Digitalization of Education in Arts and Humanities for Sustainable Development

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Abstract: The paper explains the perspectives of education in Arts and Humanities in the digital age in the aspect of leading trends such as economic, political and cultural development of the modern world in accordance with Sustainable Development goals. The literature review lets us state the gap among the number of researches that cover the issue of sustainable development in the field of Arts and Humanities and others include engineering and environmental science. Using a sustainable approach as a methodological tool allowed to shift the point of view from the development of the educational process equipment to the problem of cultural ecology in order to preserve social and cultural values in the digital age, particularly, in online education. The research based on methods of the average rating of students` musical performance records and the value orientations questionnaire. The obtained results demonstrate a high level of creativity criterion in students` performances prepared during the online lessons and the significance of moral, spiritual, and cultural values for students – future music teachers. In conclusions were stated the crucial role of subjects in Arts and Humanities for the cultural ecology as part of the sustainable development movement due to the digitalization of education.

1 INTRODUCTION

Due to the technological progress the digitalization covering all educational system components offering new opportunities for its development. Through the last decades, computer equipment became a fundamental tool of a classroom, and libraries were shifted to the digital format that provides e-sources for any type of educational activity. Moreover, the 2020th year demonstrated the transformation in education in a case of emergency, when traditional face-to-face ways were replaced by online learning. For this reason, teachers from all over the world were gathered new methods for delivering knowledge, organize students` activity and provide assessments of the educational results.

Capturing all educational subject fields, the digitalization spread the Arts and Humanities, where brought new challenges. Despite a wide range of advantages such as the availability of cultural heritage

by the means of e-books, virtual museums, digital collections of arts, online courses, necessary to point to some limits for the educational process implementation. Considering the pivotal role of personal interaction in this field we have to highlight that the discussion in an online environment cannot exactly mimic face-to-face conversation. Successful learning languages or philosophical disputes need another approach for organizing online than in the traditional classrooms.

Besides human capacity needs to be kept during the digitalization in performance arts where digital tools today allow to cover the most part of professional functions include composing of music, performing, critics and others (Bauer, 2014). Such devices as multifunctional working station Korg i3 and BioMuse for reading human`s brain activity, digital musical instruments synthesizing and reproducing sounds are able to replace all types of musician professional activity (Shirieva & Dyganova,

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2020). In such a context, the crucial role takes the issue to figure out the place of personality and human capacity as a significant component of cultural ecology. By comparison it seems to be appropriate to cite the known words of Steve Jobs that "Technology alone is not enough" (Lehrer, 2011) that sound even more meaningful in relation to such fragile and vulnerable phenomena as human culture.

The step toward the cultural ecology was included in the document '2030 Agenda" set by the United Nations General Assembly in 2015 for the purpose to achieve the Sustainable Development Goals. Despite there is no goal in this document, dedicated to culture and integration cultural aspects, there are several points direct references to culture, include:

- Goal 4.7 refers to the fact that all students receive knowledge and skills, necessary to promote sustainable development, in particular by education, recognition of cultural diversity, and the contribution of culture to sustainable development;
- Goal 8.3 aims to promote the development of policies that support development of creativity and innovation;
- Goal 8.9 and 12.b refer to the need to develop and implement strategies development of sustainable tourism, including through local culture, and the need to create monitoring tools in this area;
- Goal 11.4 emphasizes the need for efforts to protect and protect the world cultural and natural heritage.

These points demonstrate the valuable role of culture in the successful realization of the "2030 Agenda" while all of them in total summarize the aspects of cultural ecology as an important component of sustainable development.

2 LITERATURE REVIEW

In order to study the relevance of the Sustainable Development approach in different subject fields, a literature review was provided. Using the Web of Science database and sample strategy: The title includes "Sustainable Development" and the type of publication "article" the data were collected.

