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Coordinators Foreword

As editors of Studia Universitatis Babeș-Bolyai Digitalia, we are proud to announce the publication of the third issue of Studia Universitatis Babeș-Bolyai Digitalia, the first Romanian academic journal dedicated entirely to the Digital Economy and Humanities research and practice. The main aims of Studia UBB Digitalia are motivating and promoting the research in the interdisciplinary field of Digital Economy and Humanities, especially in Europe, in general, and Romania, in particular. Publishing a new journal on Digital Economy and Humanities is indeed an audacity, given that the field is still seen, after decades of evolution, as an odd hybrid between seemingly incompatible realms of scientific endeavour. Bridging this apparent dichotomy has been the focus of many researchers in the economy, humanities and the computer sciences for the past 50 years, but still the boundaries between the realms exist and grow strong, especially in the institutional practice of universities. Trying to break this barrier proves to be even harder in Romania, where the classification of "traditional" fields of scientific research dictate the distribution of research funds and the evaluation process of research output. Chances are, if an historian publishes an article on his research using computational methods in a journal for computer sciences, that his or her results cannot be "capitalised" in his own field; likewise, computer scientists may see their work in Digital Economy and Humanities not accounted for, if published elsewhere than in well-known CS journals. Digital technologies in economy area have impacted the modern workplace and stimulated the evolution of new forms of management. We are interested how big data and digital technologies are changing how we work and the world we live in. The digital phenomenon is multifaceted and changes the way organizations compete and innovate. It threatens long-lasting business models, and opens up new ways of creating and capturing value. As such, it is not only clearly relevant for management and IT&C practitioners, but also centrally important for management scholars. Digital Humanities and Economy: digital economy is an interdisciplinary field that also uses contributions from digital humanities: big data to understand narratives and plots, methods such as algorithmic analysis of text / videos, advanced visualization techniques, 3-D mapping of texts, digital economy tools for analyzing business and management content, communications, and behavior. The digital humanities sit at the crossroads of computer science and the humanities.

The journal will provide an opportunity for academic and industry professionals to publishing rigorously peer-reviewed research from the various issues and latest research progress in the area related to the smart technology and digital humanities. The topics cover various issues related to digital humanities: network analysis is an essential feature of textual analysis, a social analysis and plays an important role in the allocation of policies and resources innovation management.

Liana Stanca, Christian Schuster si Corina Moldovan Studia UBB Digitalia, Volume 63, No. 1, 2018 We should firstly like to thank the entire team of DigiHUBB – the Transylvania Digital Humanities Centre at the Babeș-Bolyai University Cluj-Napoca for both the last three years since the creation of DigiHUBB, and for the past year of preparation for this first issue of Studia UBB Digitalia. The publication of this first issue is the result of the work of many hands, seen and unseen, and the outcome of a great support from both institutional partners and many enthusiastic people from all around the (mainly European) Digital Humanities community. None of our work would have been possible without the help of the members of our advisory board, of the reviewers, of the authors who joined us into this audacious venture and contributed to this first issue, and without the editorial team of Studia Universitatis Babeș-Bolyai. Thank you all for your commitment, for the opportunity to work together, and for believing in us.

Liana Stanca, Christian Schuster and Corina Moldovan
Editors

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Between myth and stereotype: the method of studying the images of Russia in the visual media culture of Japan

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Abstract: The main sets of symbols of Russia in the visual media culture of Japan are formed in the XX century. This period was saturated with military conflicts and under the conditions of a bipolar political system; reactionary images with noticeable militaristic influence were formed. This study was performed on the materials of visual media culture in Japan, sources such as anime and manga were studied, in which a high concentration of Russian images is observed. During the study of these sources, a complex of several hundred visual and verbal images of Russia was identified, which seems to be a unique phenomenon. Since such an interest in the country-opponent in foreign policy issues is nowhere else observed. The purpose of this study is to identify markers that denote the space of Russian images in individual visual sources and determine their place in the media culture as a whole. Accordingly, the main objective of the study became the development of methods based on approaches of Digital Humanities and Visual Studies. This study allows us to determine the most economically viable images of Russia in the Japanese media industry and makes it possible to use the results of the research in Russia's state image by stimulating Japan's visual media culture sector for representation the most auspicious images.

Keywords: visual studies; manga; intercultural communications; digital technologies

The development of Russian-Japanese relations is an important direction in the political history of Russia. Domestic researchers pay considerable attention to the problems of political and economic contacts of these countries. The relationships between the countries developed in a complex political environment throughout the 20th century, which left an indelible imprint on the development of events at the present stage. Along with this, «gaps» are observed in historiography, especially in the field of studying the perceptions of the culture of the two countries (Yashchenko/ Ященко). Less attention is paid to the construction of the perception of the Russian state in Japan, the interpretation of its cultural landscape and the features of the formation of images of Russia in Japanese society (Popova/ Попова). This study is devoted to the representation of Russia in the visual media culture of Japan. The study of the image of Russia is of interest because the Japanese media culture in a number of cases forms ideas about Russian reality in unique ways.

Media culture is a type of mass culture of the information society, which is a combination of information and communication tools, printed and screen cultures, material and intellectual values (Thomas).

Under the «image of Russia» should understand a set of symbols, images and stereotypes accumulated in the social and historical memory of Japanese society and reflecting ideas about the geographic features of Russia, the relationship between countries, cultural characteristics and the appearance of the «Russian human». The formation of an image is a constant process of accumulating information about an object and the subsequent construction of ideas about it (Nikolaeva/Николаева).

The folding of stereotypes and the rethinking of Russia's cultural images in Japan were influenced by diplomatic relations complicated by a number of military and political conflicts throughout the 20th century (Yashchenko/ Ященко). At the same time, the cultural and historical section of the end of the 20th - beginning of the 21st century - implies the presence in the content of the concept of "the image of Russia" epistemological installations of several eras that succeeded each other over several centuries of development of Russian-Japanese relations.

The military crisis of 1905 for many years complicated the political relations of countries, the Russian society for a long time experienced trauma after the shameful defeat for the big power. Revanchist sentiments in Russia, which took place in the second decade of the 20th century, Japan's aggressive policy in the Asian region adversely affected the political climate between countries. Despite a certain easing in the years of the First World War, it is impossible to give an unambiguous description of this stage, since for Japan during this period the priority direction was Japanese-American relations.

In the future, the crisis of relations occurs during the Second World War, which finally destroys the ties of Japan and Russia for more than fifteen years. Political tension was partially eliminated only in 1956 with the signing of the Soviet-Japanese intergovernmental Declaration, on the basis of which diplomatic contacts were restored. Despite the stabilization of political relations by the end of the 20th century, the outcome of the Second World War, which left a deep imprint on Japan's historical memory, conditioned the tense atmosphere of the development of Soviet-Russian-Japanese relations in a broad sense (Kimura). The inhuman treatment of Japanese prisoners of war and the unresolved territorial issue also had a negative impact (Streltsov/ Стрельцов).

Of particular interest is the inconsistency and ambiguity of relations between Russia and Japa. To date, such an interest is fueled by the growing economic role of the Far Eastern region as a whole, as well as by the expansion of economic and cultural ties with Japan (Alepko/ Алепко). There is no doubt that the mutual relations strategies of these two countries are a unique phenomenon due to the absence of a peace treaty between them since the Second World War. In addition, we should not forget about the long-term territorial conflict with regard to the peninsula of Sakhalin and a number of coastal islands.

In the XX century, the process of forming a political course in Russian-Japanese relations is continuing, but there is no clear prospect (Popova/ Попова). Unambiguous in understanding the overcoming of differences is the need for dialogue with respect to the territorial problem, which today is one of the main stumbling blocks to concluding a peace treaty between countries (Visokov/ Высоков). This requires not only the transformation of the political course of countries, the strengthening of economic ties, but also the understanding of the mechanism of the influence of social attitudes and the political context on the formation and transformation of Russia's cultural stereotypes in Japanese society. In this connection, it seems necessary to conduct a detailed analysis of the Russian and Japanese relations in order to determine the key events that had a significant impact on the formation of ideas about Russia in the modern period in Japan.

Despite the keen interest in Russian-Japanese relations, the problems of intercultural communications and the origin of Russian images in Japanese society have been studied to a much lesser degree. In the Russian academic environment of orientalists, the topic of perception of Russian cultural images in Japanese society remains poorly researched.

Probably, a small study of this problem area is due, first, to the complexity and ambiguity of Russian-Japanese relations, which requires a more detailed and in-depth analysis of certain aspects of political and economic relations; Secondly, the fact that the topic is by definition a borderline, is at the junction of historical science, political science, cultural studies, and even sociology and psychology.

Features of the relationship between Japan and Russia in modern realities seems to be an urgent research issue. The problems of appearance and change of Russian images in the attitude of the Japanese are studied for a long time, attention is paid to the transformation of images, the formation of mutual stereotypes (Iguey/ Игуэ; Sidyakin/ Сидякин).

The products of the visual sector of Japanese media culture have recently become the subject of attention of scientists, manga and anime have become objects of cultural and social studies in the 2000s. In 2009, US scientists began to study the modern printed culture of Japan, however, not in the context of the problems of images, but in order to study the dynamics of the artistic style in comic images (Manovich).

This study is more focused on studying the content of Russian images, constructing intercultural communications between Russia and Japan, as well as analyzing Russian-Japanese political and economic relations, determining the degree of their influence on the appearance, transformation and interpretation of Russia's images. Of undoubted interest are the changes in political, economic and socio-spiritual aspects that are inextricably linked with the processes of transformation of Russian images. And thus, it fits into the mainstream of historical anthropology (Febvre/ Февр). One of the ideologists of historical anthropology, Peter Burke, writes that it is opposed to social history from the point of view of focusing not on quantitative data, but on qualitative data; on smaller groups of people, narrow problematic issues and sometimes focuses on cultural aspects. In his book «What is Cultural History?» P. Burke draws attention to the importance of the cultural aspect in the understanding of modern history and historical anthropology; he writes that the historical science in a broad sense stands on the way to the «cultural history of everything»: emotions, memory, gestures, humor, food and so on (Burke). In historical anthropology, the term «culture» has received a wide interpretation, implying under the cultural phenomenon any human activity: war, as a cultural phenomenon, historical memory, as a cultural phenomenon, etc. (Burke) This approach to the definition of the cultural field allows us to begin to study the narrower issues that are at the junction of several humanities. In addition, the anthropological approach in history draws attention to such aspects as perception, thinking and communication. P. Burke emphasizes that «perception has a history». And thus, it is historical science that should enter this field and, thanks to

a retrospective view, give explanations for events that are taking place today or in the past, but which have an inseparable connection with the historical context. In addition, working with cultural phenomena allows history to develop, introducing into the scientific circulation sources of previously unused, but having a huge information potential. In this study, such a source is the objects of visual media culture in Japan, previously unused in such studies.

The theory of cultural research is based precisely on the search for a historical context and the interrelationships between cultural phenomena and historical events, between everyday life and the practices of mass culture (Barker). Images are constructed in the everyday field, taking into account the interests, needs, desires, values and of course the knowledge of ordinary people about the phenomenon or country (Berger). P. Berger and T. Luckman note that «the reality of everyday life» sometimes has a key influence on the perception of certain objects and events, since consciousness is intentional, then the focus on something (in this case on the images of Russia) presupposes the influence of external factors (Berger). In this way the same image can be interpreted by a specific individual in different ways in 1994 – during the period of aggravation of the situation on the Russian-Japanese borders, in 2005 – diplomatic conflict on the background of the unresolved territorial issue and in 2010 - the expansion of cultural communications and the increase in the number of economic contracts between Russia and Japan.

Based on the above, the research is based on the principles of an interdisciplinary approach, since in order to achieve the goal and objectives a symbiosis of historical science, cultural research and digital technologies is needed, which corresponds to the scientific paradigm of digital humanitaristics (Volodin/ Володин). The digital nature, heterogeneity and large volume of the research base (as will be discussed in more detail below) determined the relevance of the application of a number of methods of digital humanitaristics, as well as the use of appropriate software.

The hypothesis of the study is the assumption that the image of Russia in visual media is conditioned by the state of political relations between Japan and Russia that have a significant influence on the construction of perception of the «Russian» in the Japanese visual media culture and the significance of the historical context in the process of representation of the «Russian space».

The purpose of the study is to study the dynamics of the image of Russia in the visual media culture of Japan and the features of constructing its content, as well as to identify the relationship between image changes and the state of Russian-Japanese relations.

Among the main tasks of the project can be identified: the definition of the main historical and cultural images of Russia in Japan, the identification of their forms and types and economic opportunities of products of the Japanese visual media culture.

The chronological framework covers the period from 1993 to 2005. The choice of 1993 is due to Japan's recognition of Russia as the successor of the USSR (the Tokyo Declaration on Russian-Japanese Relations). The declaration confirmed the question put by Russia in 1991 about the decision of the position of the Kuril Islands (the political course of the Soviet Union did not allow the possibility of such a dialogue). In 2005, the thaw period ends, as relations between countries deteriorate sharply due to Japan's refusal to accept the terms of the 1956 Declaration, and the peace treaty was never concluded.

In the course of the study, images of Russia were studied on the materials of visual media culture of Japan, published in the period from 1993 to 2005. The media sphere of Japan actively uses various images of Russia in the process of content formation, inscribes the Slavic and Russian characters in the plot, demonstrates architectural and cultural objects. And despite the ambiguous state of affairs in foreign policy, interest in the Russian side is definitely growing in the period since the 1990s. Such a high concentration of Russia's images in the media culture really seems to be a unique phenomenon, since no country in the world represents such a broadly Russia in the entertainment industry (Yashchenko/ Ященко).

