/s10668-012-9376-2>
16. Yu. Petrova, D. Dzhoieva, L. Edilsultanova, *The role of youth leadership in achieving sustainable development, environmental safety*, in Proceedings of the I International Conference on Applied Science and Engineering, ASE-I, 25 June, 2021, Grozny, Russian Federation (2021)
17. G. K. Amoako, Manag. Environ. Qual. **31** (2), 331–347 (2020) DOI: [10.1108/MEQ-09-2019-0187](https://doi.org/10.1108/MEQ-09-2019-0187).
18. I. Moutidis and H. T. P. Williams, Soc. Netw. Anal. Min. **10** (2020) DOI: <https://doi.org/10.1007/s13278-020-00681-4>.
19. J. Luo and R. Yu, Front. Psychol. **6**, 573 (2015) DOI: <https://doi.org/10.3389/fpsyg.2015.00573>
20. A. Gaeta, F. Orciuoli, M. Parente, J. Ambient. Intell. Human. Comput. (2021) DOI: <https://doi.org/10.1007/s12652-021-03483-4>
21. Yu. A. Petrova, Representation of values of youth subculture in the value-sense space of language, The thesis work, Rostov-on-Don, Russian Federation (2012)
22. Full text of Greta Thunberg’s ‘How Dare You’ speech at UN Climate Action Summit 'How dare you,' Greta roared in a speech packed with emotion, by Condé Nast Traveller, 24 September (2019) <https://www.cntraveller.in/story/full-text-greta-thunberg-speech-how-dare-you-un-climate-action-summit/>
23. S. Jin and R. Zafarani, *Emotions in social Networks: distributions, patterns, and models*, in Proceedings of the ACM on Conference on Information and Knowledge Management, 28 September, 2017, Singapore (2017)
24. Yu. Petrova, *Meme language, its impact on digital culture and collective thinking*, in Proceedings of the XIV International Scientific and Practical Conference “State and Prospects for the Development of Agribusiness – Interagromash 2021” 24-26 February, Rostov-on-Don, Russia (2021)
25. C. L. Jensen, *Sharing conventions for energy efficient lighting?* Proceedings in: European Council for an Energy Efficient Economy (ECEEE) 2013 Summer Study Proceedings pp. 2261–2271, (2013) [published as peer-reviewed conference proceeding article]
26. S. Bae, S. Int. Rev. Public. Nonprofit Mark. **18**, 553–571 (2021) DOI: <https://doi.org/10.1007/s12208-021-00285-4>

27. M. Y. Huang, J. Hous. and the Built Environ. (2022) DOI: <https://doi.org/10.1007/s10901-022-10004-y>
28. A. Polyportis, R. Mugge, L. Magnier, Resour. Conserv. Recycl. **186**, 106533 (2022) DOI: <https://doi.org/10.1016/j.resconrec.2022.106533>
29. S. M. Tehrani, A. R. Karbassi, J. Ghoddosi, S. M. Monavvari, S. A. Mirbagheri J. Food, Agric. Environ. **7(3-4)**, 132-137 (2009)
30. T. P. Nguyen, S. Dekhili, S. *What drives green product's consumption in Vietnam? A moderating and mediating effects analysis: An abstract*. In: Krey, N., Rossi, P. (eds) Boundary Blurred: A Seamless Customer Experience in Virtual and Real Spaces. AMSAC 2018. Developments in Marketing Science: Proceedings of the Academy of Marketing Science. Springer, Cham (2018) DOI: https://doi.org/10.1007/978-3-319-99181-8_84
31. B. Rimé, Emot. Rev **12(2)**, 65–78 (2020) DOI: <https://doi.org/10.1177/1754073919876036>
32. W. Oueslati et. al., Concurr. Comput. Pract. Exp. **33**, e5692 (2021) DOI: <https://doi.org/10.1002/cpe.5692>.
33. K. Stsiampkouskaya, et. al., Soc. Media + Soc. **7(3)** (2021) DOI: <https://doi.org/10.1177/20563051211035692>