The analysis of the data let us stated that the importance of Sustainable Development in the field of Art and Humanities was confirmed by researchers from all over the world by the number of papers which number some less than a thousand. While this number less than in Environmental science or Engineering – the subject fields normally pay more

attention to a sustainable approach, at the same time it is higher than in Psychology or Mathematics (see Figure 1).
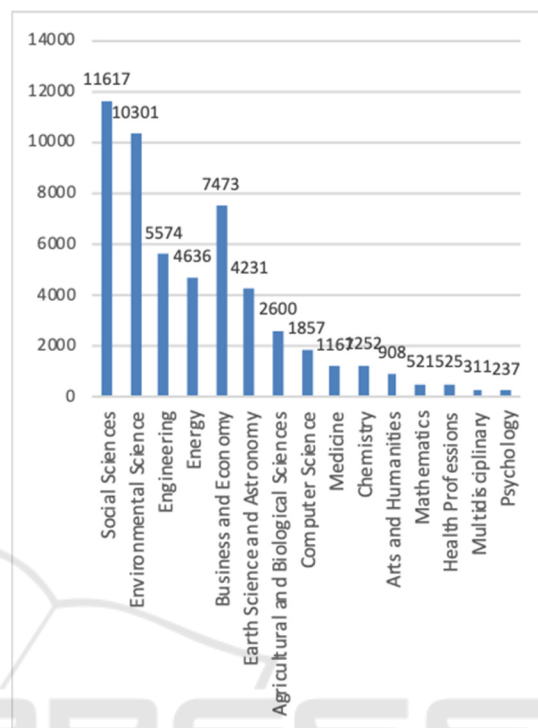

Figure 1: Distribution of articles with the words Sustainable Development in the title indexed in Web of Science

Wide range of aspects in the field of Arts and Humanities were covered by researchers through all over the world.

The term "cultural ecology" was coined by Steward as the way to adapt people culture in the surrounding environment reflecting the harmony between people and nature (Steward, 1955). The definition of cultural ecology was described by Lichachev as the complexity of architecture, literature and arts, language, and all human cultural heritage (Lichachev, 2000). According to his works, the culture was built by humanity, while different levels touch together with nature in the existence. The same topic emphasized by Barkova as an approach in the process of modern art development were the fundamental ideas such as unity and person harmony, nature and culture point the critical strategy towards humans` return to nature (Barkova, 2012).

Modern researchers covered a vide range of ecology issues in relation with culture and art (Karkina et al., 2020). The implementation of the Forest School model based on the interconnectivity between art and ecology offers "outdoor curriculum arts-based environmental education could provide

valuable learning experiences" (Hunter-Doniger, 2020). The inspiration of "Chinese traditional art forms and architectural thoughts, landscape ecology or landsenseology emphasizes the integration of human physical senses, psychological perceptions and sustainable development concept into the regional Ecol-environmental research and planning-construction-management, which is an inheritance and development to ancient Chinese" promotes ecological ideas and sustainable development consciousness (Zhao & Xiao, 2020). Furthermore, based on the connection between sustainability and art researchers explain the significant role of artist and designer in the ecologies issues by taking care of students` creative skills (Tan, 2019).

The relevance of sustainable approach implementation as a valuable trend in culture and arts was found in the field of design due to saving the environment "by improving the health and well-being of people and other living beings and ecosystems" (Yao et al., 2018). Besides, the pivotal role of careful management in the art festivals and tourism moving stated by Quinn in order to promote "the socially sustaining function of festivals and of encouraging sustainable approaches to tourism development" (Quinn, 2006).

Some researchers offer an arts-based approach for promotion sustainability, for instance, as in the British village project by the means of dialogic practices and site-specific theatre established the importance of "context-based meaning finding" that allows engaging "people in place through processes in which communities yield their own, context and time-specific interpretations of sustainable development" (Eernstman & Wals, 2013).

Towards to overcoming violence and preventing terrorism other researchers explore the role of Islamic Museum of Australia and highlight the meaning of arts-based initiatives "as 'soft' and 'non-threatening' tools promote sustainable development, facilitate social inclusion and retain value over time with important policy implications" (Azmat et al., 2017).

Due to reach sustainability in urban ecology by the means of live music researcher figure out "three different dimensions for social value (social capital, public engagement and identity) and three for cultural value (musical creativity, cultural vibrancy and talent development)" (Hoeven & Hitters, 2019).

Some cultural ecology issues demonstrate the value of musical education for Sustainable Development. Bogomolov points the opportunity to transform vibrational characteristics of an ecological system into sound form that would allow to convert them into the "music" of ecological systems as a "new

direction for creative understanding of the state of nature" (Bogomolov et al., 2020). For the purpose to improve the musical education system Li provides a "new theoretical perspectives and practical approach for the reform of preschool music teaching which is also another new exploration and attempt on the theory of ecology in education and curriculum" (Li, 2019).