Media culture in Japan occupies a special place, it is widespread and is included in the everyday life of a significant proportion of the population. The product of the media culture is oriented to different age categories, which allows to cover sufficiently broad masses of the population in the analysis (the age graduation of the product covers the population of Japan from preschool to adulthood). A large proportion of the sources used in the study are targeted to an audience of 12 to 18 years and older, since comics and serials that show the most frequently images of Russia are addressed to the middle and older age groups. In addition, animated films are often included in the curriculum of Japanese secondary schools, an example is the animated picture dedicated to the events of the Second World War «Grave of the Fireflies»[1].

As the main source of information for the study was chosen animation – anime and traditional comics – manga (Manovich). It should be noted that the study does not aim to form an objective picture of the perception of Russia in society. On the contrary, the direct interest is precisely the set of images of Russia in the artistic

[1] Могила светлячков [Hotaru no haka] [Электронный ресурс] URL: https://goo.gl/9hvwrA (Accessed 16 June 2018).

sphere, since such a representation of the country-rival in the animation and literary space is a unique phenomenon. And despite the fact that the media are excluded from sources, the concentration of Russian subjects remains quite high. This causes a special research interest, it is hardly possible to find even one more country with which there would be equally ambiguous relations, but at the same time a high interest in culture and historical events.

Traditional manga comics in Japan are valued not only as a literary work, but also as a visual art. There is a large number of printed products in the style of Japanese graphic novels, which are oriented specifically to the adult audience, often the stories are devoted to topical political issues.

The popularity of comic books also determined the pluralism of the subjects. The study used manga of the following genres:

1. Classical genres of Japanese literature: kodomo, syonen, shyojo, sainen, josei, dobutsu, jambar, jidai-geki, ken-geki, soshimin-geki;
2. Other genres of popular literature: cyberpunk, steampunk, fantasy, science fiction, space opera, apocalyptic, post-apocalyptic, romance, mysticism, comedy, drama, detective, psychological thriller, parapsychology, thriller, horrors, etc.

For the analysis of animated films and serials, the paintings were also selected for the above genres, in view of the fact that the anime is mainly drawn on the basis of manga, classical genres are also relevant to it.

The most popular genres are syonen and shoinze. Shounen is a genre targeted at a male audience aged 12 to 18 years, its share is about 34.8% of the total number of media culture products (Brenner). Shoandze, accordingly, is targeted at the female audience, the annual edition of the Shonji of twelve leading publishing houses of Japan (such as Ciao, Nakayoshi, Ribon, etc.) amounted to more than 3.5 million copies in 2004[2]. And most of the publications are weekly. If you look at general statistics on the main genres of the Japanese comic books, then in the year more than 23 million copies were released only in Japan in 2004-2006. The above statistics apply to comic books, but the animation series are similar, since a large proportion of anime is removed from the manga, but the series are shown on Japanese television, distributed on DVD-discs, their audience is much larger. So, if you look at the data of the Japanese Foreign Trade Organization (JETRO), submitted in 2004, the cost of the anime sector in the Japanese entertainment industry (that is, on the domestic market) was $ 24 billion, and in the foreign market in 2005, the cost anime was 18

[2] Manga Anthology Circulations 2004-2006. [Электронный ресурс] URL: http://www.comipress.com/article/2007/12/26/3040 (Accessed 17 June 2018).

billion dollars[3]. For example, only in the United States in 2005 the sales of anime amounted to 5.2 billion dollars. For comparison, in aggregate for 2005, only the implementation of Japanese animation products in the domestic and foreign markets brings in at least $ 40 billion, which is about 3.5-4% of Japan's GDP[4]. Thus, the selected sources are interesting from the point of view of popularity, demand in Japanese society (см. Приложение 1).

The source of the research consists of a sample of Japan's visual media culture, which includes animated series and films (anime), as well as traditional comics (manga). In the course of the study, about 350 sources were analyzed and a sample of 130 sources was formed, in which images of Russia are presented. These sources were first introduced into scientific circulation, since they were not used before in Russia and abroad for historical or historical-cultural and political studies. The early analysis of the Japanese comic books was mainly conducted from the point of view of art and linguistic problems.

One of the difficulties in working with these types of sources is a large amount of information that can not be involved in the study. Series mainly consist of several seasons (from 2 to 4), each of which from 12 to 24 series lasting from 20 to 30 minutes. Often the image of Russia is represented only in some episodes of the season.

In the case of comics, the main problem is that they are published in black and white and it is impossible to single out, for example, the characteristics of the appearance of the Russian character. But comparative analysis of the manga with the animated product can help here, since the scenarios of most serials are based on comic books and thus partial verification of visual information in the same products of media culture is possible.

To organize the sources, a database was created, consisting of 14 tables; at the moment it contains over nine thousand records in total and about five thousand entries related to Japan's visual media culture. In the future, the database will be replenished.

The main tables of the database contain information about media culture objects, the maximum possible full characterization of the characters in the paintings in question (anthropometric data, a description of the nature, type of activity, key biographical events, etc.), historical and architectural objects and objects containing references to Russian culture.

[3] Scanning the Media.Japanese Anime – Within Sight of a 10 Trillion Yen Global Markets. [Электронный ресурс] URL:https://web.archive.org/web/20050310035337/www.jmrlsi.co.jp/english/inthemedia/scan/2005/01.html (Accessed 17 June 2018).

[4] Japan GDP – Gross Domestic Product. [Электронный ресурс] URL: https://countryeconomy.com/gdp/japan?year=2005 (Accessed 16 June 2018).

Russia's reception in the visual media culture of Japan (animated films, animated series and comics) is multifaceted, reflects the historical context of the development of Soviet-Japanese and Russian-Japanese relations, demonstrates ideas about the personality and appearance of a Russian. Studying this source, you can track what changes the ideas of Russia have undergone in time or in connection with various events, how various historical events were demonstrated and the most popular images were revealed.

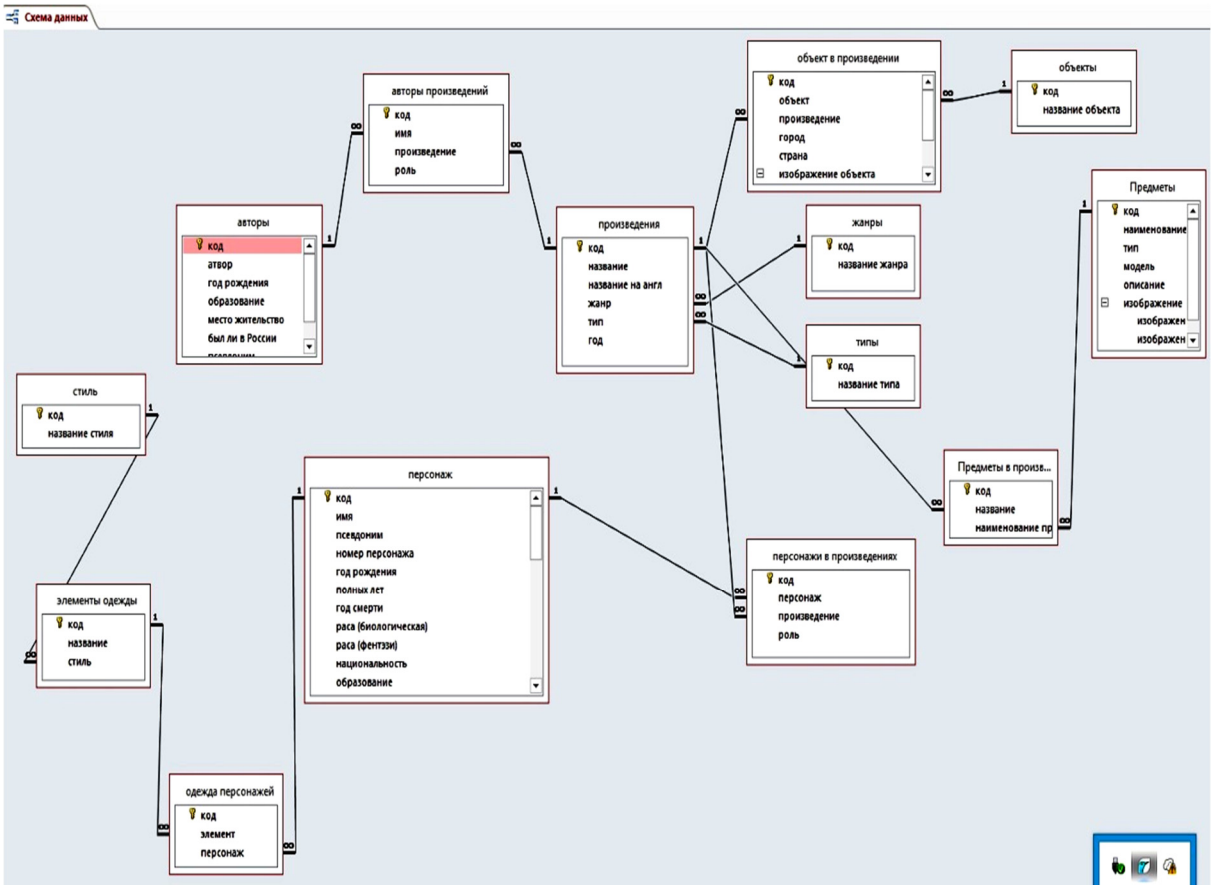

Fig. 1. Database schema «Images of Russia in the media culture of Japan»

In the course of the study, militaristic tendencies of the representation of Russia in the 1990s were revealed. With a deeper analysis of the sources, it was possible to establish that these or other images of war take their origins in the historical context of the development of Russian history and Soviet-Japanese relations.

In the light of the humanization of society, the change in the strategy of international relations, militarism acquires a more negative semantic coloring (Rusakova/ Русакова) and today such an image of the state can not be called

neutral, since the saturation of the space of «Russianness» with weapons and military uniforms causes corresponding negative connotations not only in Japan but also beyond it, since this sector of media culture is very popular in the countries of Asia, Europe and Of America (Cooper-Chen).

For example, only North American countries accounted for more than 10 million manga readers at the beginning of the 2000s., not counting the audience of viewers of animated films and serials. No less popular products of Japan's visual media culture have become in Europe (Yomota/ Ёмота). Such popularity makes the chosen source more relevant, since the features of the representation of the image of Russia in the Japanese media culture are broadcast to many other countries and form the corresponding representations.

The analysis of the source base made it possible to reveal interest in Russia not only in the form of the representation of stereotyped images, such as the Moscow Kremlin, Basil's Cathedral of the Blessed One, but also the appeal to more complex images. The historical motives in a number of Japan's visual media culture facilities prompted the need to carefully study the historical context of Soviet-Russian-Japanese relations, since this would allow us to more deeply consider the origins of various representations of Russia and identify key historical events that left a notable mark on historical memory Japanese society, which is not even visible today.

Among such events, mention should be made of the Second World War, in particular the conclusion of a neutrality pact between the USSR and Japan in April 1941 (Rees). The document allowed Japan to strengthen its alliance with Germany (Rees). The document was ratified on April 25, 1941. According to the terms of the pact, it was concluded for five years and entered into force from the moment of ratification[5]. Thus, the treaty acted from April 25, 1941 to April 25, 1946, according to article 3 of the Neutrality Pact: «If none of the contracting parties denounce the pact a year before the expiration of the period, it will be automatically extended for the next five years».

It was the events of 1945 that marked the beginning of historical battles that broke out in the historiography of Japan and Russia in the post-war period and are still continuing today. The position of many Japanese politicians and scholars regarding the USSR's entry into the war with Japan is such that the Soviet Union is recognized as an aggressor who supported the idea of the allies only with the goal of territorial increments. It should be noted that the rhetoric from time to time is very sharp even in the academic environment, so you can encounter such formulations as «the

[5] Договор нейтралитета между Союзом Советских Социалистических Республик и Японией, от 13 апреля 1941 года. [Электронный ресурс]
URL: http://hrono.ru/dokum/194_dok/19410413jap.php (Accessed 7 May 2018).

Russians treacherously violated the neutrality pact», the availability of this document allows Japan to put even modern Russia at a disadvantage and accordingly form a negative image of the Russian state in Japanese society (Vorobyeva/ Воробьева).

It is precisely the violation of the terms of the neutrality pact of 1941 that strengthens the corresponding view of the USSR, in cases where the rhetoric of Japanese scientists and diplomats remains consistent, the issue of the violation of the pact by the Soviet side. At the same time, by the 1990s, the mention of such facts does not sound in an accusatory tone, but is only given as collateral events. It is difficult to give an unambiguous assessment of such tendencies, but noting that Russian historiography looks at the problem of the violation of international agreements regarding Japan of this period (Slavinsky/ Славинский), it should be noted that on April 25, 1945 the Soviet Union, in the person of V.M. Molotov, at a meeting with Japanese Ambassador N. Sato, signed the denunciation of the neutrality pact of 1941. In fact, the pact was not annulled and formally retained its actions until April 1946.[6]

One of the popular justifications for violations of the USSR in article 3 of the neutrality pact of 1941 was, as dictated by the United States, the accusation of Japan atrocities in Pearl Harbor. As a consequence, the Tokyo Court of 1945 considered that the Japanese had to suffer the appropriate punishment. Thus, the outcome of the court session demonstrates a prejudiced decision of the «victors against the vanquished» (Slavinsky). The Soviet Union uses the argument that Japan, being an ally of Nazi Germany, which entered the war with the USSR, becomes an indirect participant in the war with Soviet Russia. However, the issue of political relations between the Soviet Union and Germany during the Second World War is clearly ignored, although those counterarguments that are addressed to Japan can be fully addressed to the USSR, since its plans did not originally include support for Western Europe.

The actions of the Soviet Union are subjected to Japanese criticism and for other reasons, for example, the Soviet leadership is accused of attacking the country that surrendered. For example, Chairman of the National Security Research Council Ichiro Suezugu notes that despite the signed surrender act of September 2, 1945, the imperial rescript to the Japanese Armed Forces was announced at noon on August 15, 1945, the troops retreated, but the Soviet army on East under the command of Commander-in-Chief A.M. Vasilevsky went on the offensive against the Northern Kurils. Thus, from the position of Japanese scientists and politicians of the USSR not only violated the terms of the neutrality pact of 1941, but also attacked the capitulating country.

[6] Soviet denunciation of pact with Japan (The Department of State Bulletin, Vol. XII, No. 305, April 29, 1945). [Электронный ресурс] URL: http://www.jewishvirtuallibrary.org/ussr-declaration-of-war-on-japan-august-1945 (Accessed 4 June 2018).

The events of the Soviet invasion at the end of the Second World War largely predetermined the tendencies of the representation of Russia in Japanese society, which can be observed even in the 2000s. Rethinking Japan's role in Nazi aggression made it possible to criticize the actions of the USSR in 1945 and the territorial results of the conflict. The theme of the Second World War is widely represented in the visual media culture of Japan, in particular, the image of the USSR and the Soviet soldier. It is clearly impossible to assess the representation of the Soviet side in this context, it is not applicable to the gradation «positive» or «negative» each image represents a borderline phenomenon, where one can find echoes of both positive and negative meanings. As mentioned in the introduction, this study requires attention to the historical and cultural details of Japan, which correlates with the ideas of the New Cultural History (Darnton/ Дарнтон). Since it is impossible to look at such images from the standpoint of Russian reality, on the contrary, it is necessary to realize as precisely as possible the prerequisites for the appearance of a particular image and the conditions for its interpretation.

Taking into account the fact that in Japanese society the idea of the «historical fault of the USSR» regarding the above events is preserved, as described in his research by TA. Vorobyeva (Vorobyeva/ Воробьева), it becomes clear why the theme of the Second World War is popular even in modern media culture in Japan. For Japan, it became the same historical memory as it became for Germany and Russia (Assman/ Ассман).

Soviet historiography for a long time was built in accordance with the contextual framework of the political regime and did not recognize the violation of the conditions of the neutrality pact for the actions of the USSR, it would be more correct to say that this question was flexibly avoided. One of the first domestic researchers who violated the traditional interpretation of Japan's aggressive foreign policy was B. Slavinsky, who questioned in principle the ownership of the Southern Kuriles of Russia. However, he met with serious criticism in academic circles (Slavinsky).

In the media culture of Japan, reflections and little-known events were found. For example, the image of the Gulag was relevant for the visual media culture of Japan, and the prominence of this topic is connected with the massive release of memoirs of interned Japanese prisoners of war. Hence modern Japanese society knows about the Gulag system in the USSR, knows about the conditions in which their relatives and fellow citizens found themselves. Therefore, seemingly unobvious image has deep roots in the historical context of Japan. Such a discovery is very important, because it simultaneously demonstrates the importance of objects of visual media culture as a historical source for studying the features of representations and reflects the depth of the rethinking of historical events in Japanese popular culture.

Fig. 2. The image of the Soviet military and Russia during the Second World War

In this regard, it is important to note that a significant share of the economy is built around the entertainment industry, which is due to the high popularity of this type of product. According to expert estimates, more than 95% of Japan's population read manga comics, the percentage ratio with anime differs slightly. Only in Japan, the circulation of popular youth magazines Shonen Jump and Shonen Magazine ranges from 1.5 to 3 million copies. These magazines are issued monthly and have foreign affiliates and Internet versions, so the relevance of this source in the context of the Japanese society does not cause doubts. In addition, directly manga is a major branch of Japanese book publishing and in 2009 the turnover was more than 420 billion yen. Thus, the process of demilitarization of the image, which began in the early 2000s, is really important because it constructs a more neutral view of Russia in the modern society of Japan and is conditioned, first of all, by the process of demilitarization of the image of Russia in Japanese society.

Turning to the analysis of images in the visual media culture, it should be noted that the fact that there is a large amount of snow in the location, presented in animated films and serials or comics, as a rule, already appeals to Russia and is used to mark the Russian space. But on the question of whether there can be snow only in the Russian way, there is a definite answer - no. Such an assumption would be erroneous, if only from the point of view of the uniqueness of these weather conditions, careful

attention to detail in the frame is necessary in order to avoid working with «false images». Only a combination of these or other markers concludes that it is precisely the space of «Russianness» that is convincing.

For the analysis of images, descriptive statistics and content analysis methods were used. A three-dimensional description of visual and verbal images was developed for the study. Analysis of the visual component of the image, analysis of the semantic content of the image, analysis of the contextual information:

1. analysis of the visual component involves fixing the whole image presented in the objects of visual media culture;

2. content analysis provides for the identification of key words describing the image, as well as historical and cultural components of a particular unit of images;

3. analysis of contextual information implies the search and study of additional information about an image that is not part of a particular image.

This approach to the analysis of images is caused by interest in the history of Russia in animated products and comics, often it manifests itself in the use of architectural images.

Weather conditions are just one of a few examples, at this stage of the study, about 10 major groups of images were identified (for example, the group «nature» includes such images as snow, pine, birch, etc.). Thus, if you meet a snow-covered landscape and wooden structures in the animation (based on a selection of sources), this will often be correlated with Russian images. As a rule, they are accompanied by various markers, which reveal to the uninitiated this stereotype (posters, Cyrillic script, achievements of culture, etc.).

If a large proportion of images can be characterized as «frequency», then some are close to «unique» and seem most interesting. Among them is the image of the Gulag, demonstrated in several animated series. At the first acquaintance the question arises about the origin of the image, it would seem, with a high concentration of Russian weapons and architectural objectives, everything is more or less clear, but how to explain the appearance of the camp? The history of the origin of the image turned out to be deeper than one might have imagined before acquaintance with the historical events of the second half of the 20th century. In the aftermath of the Second World War in 1945, tens of thousands of Japanese prisoners of war were found on the territory of the Soviet Union, who were sent to Siberia camps for a long time. The conditions in which the prisoners were found did not differ from the standard conditions of the Gulag because they were sent to ordinary general areas where repressed Russians and criminals were held.

Fig. 3. Demonstration of the image of the Gulag in visual medicine of Japan

Not only the memoirs of the military returned to their homeland left such a deep trace in the historical memory of modern Japan, it is worth noting that in the second half of the 20th century, many Japanese citizens tried to come to the USSR to find family members or visit the graves of relatives, however, even after signing the Moscow Declaration of 1956, such actions were prohibited for the Japanese. Obviously, such measures were taken by the Soviet side with a view to concealing the scale of the deaths of prisoners of war and the problem of violation of their rights.

Within the framework of the study, images of Russian characters were also studied. For the analysis of Russian characters, a method was developed that was based on identifying key words describing character and behavioral standards of the character, external physiological characteristics on the basis of which the content analysis of text data and images was conducted. The relationship between external data, personality characteristics, sphere of activity and nationality of the character was established.

The screenshot shows the frequency of occurrence of certain characteristics of Russian characters. This way of visualization is intuitively understandable and allows you to get acquainted with the results of the analysis in a simple manner. If you pay attention to the thickness of the edges, then stand out such characteristics as «blond» and «blue». In the questionnaires of characters, the second characteristic was assigned to the color of the eyes and accordingly on this screenshot one can see the main trends in the image of the Russian character: a blond with blue eyes.

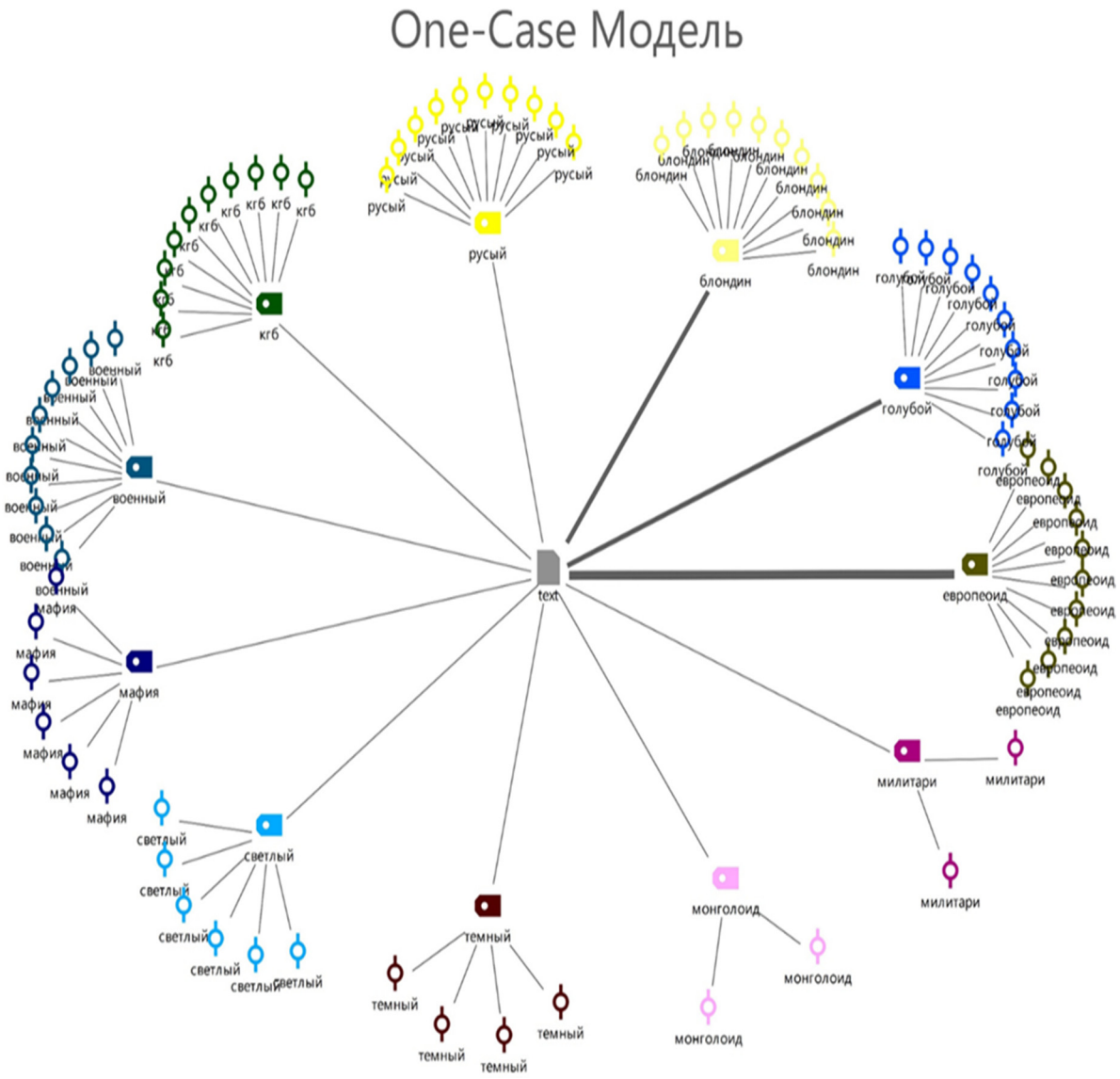

Fig. 4. Visualization of the results of content analysis of sources for the characteristics of Russian characters

The characteristics of the appearance and personal qualities of Russian characters, their activities, etc. were singled out, after which the sources were analyzed to identify the most common characteristics that are presented on the map. So, the color of the eyes prevails blue, the color of the hair is mostly blond and fair-haired.

The Russian character is endowed with a number of special traits of character and a fairly typed psycho-behavioral cliche, but in the guise there is always some militancy. It may not carry a threat to society, the character may not be military, but will have a certain character trait. For example, almost all characters have either a pronounced or

mediocre expression of such quality as duty. In the interpretation of this characteristic it is worthwhile to go deeper into the traditional culture of Japan and turn to the development of Russian-Japanese relations. First, Japan was one of the militaristic countries for a long period, and secondly, it pursued a rather aggressive foreign policy aimed at creating the image of a strong state in the international political arena and, thirdly, speaking of Russian-Japanese relations, it is always about territorial conflict, complicated by a number of armed clashes on the border. These aspects make it possible to understand that Japanese traditions are close to state trends and military subjects, and the earlier history of the Japanese empire is permeated with the feats of samurai and internecine wars, at this level the concept of duty has been strengthened in a significant way in the soil of traditional culture and has acquired exceptionally positive characteristics, character with this quality, the completely explainable goal is pursued to betray, first, the ideal traits of a soldier from the point of view of the Japanese tradition, and, secondly, to emphasize feature of the nation. Mostly, the «sense of duty», of course, correlates with the military, however, this has to do with athletes, art people, scientists, doctors, etc.

Considering the personality characteristics, the most frequently mentioned characteristics were highlighted: a sense of duty, pride, stubbornness, and prudence. However, they do not have strong negative connotations. In principle, such evaluative judgments seem to be erroneous, since the adaptation of the characteristics from the point of view of the modern person from Russia will be unrepresentative with respect to reality, which the Japanese director models for the Japanese audience, first of all.

In the period from 1993 to 1995, in the works the strongest militarization of the country is represented. In these years, Russian-Japanese relations are based on the principle of «tug-of-war», in the struggle for legitimizing rights to the Kuril Islands. Japan conducts a military and political provocation until 1994. In response, Russia withdraws troops to coastal areas. So, within the studied period, we observe the presence of contacts of Japanese society only with militarized Russia, which is reflected in the perception of the state as a whole. For this period, the largest ratio of military to civilian among the Russian characters. But in 1994 in Japan there is a strong earthquake, and Russia sends a humanitarian mission. Since 1994, the number of animated pictures has grown significantly and a new image is emerging - the image of a scientist, a doctor, more often turns to the idea of sacrifice, a duty. The growth of paintings in the period from 1995 to 2000 is associated with the expansion of «hot contacts» between states.