In the field of piano education "suggest that teachers can adopt the generative teaching method to form the piano teaching ecosystem for teaching objectives", content, ideas and design (Fan, 2019). Follow a "Canadian poet Robert Bringhurst found inspiration for New World Suite No. 3, a complex poem for three voices in four movements, in the natural polyphony of the Earth and in the vast world of polyphonic music" (Serrano, 2019) the researcher noted that the Suite reminds about mandatory moral imperative regulate the dwelling humans on Earth.

Due to the digitalization process progression researchers propose self-training as a basis "to return a view among both to the ecological/environmental field and the artistic/aesthetic field" for musical educators (Gomes & Saheb, 2019). The crucial role for necessary "to redirect culture away from economic prescriptions and to focus on ecological approaches to 'value'" pointed as an important strategy for modern reality (Bailey et al., 2019).

The value approach features using the concept of "art" in Science not less than in Humanities, includes engineering that contains the explanation of it as a "kind of mastery that comes from an intimate familiarity with real circuits, actual devices" (Horowitz & Hill, 2015). This example demonstrates the correlation between two huge fields which is bridged by issues of values carried by arts. In such context, it seems pivotal to offer the purpose of the study to characterize the role of aesthetic values providing by subjects in the Arts and Humanities in order to bridge the gap between humans and the digital environment in order to save the uniqueness of human capacity as a significant component for Sustainable Development.

3 METHODS

The research work was based on the educational process at Kazan Federal University. The data were collected by the means of two methods:

- questionnaire average rating of the students` musical performance works, prepared in online interaction with teachers

- questionnaire on values orientations implemented by the means of Google form (Motkov & Ogneva, 2008)
- statistical methods of median and standard deviation

In the experimental work have taken part 120 students studied in the bachelor program for future music teachers. During the experiment, they learned in an online way due to the case of emergency with COVID19 on the platform Microsoft Teams and using online courses created by authors of the research.

4 ANALYSIS OF RESULTS

The experimental work included students learning in piano class. During the pandemic time, all lessons were shifted to the online way. Students created the records of their performance and sent them to the teacher, after that they received the teacher`s instructions and recommendations for future improvements of musical performance. Students` piano performance works were evaluated on a tenth point scale according to the next criteria: technical level, correspondence to the text, artistic expressiveness, emotionality, creativity. The highest level of each criterion received 10 marks, while the lowest could receive 0 mark. The results of average rating of the students` works presented in the Table 1.

Table 1: Average rating of the students` musical performance works.

Criteria	Number of students	Median	Standard deviation
Technical level		7	0.786630
Correspondence to the text		6	0.819235
Artistic expressiveness	120	8	0.995645
Emotionality		8	1.002178
Creativity		9	0.984232

The analysis was based on statistical methods such as the median, which allowed to count and average points without limitation such as kind or asymmetric of distribution, and standard deviation was used for counting the level of differences between the students` test results. Through the analysis were concluded that the highest level (9 points), students reached in the criterion of creativity. This result corresponds to the research of Pike, when students had been studying to play piano by skype and received any instruction in such a way only (Pike,

2017). During the analysis of this work were established the highest level of creativeness in the performances in comparison with the traditional face-to-face way, because students were free for choosing their body and hand position near the piano. The conclusions of Pike were confirmed in our experimental work, where students felt themselves more free than near a teacher. So, not only in creative criterion, but also in artistic expressiveness and emotionality (8 points). Indeed such criteria as technical level and correspondence to the text reached less points (7 and 6 respectivamente), let us to conclude about necessary, at least, to combine online and face-to-face way in teaching piano. Using the standard deviation method demonstrated no statistically significant differences among obtained data, and proved their appropriate quality.

Another valuable conclusion from of the analysis the performance result was the possibility to teach piano by the means of digital technology, as well as improve human creative capacity which students demonstrated much more successfully in comparison with performance after the face-to-face study process only.

The second stage of the experimental work included ten values that a responded must assess by five scales: in the aspect of the significance and implementation of life values and reasons of their realization, such as external reasons, personal capacity, personal efforts. Questions were followed by five-point Likert scale questions (using strongly agree; agree; neither agree nor disagree; disagree; strongly disagree) exploring respondents' value orientation. For each answer student received a mark from 1 to 5 points according to the Likert scale. The total result of each student could be from 1 to 5. The results of the attitude survey were presented in the Table 2.