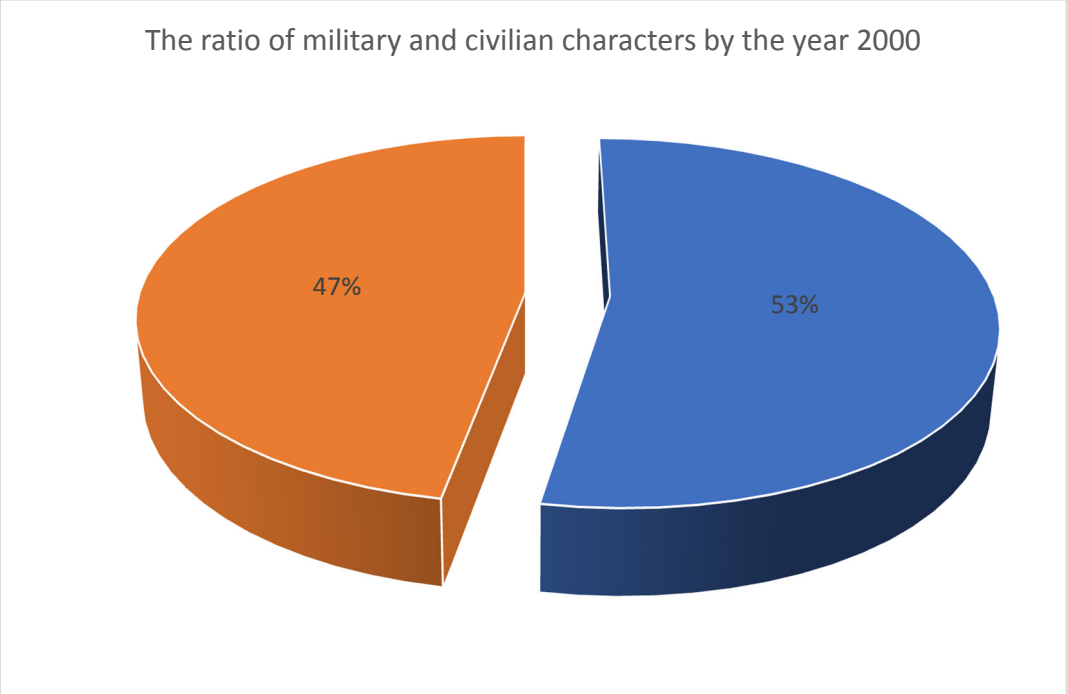

Fig.5. The ratio of military and civilian characters by the year 2000: 47% - ratio charters; 53% - military charters

The number of paintings with Russian characters is also growing, the peak is at the end of 2003 - the beginning of 2004 (about 50 works). And by 2005 it is again falling against the background of aggravated political disagreements.

Tendencies of militarization of the image of Russia, with further study of the chosen period, decreased significantly by 2005. But the process of demilitarization does not occur due to the reduction of the representation of military characters or the reduction of the number of weapons, but thanks to the pluralism of civil images. The professional representation of Russian characters has expanded, statistics have shown that the number of military characters is declining after 2000. It can be assumed that for the Japanese of the generations of the Cold War, Russia is associated with the military sphere, but at the present stage the level of militarization is declining due to the expansion of intercultural communications and economic relations, significantly increased mobility of the population of countries. Throughout the period there has been a positive dynamic of the image of Russia, the number of military characters has decreased by an average of 30% (if in the 1990s, about 50% of all military characters, then by 2005 less than 20%).

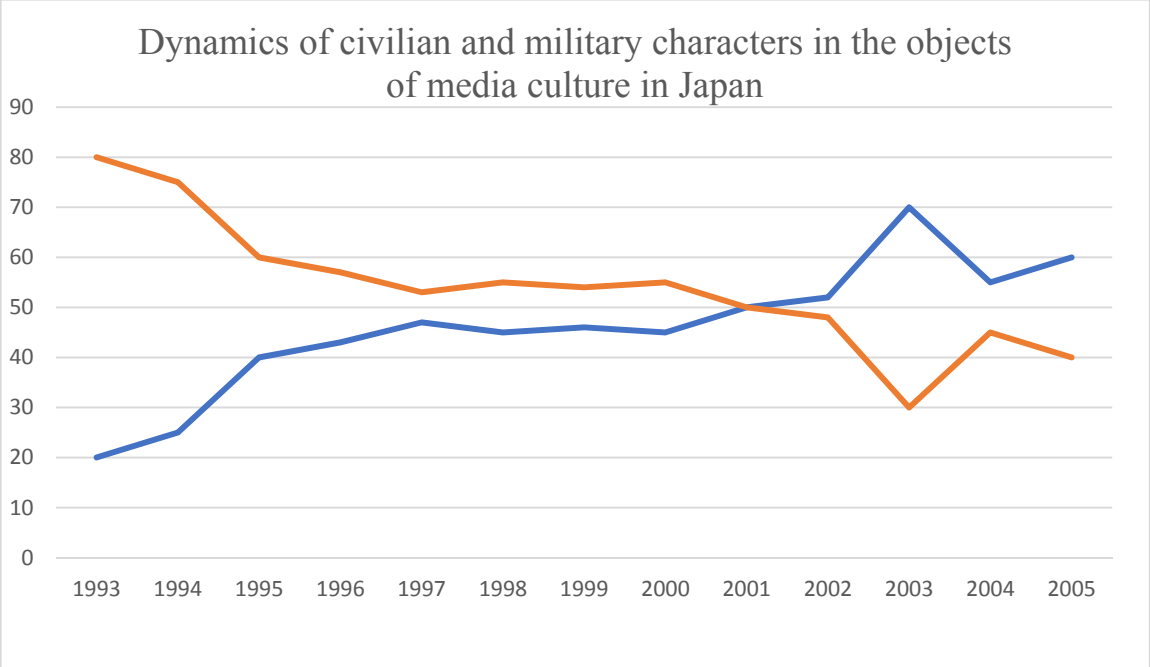

Fig. 6. Dynamics of civilian and military characters in the objects of media culture in Japan. The blue graph reflects the dynamics of civilian characters, yellow, respectively, military characters

Quite often the plots of Japan's media culture products appeal to historical events and personalities of Russia. Particularly often refer to the events of the 1917 revolution and to historical personalities who manifested themselves in that period. Most often there are references to the house of the Romanovs, there is a great interest and even sympathy for the personality of Nicholas II.

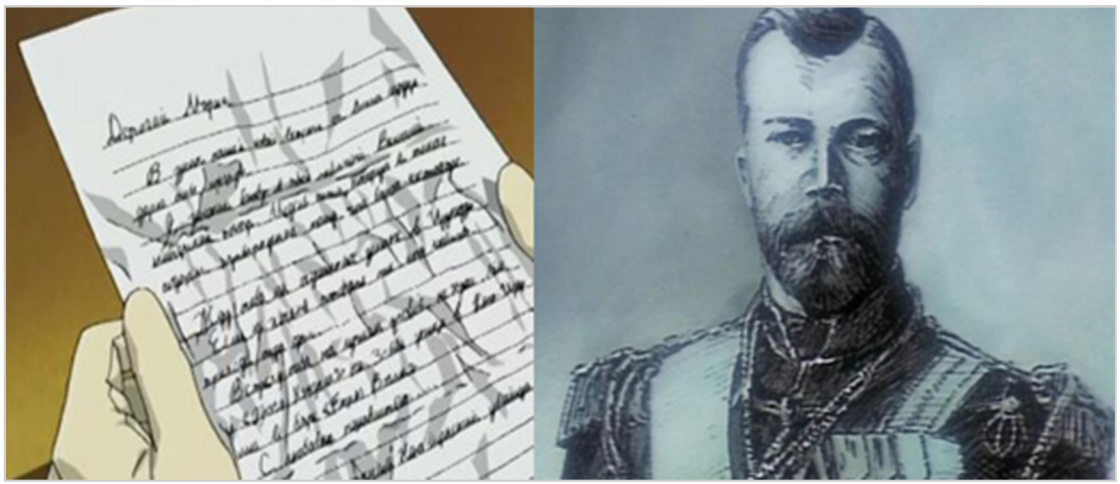

Fig. 7. Demonstration of images of Russia in the media culture of Japan

In this connection, it is usual to recall GE. Rasputin, which can be associated with rooted mysticism in the traditional culture of Japan. It seems that this is due, above all, to the Japanese experience of the trauma of Russian society associated with the murder of the imperial family in 1918, which did not happen in Japan. This assumption seems less convincing than, for example, the explanation that the popularity of Nicholas II is due to his personal tragic fate and visits to the Japanese empire. Such interest in the Romanovs' house explains the frequency of occurrence of architectural objects in Yekaterinburg and, in principle, the popularity of the Urals region, since it is directly related to the history of the last Romanovs.

In addition to political figures or mystical figures entangled in legends, the creators of the work appeal to scientists and famous people of Russia throughout its existence. Among such people can be called the Queen and Gagarin, in general the topic of space conquest is very popular in Japan's visual media culture.

By the early 2000's. interest in the civil spheres of Russia demonstrates an increase in the number of images related to Russian culture and sport. So, if you pay attention to the literature presented in the animated pictures, you can see that these are mainly Dostoevsky's books, especially the «Brothers Karamazov» and «Crime and Punishment» are popular. This also has a real explanation, not the fiction of filmmakers and screenwriters, but quite a response to the consumer's request.

The results of the research demonstrated the presence of stable images of the Russian person, images that mark the Russian space and abstract appeals to climatic features and the natural landscape of Russia. As a rule, this is accompanied by other images that reveal to the uninitiated this stereotype (posters, Cyrillic script (inscriptions do not always represent words, sometimes they are only meaningless sets of letters), achievements of culture (paintings, music, literature, portraits of political leaders of the country, etc.).

Thus, the study of image dynamics over a long period has shown the presence of positive trends in changing stereotypes about Russia in Japan. The results of the research showed that interest in Russia in Japan was quite high and intercultural communication between the countries in the period 2000-2005. actively developed in a positive direction, which confirms the hypothesis about the importance of political relations as a key factor in building a positive image of the country.

The stereotypes of the Russian people existing in Japanese society are determined by the peculiarities of the formation of Russian-Japanese relations. In addition, the relationship between political events, the general level of political relations between countries and the dynamics of the image was revealed.

There is no doubt that the emergence of a «new image» of Russia in Japan associated with the civilian population is due to a decrease in the concentration of Russian troops on the Russian-Japanese borders and the desire to resolve the territorial conflict.

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Decision making in smart supply chains: a case study on the energy industry

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Abstract: The dynamic economic environment is driving the evolution of traditional supply chains toward a connected, smart, and highly efficient supply chain ecosystem. Algorithms become powerfull tools that enable machines to make autonomous decisions in the digitized supply chain of the future. The present paper proposes an decision making mechanism for smart supply chain management in the petroleum industry. This industry has a strategic position as it is the base for other essential activities of the economy of any country. The petroleum industry is faced with volatile feedstock costs, cyclical product prices and seasonal final products demand. The current paper considers the position of a refinery as it is at the middle of the integrated petroleum supply chain, between the upstream and downstream. It procures crude oil from upstream assessing the price, quality, timing, and distance to the refinery in order to decide the optimal acquisition. Additionally, the refiner has to carefully monitor the price risk and manage the inventory. The manufacturing activities of the refiner requires thoroughly planning and scheduling the production levels and supply chains for all the derivates and feedstocks for petrochemical industry using tools for decision making in order to estimate market opportunities and threats under volatile market conditions.

In order to provide a reliable and practical decision making model, the current paper proposes a mechanism for decision support under uncertainty using maximum expected utility.

Keywords: supply chain, decision support, software agents, maximum expected utility, petroleum industry

1. Introduction

Delivering the right product to the right location at the right time at the right price is essential for nowadays actors in the economic environment. Agility and flexibility via clients and adaptability in the face of social and environmental economic constraints are the leverage to achieve sustainable progress. A controlled and agile supply chain becomes essential to the collaboration between suppliers at all levels in the supply chain.

The supply chain formation (SCF) problem has been tackled in the literature using several approaches. The first approaches addressed the problem by means of combinatorial auctions (W. E. Walsh, M.P. Wellman, F. Ygge, 2000) (W.E Walsh, M.P. Wellman, 2003). In (W.E Walsh, M.P. Wellman, 2003) the authors proposed a mediated decentralized market protocol with which uses a series of simultaneous ascending double auctions and recent papers are using a message passing mechanism in graphical models in order to solve the SCF problem (M. Winsper, M. Chli, 2013), (T. Penya-Alba, M. Vinyals, J. Cerquides, J.A. Rodriguez-Aguilar, 2012), (M. Winsper, M. Chli, 2012). All these approaches have the folowing limitations: 1) are using only cost as a parameter for contract negotiation between parties involed in the supply chain 2) the feasible supply chains that are obtained are evaluated using a profit maximization function and do not take into account any risk involved, as in an economic environment a higer profit is usually associated with a higher risk.

Our previous work in (Covaci, 2017) proposed means for contract negotiation and supply formation using multiple contract parameters (e.g. price, delivery time, quality constrains) in order to overcome to the first limitation of the previous approaches stated above. The current paper aims to overcome the second limitation of using a profit maximization function in order to make decisions about the best mix of possible supply chains. We are using the results obtained in our previous work (Covaci, 2017) and we further propose means for modelling decision support under uncertainty using as a measure the maximum expected utility, in order to incorporate risk in decision making.

Although the proposed model can be applied to any complex industry, for the present work we will apply it to the petroleum industry because the supply chain of the petroleum industry is extremely complex compared to other industries and provides the most complicated scenarios to validate our model. The petroleum industry is divided into two different, yet closely related, major segments: the upstream and downstream supply chains. The upstream supply chain involves the extraction of crude oil, which is the specialty of the oil companies. The upstream process includes the exploration,

forecasting, production, and logistics management of delivering crude oil from remotely located oil wells to refineries. The downstream supply chain starts at the refinery, where the crude oil is manufactured into the consumable products that are the specialty of refineries and petrochemical companies. The downstream supply chain involves the process of forecasting, production, and the logistics management of delivering the crude oil derivatives to customers around the globe (R. Hussain, T. Assavapokee, B. Khumawala, 2006).

Among all stakeholers involed in the supply chain of the petroleum industry we particullary are focusing on the refinery, because it acts in the middle of the upstream and downstream supply chain. The classical way of operating the refinery takes into account the wide variation in price and the seasonality of consumption for the products. For the first one, some refineries are able to adjust quite quickly to the market value of the products and generate the optimal economical mix of products to maximize revenue. On the other hand, refiners also take into account the seasonality of consumption, usually producing more gasoline during the summer and more heating oil during the winter.

The paper is structured as follows: section 2 describes the stakeholders and the products of the petroleum industry, section 3 provides a resume of our previous work regarding supply chain formation, section 4 describes the proposed model for decision making under uncertainty and finally section 5 provides conclusions of our work.

2. Stakeholders and Products of the Petroleum Industry

Supply chain in the petroleum industry contains various challenges, which are not present in most other industries. The oil and petrochemical industries are global in nature. As a result, these commodities and products are transferred between locations that are, in many cases, continents apart. Commodities such as oil, gas, and petrochemicals require specific modes of transportation such as pipelines, vessels or tankers, and railroads. These commodities are produced in specific and limited regions of the world, yet they are demanded all over the globe since they represent an essential source of energy and raw material for a large number of other industries.

Crude oil and natural gas are the raw materials of the downstream petroleum industry. They are used for the production of petrochemicals and other oil derivatives. After the production of crude oil is complete from oil reserves, the crude oil undergoes a distillation process. As a result of the distillation process, various fractions of the crude oil are produced, such as fuel gas, liquefied petroleum gas, kerosene and naphtha.

After cracking operations, petrochemical products such as ethylene, propylene, butadiene, benzene, toluene, and the xylenes are supplied to petrochemical plants to produce even more specialized products, such as plastics, soaps and detergents, synthetic fibers for clothes, rubbers, paints, and insulating materials. Figure 1 shows the final products that can be obtained from processing crude oil and oil derivates.

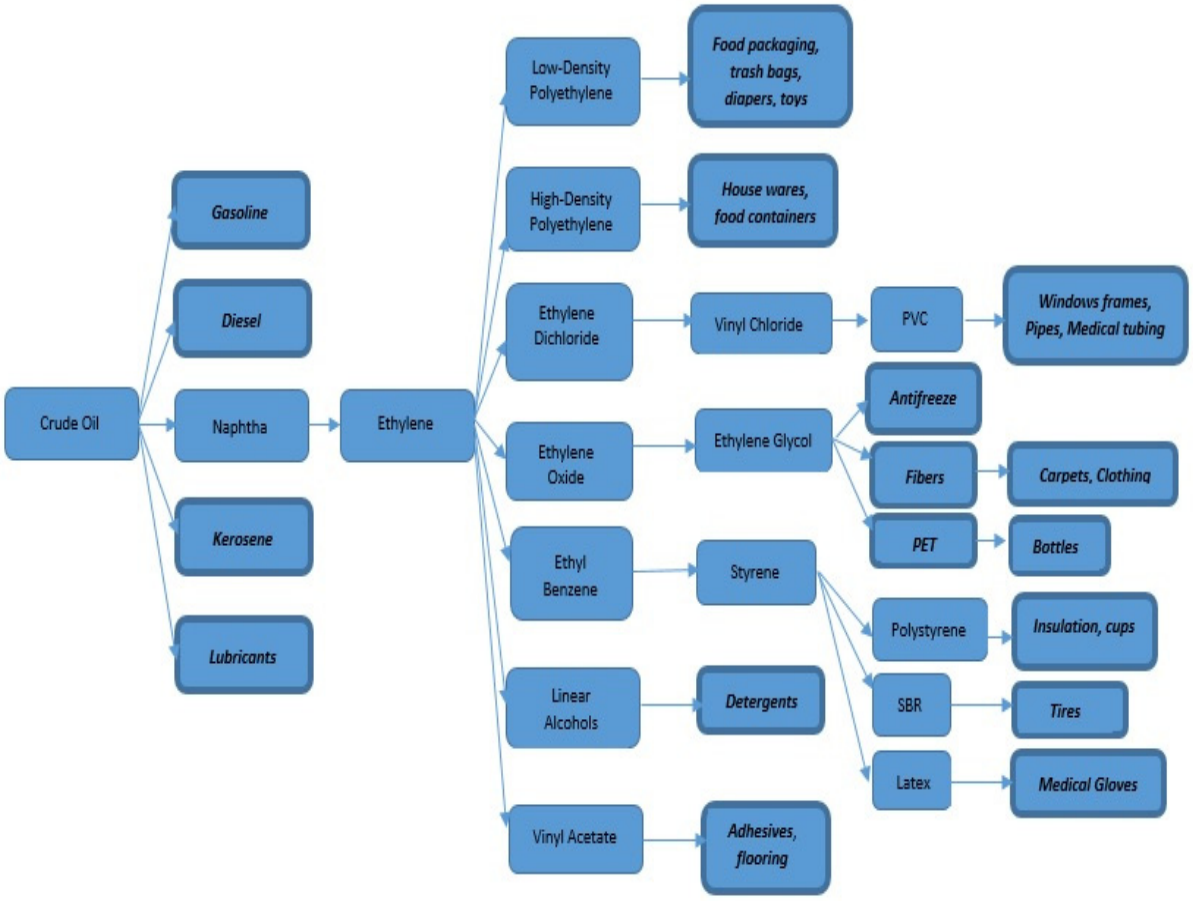


Figure 1. Petroleum Downstream Products (adapted from (Manzano, 2000) and (Profesional Logistics Group, 2013))

The downstream petroleum supply chain can be characterized as a global supply-driven structure with the main following stakeholders (Manzano, 2000):

- Suppliers of crude oil: as a natural resource the crude oil is located in certain areas of the World that usually are far from the main consuming countries, mostly the OECD (Organization for Economic Co-operation

and Development) members. An important part of the crude oil supply and reserves is concentrated in the hands of a cartel: OPEC (Organization of Petroleum Exporting Countries).

- Refiners: with plants located all over the world and closer to final consumers. The main reason for this fact is the economies of scale of transporting crude oil in big supertankers versus transporting the final product in smaller lots, and the strategic value of the refining assets. This latter fact makes governments prefer having some of the refinery operations in their territories.
- Consumers: as stated before they are divided into small consumers (e.g., car owners buying gasoline) and wholesale consumers (e.g., power stations using heavy oil, petrochemicals plants receiving feedstock). Wholesale customers, composed by petrochemical facilities, power plants, big fuel consumers (airlines, shipping companies) and other industrial customers. Retail customers, who use the fuels essentially for transportation and domestic heating.

3. Agent-Based Smart Supply Chain using Message Exchange in Graphical Models

As the nowadays dynamic economic environment requires that the companies form and adjust as fast as possible their supply chain we have chosen in (Covaci, 2017) to model the supply chain formation problem using self-interested software agents. Agents are designed to be autonomous problem solvers, possibly communicating with other agents, and are therefore equipped with sufficient cognitive abilities to reason about a domain, make certain types of decisions by themselves, and perform the associated actions

We have modeled the supply chain by mapping the problem in terms of a directed acyclic graph where the nodes are represented by the suppliers/consumers acted by self-interested agents. The agents own utility functions and negotiate multiple contract parameters by message exchange directly with other participant agents representing their potential buyer or seller and take actions in order to maximize their utility functions. Agents send messages regarding multiple contract issues: price, time of delivery, different quality parameters, delay penalties etc.

The agreed values of the negotiated issues are reflected in a contract which has a certain utility value for every agent. By using utility functions, they can assess the benefits they would gain from a given contract, and compare them with their own expectations in order to make decisions.

The following paragraph provides a formal description of the supply chain formation problem in terms of a directed, acyclic graph *(X, E)* where $X = \{X_1, X_2, ..., X_n\}$ denote set of participants in the supply chain represented by agents and a set of edges E connecting agents that might buy or sell from another.

The agents negotiate on multiple contract parameters and negotiation finishes with a contract that is composed of the actual values of the issues that they have agreed on. Notation v_i represents the expectation of a participant in the supply chain on issue *i* of the contract and *U(v)* the utility that a participant obtains by receiving the actual value $v = (vi_1, vi_2, ..., vi_k)$. When a supplier (seller) negotiates with a consumer (buyer), both parties are interested maximizing their utility functions *U(v)*. This means that during the negotiation, the agent sends a messages to its neighbors regarding the states of his variables that is maximizing its utility function.

The utility functions *U(v)* are calculated by means of weighted sum as follows:

$$U(v) = \sum_{i=1}^{k} w_i * v_i \ , \ with \ \sum_{i=1}^{k} w_i = 1 \quad (1)$$

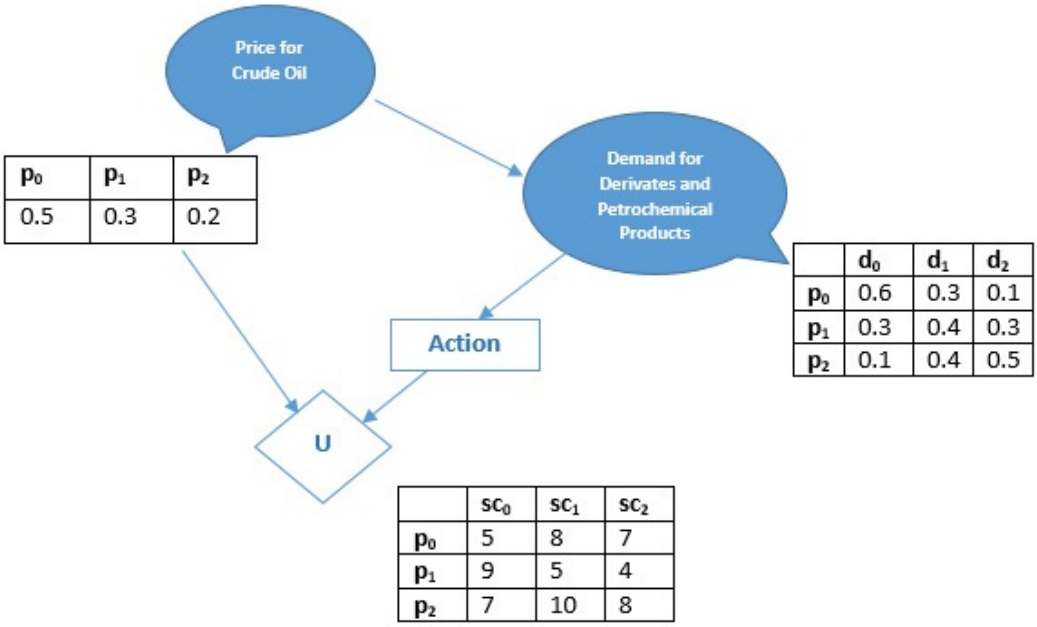
where $0 <= w_i <= 1$ represent the weights measuring the importance of a given issue *i* for a certain agent in the chain.

A feasible supply chain is an allocation representing a sub-graph $(X',E') \subseteq (X, E)$. For $X_i, X_j \in V'$, an edge between X_i, X_j means that agent X_j provides goods to agent X_i. An agent is in an allocation graph if it acquires or provides goods within the underlying partners' constraints.

Using the formalism stated above and message exchange mechanism used in (Covaci, 2017), we have showed that we are able to obtain feasible supply chains in an economic environment with multiple suppliers and consumers.

4. Modelling Decision Support under Uncertainty

The supply chain in petroleum industry presents challenges mainly due to high volatility of the prices of the raw materials and seasonal demand for the final products when compared to other commodities. We are modelling decision support for a refinery and we will consider the petroleum downstream with the activities which take place between the purchase of crude oil and the use of the oil products by the end consumer. This covers performing buying crude oil, refining the crude oil, and distributing the refined products output.



p_0	p_1	p_2
0.5	0.3	0.2

	d_0	d_1	d_2
p_0	0.6	0.3	0.1
p_1	0.3	0.4	0.3
p_2	0.1	0.4	0.5

	sc_0	sc_1	sc_2
p_0	5	8	7
p_1	9	5	4
p_2	7	10	8

Figure 2. Influence diagram

Having obtained several feasible supply chains using the mechanism stated in the section above, we consider uncertainties in crude oil prices and demand in petrochemical products.

In order to model the decision mechanism for a refinery we use the influence diagram in Figure 2. The price for crude oil and predicted demand are in the form of a probability distribution and we will notate it with *P(d)*. The price variable tells the probability that the price of the crude oil will go up, go down or stay at the same level (p_0, p_1, p_2). The demand variables tells the probability for the evolution of the demand (d_0, d_1, d_2) for petrochemical products when the price for the raw material will change *P(d|p)*. We introduce, an action variable that provides a decision rule δ_A at action node A (Action), that is conditional probabilistic distribution P(A|Parents(A)). Parents (A) are the variables that the agent observed prior to making a decision, in the example below being the predicted demand evolution *(P (A|d))*.