Table 2: Questionnaire on students` values orientations.

Criteria	Number of students	Median	Standard deviation
Significance		4.23	1.234151
Implementation		3.78	0.925362
Life values and reasons of their realization	120	3.89	0.884545
Personal capacity		4.45	0.902398
Personal efforts		4.48	0.887262

The analysis of the results demonstrated the significance of different values for students. The lowest level was reached for Live values and reasons

for their realization (3.89) and implementation (3.78) showed less interest of students – future music teachers to external environment than moral and spiritual culture. More points than the previous two were obtained to the next value significance (4.23) which was in the middle. The highest result was obtained for the personal capacity (4.45) and personal efforts (4.48) which demonstrated its pivotal role among students` value orientations.

Using the method of standard deviation demonstrated the minimum diversity between all the students` average results, while all the results were approximately equal or less than 1.

Based on this analysis were concluded that students, who learn music as a professional subject, appreciate social and cultural values more than substantive what correspondent to regular personal features not only musicians, but all persons who studied, teach or doing arts.

5 DISCUSSION

In order to define the role of sustainability in Arts and Humanities were establish a point of view on it as the crucial factor of successful economical growth in the countries where the government supports arts. Hunt noted in his research the role of arts such as "much more than money. It suggests a willingness to learn and a commitment to the long-term. While in economic terms it means sustained success in competition, publicly-funded arts define success as producing something society values" (Hunt & Shaw 2008).

Furthermore, some researchers emphasize social and cultural values as fundamental part of economical growing which principles were stated by Australian Research Institute for Environment and Sustainability include the movement to balance and harmony between human and environment (Drew, 2020).

The digitalization of Arts and Humanities provides modern equipment for fruitful work in some cases changes the point of view on the humans` activity. Using this equipment allow to produce sounds expressing artistic ideas without special skills or musical education. Digital technologies today provide the music-making process as a more quicker and easier, while a person not needs to know the elements working process, but has an opportunity to correct mistakes at any time (Humberstone, 2014). As a matter of this fact using digital musical technologies provides the easiest way to create a musical background for movies, TV shows for which electronic sound is quite enough.

In strict contrast, the implementation through arts the most important function of human capabilities such as creativity needs is shifting its role from applied mean to self-valuable. For this purpose, a person who uses digital devices needs to keep an open mind and critical thinking for using them following the inspiration and inner feeling of harmony (Price, 2013). This way allows to use digital tools for taking care of cultural ecology as a valuable part of sustainable development.

6 CONCLUSIONS

The digital development brings new opportunities to human life challenging some fundamental issues such as creative capacity and its role in the future. In order to establish the proper way to implement new digital equipment in such fields as Arts and Humanities they are needed to be study as a part of global purpose as cultural ecology. This concept points the necessary to reach harmony in human existence in close contact with nature and the urban environment. Study the cultural ecology include figure out the ways for taking care of cultural heritage as well as point its critical role in economy and politics which understand the necessity to keep balance among all parts of the human society include culture.

The sustainable approach to Arts and Humanities as an educational field means to change focus from the applied tasks to the core of the professional activity such as providing social and cultural values in order to translate it to the young generation. The digitalization of this field required the improvement of the ability to keep an open mind and critical thinking about computer technologies and follow the inspiration in using them as a guarantee to keep unique human capacity as the main value for sustainable development.

7 LIMITATIONS

The paper has a limitation such as a comparative data analysis among value orientations among students, who enrolled the bachelor programs in the field of Arts and Humanities and students who studied on any Science program. In order to eliminate this gap, we have a plan to establish in the future experiment, which will combine students, learning different subject fields.

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REFERENCES

Bauer, W.I. (2014). *Music learning today: Digital pedagogy for creating, performing, and responding to music*, Oxford University Press. New York.

Shirieva, N.V., Dyganova E.A. (2020). Music education in the age of transgumanizm. *In World of Science, Pedagogy and Psycology,* 3.
https://mir-nauki.com/PDF/56PDMN320.