Hence, the action variable provides the agent with a decision situation D. Let A= {sc_0,sc_1,...,sc_m} be a set of possible actions, we want to solve the equation (2) according to the decision rule $D[\delta_A]$ of maximizing the expected utility.

$$a* = argmax_a \, EU[D[\delta A]] \tag{2}$$

The influence diagram in Figure 2 can be translated as a product of factors in equation (3). The first three of them are probabilistically factors and there is one numerical factor U(p,A) which represents the utility obtained by the agent depending on the evolution of the oil price and the action of choosing one of the possible supply chains (sc_0,sc_1,sc_2).

$$EU[D[\delta A]] = \sum_{p,d,A} P(p)P(d|p)\delta A\,(A|d)U(p,A) \tag{3}$$

As we want to maximize over the decision rule δ_A, the equation (3) can be written as in equation (4) and if we marginalize out *p,* we get a factor *μ(d,A).* Hence, the agent has now a simple expression that is trying to optimize in equation (5), a summation over all possible values of *d* and *A* of the decision rule δ given the predicted evolution of the demand, multiplied by the factor *μ(d,A)* that we just computed.

$$EU[D[\delta A]] = \sum_{d,A} \delta A\,(A|d) \sum_{p} P(p)P(d|p)U(p,A) \tag{4}$$

$$EU[D[\delta A]] = \sum_{d,A} \delta A\,(A|d)\mu(d,A) \tag{5}$$

In order to maximize the expected utility the agent will take the action *A* of choosing that supply chain (sc_0,sc_1,sc_2), that will maximize his utility taken into account the predicted evolution of the demand *d*.

5. Conclusion

Optimizing the supply chain is critical to achieving operational excellence and the overall objective of maximizing utility, particularly return on capital while ensuring safety and sustainability.

Within the supply chain, in order to complete their tasks, the supply chain participants, are often reliant on the completion of subtasks (the production of their input goods) by producers upstream in the supply chain. The digitization of supply chains requires intelligent and efficient algorithms that can capture the complexity of real scenarios and establish the new end-to-end processes connecting suppliers and customers. Hence there is needed research to create models that have flexible contract parameters that incorporate risk and asses the supply chains from the perspective of an integrated supply chain.

The current work proposed a decision support mechanism within the SCF process. As opposed to the previous approaches, our approach translates the SCF optimization problem not as a profit maximization problem but as a means for maximizing expected utility. Hence, it incorporates multiple negotiated issues and uses utility functions and action variables in order to compute maximum expected utility.

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Digital Humanities and e-commerce: considerations on digital monographs

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Abstract: "Humanities", "Commerce" and "Monographs" are three terms that have been existed for a very long time. Nowadays, they are often conceptualized in a digital way that implies a radical paradigm shift in their main features. The aim of this article is to investigate the possibility of interaction between digital humanities and e-commerce, through their application to the genre of digital monographs. By "digital monograph" we mean born-digital, long-form, media-rich, scholarly publication, that rejects the print-based form (and so the e-book format) and takes advantage of the methods and tools of digital humanities. In particular, digital monographs re-think the traditional textuality of essays; textuality becomes "liquid" and multimodal. Because of publishing, obsolescence, discoverability, use, evaluation, etc. these products must be hosted on a publishing platform that is suitable for the scholarly needs both of the authors and of the final users. The link with e-commerce arises from the need of the publishers to sell the products of research, especially in countries where the academic publishing system is not based on University Presses but on commercial ones. This study wants to reflect on how the economic logic of profit and cultural logic can coexist in a digital publishing platform: is it possible to overcome the "monograph crisis"? What are the major problems that arise when selling an academic monograph? What business models could be the most suitable for this kind of publication? In what way can a publisher improve customer loyalty? The thesis of this article is that digital enhancement of the monograph plays a key role in its sale. The opportunities offered by the digital humanities, in fact, are not only a matter of format; they are, indeed, what makes the substantial difference in the quality of scientific communication. They enable the authors and the publishers to offer the consumer something that neither the print version, nor the e-book can do. First of all, a digital monograph allows a direct link with primary and secondary sources; secondly, it supports different layers of use and wider accessibility.

Moreover, it gives both the author and the reader, the possibility to better represent and understand the complexity of the research and of the methods and tools that are used. On the other hand, this article considers the infrastructure for producing and hosting these products and its importance in the development of a cultural community based on scholarly value creation. These are some of the issues that a digital publishing project needs to consider in order to sell its products and become sustainable. After discussing these questions, this article postulates a possible functioning business model of subscription based on the concept of cultural engagement. The conclusions concern the requirement of an editorial workflow that links together all the phases of production, from the author's composition to the reader's purchase.

Keywords: digital monographs re-think; e-commerce; digital tools; digital-textuality layer

1. Monographs: between the old and the new

Writing about Digital Culture, Charlie Gere evokes a change of paradigm, to be seen both technically and philosophically, that concerns many aspects of human life: «Digitality can be thought of as a marker of culture because it encompasses both the artefacts and the systems of signification and communication that most clearly demarcate our contemporary way of life from others» (Gere, 12). Thinking the digital as the common denominator in theory and practice, this article wants to examine the possible interaction between digital humanities (DH) and e-commerce, through their application in the field of digital monograph publishing. The key issue is represented by the digital, in the way it creates links and implications between these areas, both technically and philosophically speaking.

In recent decades, thanks to, and concurrently with the digital technical developments, scholarly practices and communication in the humanities have been changing radically in all their features: from methodologies and tools for research, to matters of production, dissemination and final fruition.

Starting from this change of paradigm, it's useful to study the best way for publishers to deliver and sell academic editorial products: is it possible to overcome the "monograph crisis"[1]? What are the major problems that arise when selling an

[1] For data, evidences and deepening about monograph crisis in a global perspective see Darnton, Robert. "The New Age of the Book", *New York Review of Books*, vol. 46, no. 5, 1999; Fitzpatrick, Kathleen. *Planned*

academic monograph? What business models could be the most suitable for this kind of publications? In what ways can a publisher improve customer loyalty? To answer these core issues, we need to take a step back to introduce the exact context in which we are dealing.

Since the beginning of humanistic scholarly communication, the academic monograph has been the highest level of knowledge production and transmission. Still today, despite the press of journal articles, the monograph is considered the most suitable and validating format of academic writing, and the most considerable criterion in the evaluation of an academy's reputation and assessment of merit and achievement.

By "academic monograph" we mean a long-form scholarly work concerning a specific topic in detail, that provides research findings on that topic. «A monograph is what it means to work out an argument in full, to marshal all the relevant evidence, to provide a complete account of consequences and implications, as well as counter-arguments and criticisms» (Willinsky).

The problem, in recent decades, has been the «monograph crisis» - or «chronic illness» (Thatcher), as some scholars prefer - first detected by Darnton in 1999. Started in the '70s and becoming more and more pronounced during the '80s and the '90s, the crisis affected monograph publishers, causing smaller print runs, a predilection for more commercial and marketable titles, an increase in the number of output/titles, and created a struggle for specialized research to find publishing outlets.

Among the causes of the crisis are an escalation in the price of periodicals (which forced the libraries to cut their purchase of monographs), cuts in academic budgets, and the economic downturn affecting the publishing industry in a broader sense.

Nevertheless, it seems reasonable that the causes of this crisis are not only strictly connected to the economy and trade; some are a matter of substance and concern the stasis of the genre, the deficiencies in development and effectiveness, the self-centredness of academia and, last but not least, the obsolescence of the form caused by the new potential of the digital environment.

In fact, the digital turn has really up-ended the game, introducing new challenges for scholars, publishers, readers and for all attendees of the knowledge chain. The most widespread solution, today, is to complement the traditional book format with the e-book

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monograph: a sort of transposition of the print-based version, from the analogical to the digital support. Although this publishing strategy is quite widespread today, and it does represent a significant entry in sales reports, it does not seem to have provoked the expected improvement, either for economic sustainability nor for the quality of research production and dissemination:

> *In their haste to migrate content from the print into the digital realm, publishers have typically not strayed far from traditional print format. When comparing an eBook with a print book, or a PDF to a print article, one is struck by how similar they look. Not only does this approach make for a suboptimal User Experience by not taking into account the limitations of the medium, it also fails to take advantage of the possibilities to make digital content more attractive to and relevant for users.* (Campbell 2012, 271)

However, thanks to some visionary scholars' and publishers' efforts something different is being done: a new-born genre, the digital monograph, is trying to assert and develop itself. By digital monograph we mean a long-form research output genre with specific features that enhance the signification of the traditional print-based textual essay. First of all, they are born-digital, projected and composed for, and in, the digital environment, following the principles of digital rhetoric (Douglas). They gain from digital humanities tools and methods, being interactive, media-rich and based on a fluid and multimodal textuality. The result is that both the contents and the form (which are indissolubly linked) contribute to meaning-making to the same degree.[2] The user/consumer/reader perspective also changes, because the use of a digital monograph totally differs from the traditional one: from accessibility and purchase methods, to their particular use of the format, to the contents' reshaping and visualization.

One good example of a full use of this new form is the case of *Enchanting the desert*, a monographic work by Nicholas Bauch (assistant professor of Geo-Humanities at Oklahoma University), published by Stanford University Press in the Digital Projects section.[3] This is a born-digital examination of the photographer Henry Peabody's early-twentieth-century slideshow of the Grand Canyon, placed within the spatial framework of the Canyon itself, and embellished with rich overlays created through GIS mapping and virtual recreations of the topography. The accomplishment is a digital prototype for studying historical and cultural geography in which, as the author

[2] For an in-depth explanation of digital monographs see Riva, Massimo. "An Emerging Scholarly Form: the Digital Monograph", *Digitcult*, vol. 2, no. 3, 2017, pp. 63-74, http://dx.doi.org/10.4399/97888255099087.

[3] This pioneering work has been financed by Mellon Foundation, that for years has been promoting innovation in scholarly communication. For further details about the monographs' project see https://mellon.org/resources/shared-experiences-blog/monograph-publishing-digital-age/.

says,[4] the digital stage is not a matter of merely technical issues, but a vital process that shapes the entire research methodology. This project represents a typical application of digital humanities to an editorial product.

However, apart from some pioneering experimentation, the digital monograph genre is not widespread and it faces resistances from editors, authors, publishers, etc. The reasons for these objections are many and considerable; they concern questions of evaluation, obsolescence, experimentation costs, trade and, more broadly, a general tendency to tradition.

2. Publishers: tension between cultural logic and business efficiency

Especially in the countries without a strong tissue of University Presses, for example in Italy, the commercial publishers' involved in academic monograph publishing need to balance scholarly quality with business efficiency, being sustainable and in accordance with their mission. It goes without saying that the digital turn has deeply affected the entire knowledge value chain: production, evaluation, distribution, marketing, use, etc.

> *For centuries, printed products such as books and journals were the only content media a publisher had to control and take care of, with clear supply chain responsibilities and roles. In parallel with the wider technological developments over the past 15 years (such as growth of the Internet), the academic and professional publishing industry has seen a rapid evolution of new digital publication channels and content formats that have become valuable parts of a publishing house's product portfolio.* (Campbell 2012, 195)

For the last twenty years, reflecting the general trend in trade, e-commerce has also been playing a key role in the publishing market. Nevertheless, from a cultural and scholarly perspective, it's important to focus not only on how to sell, but also on what you sell. Generally speaking, e-commerce is any type of commercial transaction that is handled on the Internet, without differentiation about the materiality of the "object" that is sold. In cultural industry in general, the transition from marketing of physical objects to marketing of digital object is almost complete, except for some areas, indeed, such as monographs. Some would argue that e-book format monographs are "digital objects", and this is true, from a technical point of view. But if we think about the disruptive potential of the DH tools and research methods, e-book will only feel like a transposition of the same content from one medium to another (with really few enhancements like annotations, highlighting and the like), as we said before.

[4] http://stanfordpress.typepad.com/blog/2015/01/the-digital-pilot.html

In any case, it must be said that many publishers, in recent years, have developed different and valuable kinds of online products such as databases, encyclopaedias, collections, archives, teaching apps and tutoring sessions. To name a few, recently Bloomsbury has been developing a Digital Resources section of HSS (Humanities and Social Sciences) scholarly contents that seems to be very promising; the Italian Il Mulino, for its part, has built the e-learning platform Pandoracampus, which host enhanced academic textbooks. Also journals have found their digital way, which is functioning well and provides many advantages in terms of accessibility and dissemination (Campbell 2011), which has rapidly become a scholarly shared practice. Nevertheless, the field of the academic monograph is different because, unlike the journal articles, it is characterized by the long-form critical issue. The mere digitizing of the textual form is an inadequate attempt that ignores the require of the genre's enhancement.

What is certain is that monographic scholarly works strongly need to find their own "digital way" to survive avoiding the danger of marginalization, and this is possible only with a shared effort led by academic publishers. In fact, despite the considerable problems of evaluation (there still does not exist a common standard for the assessment of this kind of scholarly products) and opposition to the digital methodological shift, scholars need to have the right editorial conditions for publishing high-quality products, that would benefit publishers both from reputational and commercial points of view.

If the monograph's precarious situation derives from an assembly of economic and formal problems, it goes without saying that a possible solution must consider both these aspects carefully. Nowadays the publishers' imperative is to ask about what research needs and how publishers themselves could meet demand in a sustainable way.

The new way scholars carry out humanistic research is strictly linked with digital humanities paradigm. Lagging behind STM (scientific, technical and medical) early development (Casalini 2016), nowadays more and more scholars uses digital tools and resources to conduct their studies: from the simple access and consultation of primary and secondary sources, to the emergence of new methodological perspective like distant reading made via textual analysis technology, to technical innovations like GIS mapping and VR reconstruction. So, if the DH tools and methods developed by scholars and institutions are so useful and significant, why shouldn't they play a key role also in the communication of the research they produce? If we have a chance to better represent the philosophical and technological complexity of our work, why shouldn't we implement it? Moreover, in the field we are talking about, the peculiarity is that often the authors and the users coincide (Thompson 2016, 84) or are very close culturally speaking, making this operation necessary and, in a sense, easy.

3. A container for digital monographs

Once publishers understand the core problem of reshaping monographs, it could be useful for them to lead the transition, in order to regain and keep the central role they play in the scholarly world. To do this, they have to provide the right publishing environment, in order to allow scholars to carry over into the publication stage the enhanced tools and methodologies they have used during research. Broadly speaking, this entails the creation of a system that allows authors and readers to complete the digital switch. Creating a structured publishing system is no minor matter: there have been several isolated attempts so far, especially in academia, but the editorial role of publishers so far has been too weak in this area.

Similar to ways in which this occurs in print monographs, this system should be based on a specific editorial workflow underlying the digital environment which hosts and delivers the digital monographs. The editorial products under consideration are complex digital objects that need a platform not only to be created but also to be used and then purchased, and the process does not end here. The idea of a "place" for these products is also a cultural and philosophical matter, because it provides the legitimacy, substance and robustness that every experiment needs in order to become practice. In the double approach we are adopting, the role of the publisher is fundamental and resembles what it used to be: a mix of technical effort and cultural influence. The platform, therefore, is not only a container of single editorial products, but becomes the medium for scholarly and cultural experience constantly updated, meeting the horizontal requests of digital fruition. The user has at his/her disposal a space for getting around, choosing and operating according to his/her interests.

Broadly speaking, there are two dimensions on which publishing stakeholders must focus: a micro and macro one. The first refers to the quality of the single monographic work and requires scholarly as well as technical work. It implies a strong dialogue between publishers and authors, an awareness of humanistic research methods and tools on the part of the publishers as well as awareness of the continuous innovations provided by DH on the part of the authors. The macro dimension is, on the other hand, quantitative, based on the need of building an efficient infrastructure for contents aggregation, dissemination and purchasing.

These two focuses are as two sides of the same coin and deserve to be handled in conjunction with each other through a workflow that allows performance of all the steps involved within the digital publishing platform itself.

In recent years, *platformization* is one of the most visible digital phenomena (to the point where a new field of media studies has been born and dubbed "platform

studies"[5]). This term refers to the word "platform" in all its different meanings, emphasising its magnitude:

> *This more conceptual use of "platform" leans on all of the term's connotations: computational, something to build upon and innovate from; political, a place from which to speak and be heard; figurative, in that the opportunity is an abstract promise as much as a practical one; and architectural […].* (Gillespie, 352)

One of the most likely scenarios is the creation of a monographic series that, unlike print counterpart, is characterised not by topics or layout, but by similarity in format. We will discuss about micro and macro dimensions respectively as the back-end workflow and the front-end of the platform; starting from the micro.

The first phase of the workflow is that of writing or, perhaps more accurately, creation: this is author's responsibility but could also include the assist of a specialist that supports the work of composing the research output, favoring a reasoned and functional use of the potential offered by digital writing environment. This could be, in a mash-up perspective, the open Scalar platform (created by the Alliance for Networking Visual Culture), which is absolutely one of the best tools available; it is not by chance that Scalar is used for the most significant and pioneering ongoing experiments of digital monographs.[6] This tool offers an excellent balance between standardization and flexibility, includes both a standard user interface and the possibility of customization, lends itself optimally to research needs, and has good portability.

The second phase is the copyediting of text, which is expected to be consistent with the principles of digital rhetoric and which must be made, by the editor, technologically suitable for publication on the platform. After the joint work of the author(s) and editors, and after the "digital proofs" have been carried out in the back-end, the monograph is ready to be evaluated by one or more external reviewers, in order to guarantee consistency and scientific legitimacy. This process can also be carried out on the back-end, where the contents, which the reviewer can access by invitation are uploaded. Once ready and approved, the work is published by the publisher in the chosen section of the platform.

Turning to the macro-dimension, with the goal of a strong editorial imprint in mind, the infrastructure that hosts the series should be linked to or could even be a section of the publisher's website. Thinking of an ideal user interface, it could be divided into three sections: one to explain the project, one to stimulate the interest and

[5] http://platformstudies.com/.

[6] As an example see Pathfinders: «co-authored by Dene Grigar and Stuart Moulthrop and funded by a grant from the National Endowment for the Humanities, is a multimedia, open source book that documents the experience of early digital literature, specifically pre-web hypertext fiction and poetry, from 1986-1995».

the last to use the contents. The first is conceived as a presentation of editorial choices, of theorical and technical issues linked to the series; the second is a kind of enhanced–blog that promotes users' engagement and interaction through documentations of ongoing publications, considerations and debates on content and methodological issues, comments and sharing between authors and publisher and among authors themselves. The last section would be the real container of publications. The whole thing is structured with an eye to the coordination of its parts, guiding the user through different levels of fruition and access.

4. A business model for the monograph series

According to Magretta, business models are the result of two parts: the first consists of activities related to making something (designing, manufacturing, etc.), the second concerns the activities connected to selling something (finding customers, distributing the product, etc.). So, as the author says, a new business model's plot could design a product for a specific purpose, or could represent an innovation in selling or delivering an existent service or goods. The first part, which we called the micro-dimension, is the one that designs new editorial products for an unmet need; the second, the macro-dimension, is our better way of selling or distributing these products.

To be appealing, digital monographs have to be innovative and offer something that print monographs cannot: this is strictly linked with the DH paradigm, as we said before, and is something very similar to what Ball and Douglas call design-as-argument. This is the foundation of web-text (also called screen-based text, liquid text, etc.) and defines the reshaping which is both formal and substantive: design and technology of text are not disconnected from contents but allow enhancement both in representing and in making scholarly meaning.

These are the words of Massimo Riva about his pilot digital monograph that Brown University selected to take part in the Mellon Foundation project about scholarly communication in the humanities mentioned above:

> *[…] what really excited me was the very nature of my topic: in which the visual component – being focused on the genealogy of modern visual culture – was so central, and not only, as we shall see, from the point of view of the subject matter but also from that of the very argument I wanted to "build." Leveraging the vast reservoir of images or videos documenting my objects of research available on the web, or in library and museum archives, or even private collections, and doing it in an innovative way, made possible by the dynamic flexibility and multimedia capability provided by a digital platform, would have made the "illustration" of my argument much richer, easier, and more effective.* (Riva 2017)

Benefits in building the argument digitally are clear for the author and will be massive for the "reader" that will face the work with a much more performative knowledge infrastructure than the one he/she is used to. It is not inconceivable that, thanks to the possibility of various interpretative levels, such kinds of products could expand and differentiate the catchment area: if the insider benefits from experiencing sources, methods, tools, etc. used by the scholar, then an outside or non-expert reader can be facilitated in following the argument by multimedia, non-linear, and interactive features. This process is called audience development and it's crucial for the expansion and sustainability of cultural industries; it's geared towards three main objectives: extension of the target, differentiation of the target, improvement of the relation between producer and target (Bollo).

In this regard, we can turn to the second part of Magretta's statement about the activities associated with selling something. This part concerns our digital platform, representing a socio-cultural occurrence set in a computational "space" of participation and exchange. In some sectors like publishing, due to their cultural nature, the web platform also carries further implications like a strong sense of community and similarity, a tendency to loyalty and the willingness of cultural engagement. The publisher's responsibility to guarantee quality encourages both authors and users to trust the platform, which becomes a sort of cultural brand. And this is, obviously, the key card of the whole system.

Considering that the product economy is inexorably shifting towards the economy of services in which licenses are displacing traditional acquisitions, the most advantageous option seems to be a subscription solution, already widely tested and consolidated in contiguous digital areas such as TV, music, and magazines. Especially in fields like publishing, the subscription model has some unquestionable advantages: it gives the user a stake in the content creation process, it lowers the costs for each subscriber spreading them over a large audience, and it incentivizes long-term value creation (Anderson). The intent, in fact, is not to sell a single monograph to the reader, but to retain him/her and to gain its interest, even economically, through the continuous, variegated and prestigious offer of scientific and cultural products. The latter, which in the publishing platform project in question are the articles and contents of the "blog section", are open, as they constitute the *viaticum* for the subscriber's access to the monographs; of which, from the outside, only titles and short previews are visible. Thus, the transformation of the single-monograph reader/user in a scholarly platform subscriber/member is completed.

To conclude, the kind of workflow we described, whose decisive feature is the carrying out of all the operations (from writing to purchasing) on a single, self-contained digital infrastructure, allows publishers to completely eliminate the cost of printing, intermediation and distribution. They have to take care, instead, of the one-off costs of the platform's design and implementation, updating and (possibly) creative consultancy during the writing stage.

5. Conclusions

Digital culture and technology have modified habits, behavior, practices, approaches and understandings in many domains of human life; scholarly communication is no exception. Starting from this paradigm shift we focused on scholarly monographs in the humanities, which for years have been affected by a chronic illness because of external as well as internal generic factors. Thanks to some ongoing projects, especially in the Anglophone context, a new way of conceiving monograph digitally is emerging. This has nothing to do with the e-book format, but is based on DH, which operate in the interaction between the digital-textuality layer (making it multimodal, fluid, media-rich, interactive, non-linear) and the new technical and methodological way of conducting research thanks to digital tools. Commercial publishers act within this framework, always trying to balance their goal of scholarly quality with the business dimension, and technical effort with cultural influence in the digital environment. A strategy to finally establish and valorise digital monographs must proceed in two complementary dimensions (both orientated towards audience development): the first, which we called the micro, is the dimension of design and products creation while ensuring quality standards; the second, which we called the macro, is the dimension of product sale. To this end we have envisioned the development of a publishing platform that supports a specific workflow and creates a cultural community that identifies itself with the values of the knowledge infrastructure. We conclude that the most suitable business model to make such a project sustainable is the subscription solution, which indeed is the most common scheme in the current cultural industry. When goods become services and acquisitions become licenses, users will become subscribers in their turn, initiating a lasting and trusting relationship with producers.

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Digital and Coding Literacy for School Students

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Abstract: In the digitalization era, the notion of gamification appeared in every field of activity. Experimenting gamification of programming hours by practitioners and teachers in the 2017-2018 school year at the 5th grade is part of the research area related to identifying ways to improve student engagement and skills for lifelong learning.

The article will present the outcome of this pilot experiment, which aims to track the evolution of pupils during the project, by analyzing and comparing the results from the initial evaluation with those from the final evaluation. The purpose of the article is, on one hand, to contribute to the literature with new results in the field of digitization of the teaching-learning activities through gamification, and, on the other hand, to present a new teaching instrument used to streamline the instructive-educational process at the fifth grade students, within the Computer Science, which is now a mandatory object. The experiment was conducted in accordance with the Creative Computing curriculum created by the ScratchEd team at the Harvard Graduate School of Education.

Keywords: digital literacy, coding literacy, programming, gamification, Scratch.

In the digitalization era, the notion of gamification appeared in every field of activity. Experimenting gamification of programming hours by practitioners and teachers in the 2017-2018 school year at the 5th grade is part of the research area related to identifying ways to improve student engagement and skills for lifelong learning.

The article will present the outcome of this pilot experiment, which aims to track the evolution of pupils during the project, by analyzing and comparing the results from the initial evaluation with those from the final evaluation. The purpose of the article is, on one hand, to contribute to the literature with new results in the field of digitization of the teaching-learning activities through gamification, and, on the other hand, to present a new teaching instrument used to streamline the instructive-educational process at the fifth grade students, within the Computer Science, which is now a mandatory object. The experiment was conducted in accordance with the Creative Computing curriculum created by the ScratchEd team at the Harvard Graduate School of Education.

1. Introduction

Literacy is the ability to use a symbol system and a technological tool to comprehend, generate, communicate, and express ideas or thoughts by making a shareable product that others can interpret. This definition applies to both textual and coding literacy (Umaschi Bers, 2018).

Coding literacy is a requirement for participation in a digital world. This is because when we are not code literate, we must accept the devices and software we use with whatever limitations and agendas their creators have built into them. On the other hand, a code literate person stops accepting the applications and websites he uses at face value, and begins to engage critically and purposefully with them instead (Rushkoff, 2012).

Digital literacy consists of the skills, knowledge and understanding that enable critical, creative, discerning and safe practices with digital technologies. Moreover, it is about knowing when digital technologies are appropriate and helpful to the task at hand and when they are not (Digital literacy across the curriculum, 2011). The International Society for Technology in Education (ISTE) frames its benchmarks for digital literacy around six standards: creativity and innovation; communication and collaboration; research and information fluency; critical thinking, problem solving and decision making; digital citizenship and technology operations (ISTE, 2018). Thus, coding literacy could be regarded as being part of digital literacy.

In 2016, the study “Young Children (0-8) and Digital Technology. A qualitative exploratory study. National report: ROMANIA” was published. According to this study:

> “Most of the children have basic operational skills (knowing how to open/shut down the device, how to connect to the internet, to install and delete apps, if they use a mobile device). When needing support, they usually ask one of the parents (not necessary the most skilled, but the nearest one), while few of them

> look for online support or ask their friends. In general, children at this age do not have a clear image of the online risks and do not take measures to protect their devices (this is sometimes done by the parent, or other skilled adult prompt by the parent) or to have a preventive behaviour online." (Velicu, 2016).

According to the study: "Romanians beyond display: attitude, behavior and habits of using the internet", carried out by the Romanian Institute for Evaluation and Strategy (RIES) between 4-16 May 2017, Romania is among the countries with the most advanced infrastructure of digital communications in the world. Despite this, the country does not excel in the share of people using technology, nor is it digitally literate at a high level. However, the digital generation is strong behind: 97% of young people aged between 12 and 18 say they use the internet. The study was conducted on a sample of 4,328 people aged over 12 years from Romania (Dancu, 2018). It is therefore necessary that these concepts of digital and coding literacy are introduced into schools as early as possible. Thus, they will be naturally assimilated by children who will live in a highly digitized world. Within this context, this study aims to present an overview of the level of digital literacy in primary school children, also trying to identify / determine the degree of acceptance of new technology by parents and children. Specific, it is intended to present the children and, indirectly, the adult population perception, the importance of early access to technology and therefore of introducing it as a subject in the primary school. This study is structured in two major parts: literature review of digital and coding literacy, and the presentation of the study from methodology to the obtained results.