Lehrer, J. (2011). *Steve Jobs: "Technology alone is not enough". The New Yorker.* Retrieved from http://www.newyorker.com/news/news-desk/steve-jobs-technology-alone-is-not-enough.

Steward, J.H. (1955). Theory of Culture Change. The Methodology of Multilinear Evolution. *University of Illinois Press*, Urbana.

Lichachev, D.S. (2000). *Russian culture*, Iskusstvo. Moskow.

Barkova, E.V. (2012). Philosophy of culture in ecologoorientirovannoy perspective. *Culture. Science. Integration,* 2.

Karkina S.V, Batyrshina G.I, Valeeva R.A. (2020) A sustainable approach to music education: Towards a cultural ecology in the digital age. *ACM International Conference Proceeding Series.*

Hunter-Doniger, T. (2020). Seeing the forest through the trees: at the intersection of Forest Kindergartens and art-based environmental education. *Journal of Adventure Education and Outdoor Learning*, DOI: 10.1080/14729679.2020.1771388.

Zhao, Y., Xiao, L. (2020). Analysis on the landsense creation of Chinese classical poetry and mountains-and-waters painting based on landsenses ecology. *International Journal of Sustainable Development & World Ecology*, 27:3, 292-296, DOI: 10.1080/13504509.2020.1726835.

Tan, M.K.B., 2019. *Art and Design Education in the Ecology of Care*. In International Journal of Art & Design Education, 38(4), SI.

Galeeva, Z.N., Yao, M.K., Emanova, J.G., Pushkar, T. (2018). Development of sustainable design: directions and problems. *Amazonia Investiga*, 7(15).

Quinn, B., 2006. Problematizing "Festival Tourism": Arts Festivals and Sustainable Development in Ireland. *Journal of Sustainable Tourism*, 14.

Eernstman, N., Wals, A.E.J., (2013). *Locative Meaning-making: An Arts-based Approach to Learning for Sustainable Development*. In Sustainability (Switzerland), 5(4).

Azmat, F., Ferdous, A., Rentschler, R., Winston, E. (2017). Arts-based initiatives in museums: Creating value for sustainable development. *Journal of Business Research*, DOI: 10.1016/j.jbusres.2017.10.016.

Hoeven, A., Hitters, E., (2019). The social and cultural values of live music: Sustaining urban live music ecologies. *CITIES*, 90.

Bogomolov, A., Nevezhin, V., Piskun, E., Khokhlov, V., (2020). Models of Frequency Characteristics of Ecological Systems and their Conversion to Sound Form. *International Conference on Efficient Production and Processing, ICEPP 2020*, Prague, Czech Republic, 27-28 February 2020.

Li, X.B. (2019). Research on Preschool Music Education from the Perspective of Ecology. *EKOLOJI*, 28(107).

Fan, J. (2019). Research on Piano Education from the Perspective of Music Eco-environment Psychology. *EKOLOJI*, 28(107).

Serrano, L.M.M. (2019). Polyphony and ecology: The green world in Robert Bringhurst's New World Suite No. 3. *Journal of Postcolonial Writing*, 55(2).

Gomes, Y.L., Saheb, D. (2019). Teaching the human condition: a reflection on environmental education, music and self-training. *Remea-Revista Electronica do Mestrado em Educacao Ambiental*, 36(2).

Bailey, R., Booth-Kurpnieks, C., Davies, K., Delsante I. (2019). Cultural Ecology and Cultural Critique. *ARTS*, 8(4), DOI: 10.3390/arts8040166.

Horowitz, P., Hill, W. (2015). *The Art of Electronics. Cambridge University Press*. England, 3rd Edition.

Motkov, O.I., Ogneva T.A. (2008). *Methodics of Value orientation,* Prosvesheniye, Moskow.

Pike, P.D. (2017). Improving music teaching and learning through online service: A case study of a synchronous online teaching internship. *International Journal of Music Education,* 35(1).

Hunt, C., Shaw, P. (2008). A Sustainable Arts Sector: What Will it Take? *Platform papers*, 15.

Drew, C. (2020). Education for Sustainable Development, Explained!
https://helpfulprofessor.com/education-for-sustainable-development/.

Humberstone J. (2014). The place of Music in 21st Century Education.
https://www.coursera.org/learn/music-education?

Price, D. (2013). *Open: How we'll work, live and teach from the inside out*, Crux Publishing. London. England.