2. Literature review

Education has always been subject to adopt the latest technology in order to be improved, made more accessible or meet as many needs as possible. In this context I went through the literature of Play-based digital learning (PBDL). The paper "Introducing the 'new' digital literacy of coding in the early years" (Claire Campbell and Chris Walsh, 2017) outlines the importance of PBDL in childhood. Here are mentioned two fundamentals of this approach:

> "Children have the right to relax and play, and to join in a wide range of cultural, artistic and other recreational activities" (Article 31 of the United Nations Convention on the Rights of the Child, 1989).

Competence in coding is a practice that leads to digital literacy.

In the book “Play in the Early Years” (Marilyn Fleer, 2013) it is demonstrated that students can learn coding and robotics through playful, practical, engaged and interactive learning experiences. It is necessary to introduce coding and robotics into school curriculum, but to use methods appropriate to the needs of young children. The methods have to include a balance between the learning experiences initiated by children and those initiated by teachers, according to “Early Years Learning Framework” (EYLF) (Commonwealth of Australia, 2009). Also, students should be seen as being able to learn using technology, while play and collaboration should be understood as innovative when integrating digital tools and technologies to stimulate children’s curiosity (Dietze & Kashin, 2013; Bølgan, 2012; Szmodis & Columba, 2013).

From another perspective, there are works in literature to demonstrate that early introduction to PBDL is not necessary (Siegel, 2006; Bearne, 2009; Bazalgette & Buckingham, 2013). They are offering class examples that highlight the particularities of multimodal interaction of children with moving image environments, and consider that those elements destabilize rather than consolidate. The authors conclude that the early introduction of coding has negative effects in the long-term assimilation process of both the binary and the non-binary, and suggest that the introduction of high-quality digitization into secondary and higher education is more beneficial.

Literature on PBDL abounds in results of practical experiments, those being generally implemented by businesses and educators. Notable results on which we conducted this paper are presented in several studies (Kwok, 2017; Prozesky & Cifuentes, 2014). In “Starting from Scratch: Using Scratch as a Montessori Material to Develop Digital Literacy”, Simon Kwok studied how Scratch programming language would help students develop digital literacy into the Montessori environment. The data collected showed that Scratch not only enabled students to develop digital literacy based on ISTE’s achievement indicators (2016), but also met the general criteria outlined by Prozesky and Cifuentes (2014) for a technology to be integrated into the Montessori environment. The author used the ten principles of teaching and learning for technology integration in the Montessori classroom to argue how Scratch can be considered a Montessori material. These principles had been enunciated by Prozesky and Cifuentes (2014) and they are: engaging the senses, control of error, collaboration, isolation of concept, sequencing concrete to abstract, rewards and competition, peace, planes of development, creativity and imagination, concentration. The author showed that these things can be achieved using Scratch programming teaching programming skills, and that it would be an effective way to develop digital literacy to Montessori students (Kwok, 2017).

(McDougall, J., Readman, M. and Wilkinson, P.) describes a research facilitated by a multinational technology provider, converging tablets used across school and home, a technology enhanced community 'third space' providing workshops for students aged 6–9 with their tutors from an Academy School on the south coast of England. The project aimed at creating a digital space for workshops (workshops being seen as a means of building relations, allowing tutors, parents and children to find cognition through socializing). The project demonstrated that traditional space, technology and parent-child-teacher socialization are beneficial to the introduction of modern learning tools that allow choosing the pedagogical method appropriate to each child. It has also been showed that it is necessary to create a space in which the familiar environment meets with the school one, in order to introduce PBDP. In our opinion, this project validates the theory of Icek Ajzen (2006) according to which the teacher needs to know the environment the child comes from in order to develop pedagogical methods in accordance with the child's behavior. Pedagogical materials built on this theory increase the child's engagement and desire to learn, regardless of the area under consideration. In projects within the PBDL area, we consider this aspect to be mandatory, bringing added value to the whole process of digitization.

In most of the studies conducted after 2009, there are arguments about the potential benefits of PBDL for early learners in terms of developing in them the so-called 21st century skills: problem-solving, exploration, skills acquisition, collaborative learning, social interaction and meaning generativity, as well as multisemiosis and criticality. These studies conclude that the benefits for children are of particular importance. (Lankshear and Knobel, 2003) demonstrate that these children are in fact "disadvantaged", namely: of diverse or multiple linguistic, socio-economic, race-ethnic backgrounds and diverse ability levels.

Our research also relied on the review of literature "Library preschool story times: Developing early literacy skills in children" (Maclean, 2008). This article shows that there is evidence to support that meaningful literacy activities, such as reading, singing and playing with children, can impact a child's brain development and subsequently help provide them with the pre-reading skills they need to start school. Neuroscientists tell us (Howard, 2013) that the type of learning based on technology that occurs in institutions such as libraries and museums is self-directed, experiential, content-rich and promotes executive function skills that can shape a child's success in school and life. Based on these results, we have built this experiment to find out how children from a developing country can access digital education and cope with the new digital age, regardless of their social background or material situation.

The resulting theories can be reunited to create a powerful tool, useful in developing a holistic framework to streamline the introduction of PBDL in the curriculum. All this will allow the teaching-learning process to adapt to Web 2.0, Web 3.0 and, why not, Web 4.0 technologies. In this context, we focused on determining how prepared are Romanian children to have PBDL implemented in their learning-evaluation process.

3. Material and method

3.1. Description of the experiment

During the 2017-2018 school year, the "Dalia's Book" Association carried out the second edition of the project "Adopt a School!". Two IT companies were involved in the project to form and develop digital skills at primary level in 5 cities in the country. In this project, the volunteers from the involved companies carried out activities of teaching-learning-evaluation programming concepts through the Scratch application. The program followed the Creative Computing curriculum created by the ScratchEd team at the Harvard Graduate School of Education. The approach aims at involving technology in the educational process of children, providing them with the necessary support to carry out their studies and to achieve school performance in the digital age. The project wants to encourage learning by using the opportunities and tools that modern technology offers so that every child has access to digital education.

The didactic activity was considered as follows:

1. A group of 5 to 15 volunteers within a partner company organize the Scratch Club, with the help of a team lead and "Dalia's Book" Association.
2. Volunteers take part in a training session held by "Dalia's Book" Association to familiarize with the Scratch language and prepare to work with children.
3. The group organizes one-hour weekly meetings at the Scratch Club. The meetings take place in the school's computer lab throughout the second semester. The meetings are held by 5 volunteers, designated by turn.
4. Finally, we organize a Hackathon, where students create animations and games.

The primary education curriculum in Romania does not aim at developing digital skills. In this context, we started the current project to look at the effect of introducing digital competences in primary school. Lack of this dimension in the curriculum imposed as unique conditions in the choice of schools participating in the project the

existence of a computer science lab in the school, and the availability of a fourth-grade teacher to participate with the class at the activities run by IT practitioners. The selected schools were situated nearby the companies participating in the project to ease volunteers participation in classes. Picked classes had an average of 30 pupils (between 24 and 36). The volunteers were IT company employees willing to introduce students to the digital world. Before starting classroom activities, they were taught pedagogy notions for primary classes and programming notions in Scratch. At the same time, the Creative Computing manual has been made available to them. The research is based on the structured interview method, using the questionnaire as a tool. The questionnaire was used to identify the 4th grader's profile before being subjected to a PBDL experiment. The observation method supports the idea that the familiar environment instills children to develop the primary digital competences required to enter the program. In this context, the study's hypothesis is that children of Z generation have digital competences in their early years of study, more precisely they are digitally native.

Data processing was done using the software SPSS13 (Statistical Package for the Social Sciences) for Windows. The selected statistical methods are consistent with the theory and nature of the data processed, frequency assays and the Wilcoxon Signed Ranks Test for p-value <0.05.

Validation of the tool (the questionnaire) was based on the Reliability and Validity method. Following the test, we obtained that it is sensitive to the measured characteristics: alpha Cronbach = 0.756, and the alpha value obtained is significant and suggests that the instrument is suitable for the purpose for which it was built. The study hypothesis is unilateral and according to the results of the analysis there are no differences between the study participants and the interaction effect with the instrument performed with Friedman's Chi-Square = 169,143; p-value = 0.000. So the differences between the items are generated by the answers given by the study participants, the test being able to differentiate students according to how they relate to technology.

Item	**Competence**
I use drawing software (eg Paint).	Information and media skills
I like to work in team. I like the most in team work: …….	Responsibility and adaptability Social responsibility Collaborative and interpersonal skills

Item	**Competence**
I manage documents and files (I create, save, delete files and folders).	Information and media skills
I place pictures, sounds, movies in documents.	Information and media skills
I use the internet.	Intellectual curiosity Self-training
I save pictures and sounds from the internet.	Information and media skills
I use e-mail.	Communication skills
I create animations.	Creativity and intellectual curiosity
I manage CDs and flash memory on the computer.	Information and media skills
I create games.	Creativity and coding literacy

In the study participated 119 pupils (59 male and 60 female participants) of seven educational units located in the cities of Cluj-Napoca, Timisoara, Bucharest, Brasov, Craiova and Sibiu in Romania. The questionnaire contained 10 items created to verify the digital competences of people who have expressed their willingness to take part in the study. The digital profile of future participants in the study is:

- 67.227% (80) confirmed that they use a drawing software while 32.773% (39) said they do not.
- 94.118% (112) confirmed that they like to work in a team while 5.882% (7) have a restraint from teamwork.
- 62.185% (74) confirmed that they know how to manage documents and files (create, save, delete files and folders) while 37.815% (45) said that they do not.
- 50.420% (60) confirmed that they can insert images, sounds, movies in documents, while 49.580% (59) do not know how.
- 100% (119) use the Internet for the following purposes, which are illustrated in the Figure 1:
    - 46.218% (55) use the email while 53.782% (64) do not.
    - 64.706% (77) save multimedia files on the internet while 35.294% (42) do not.
    - 64.706% (77) use USB and CD while 35.294% (42) do not.
    - 44.538% (53) create animations while 55.462% (66) do not.
    - 28.571% (34) create games while 71.429% (85) do not.
    - 23.529% (28) have mobile phones while 76.471% (91) do not.

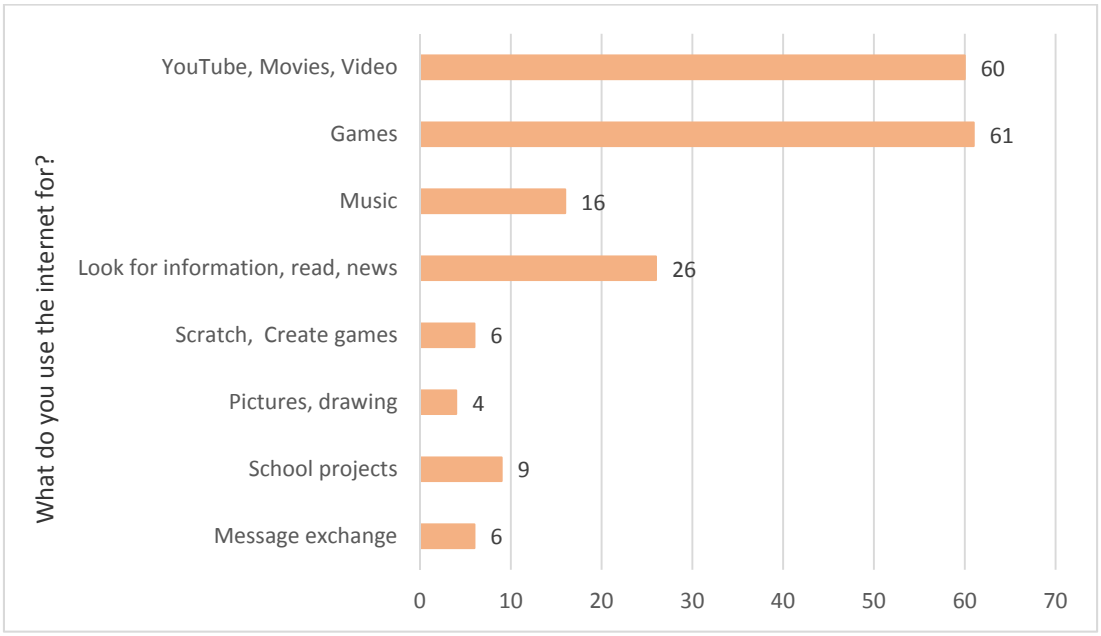

Figure 1. Purpose of using the internet

The study continued with the testing of statistical hypotheses. The research hypothesis is: there are differences between the digital abilities of the participants in the study. According to Shapiro-Wilks, data is not normally distributed, so the Wilcoxon Signed Ranks Test is applied and the following is obtained:

1. there are no gender differences in the use of drawing software Z = -1,036, p-value = 0.3;
2. gender does not influence the pleasure of working in a team Z = -1.187, p = 0.235;
3. gender does not influence the existence of knowledge of document and file management (create, save, delete files and folders) Z = -1.247, p = 0.213;
4. gender does not influence the existence of knowledge about the use of documents and audio / video files in documents Z = -0.273, p = 0.785;
5. gender does not influence the existence of knowledge of downloading audio / video documents and audio files from the internet Z = -0.832, p = 0.405;
6. gender does not influence the existence of e-mail knowledge Z = -1,929, p = 0.054;
7. gender influences the existence of knowledge related to the creation of games Z = -3.041, p = 0.002; more precisely, female gender has greater experience in creating games; this information is illustrated in the Figure 2;

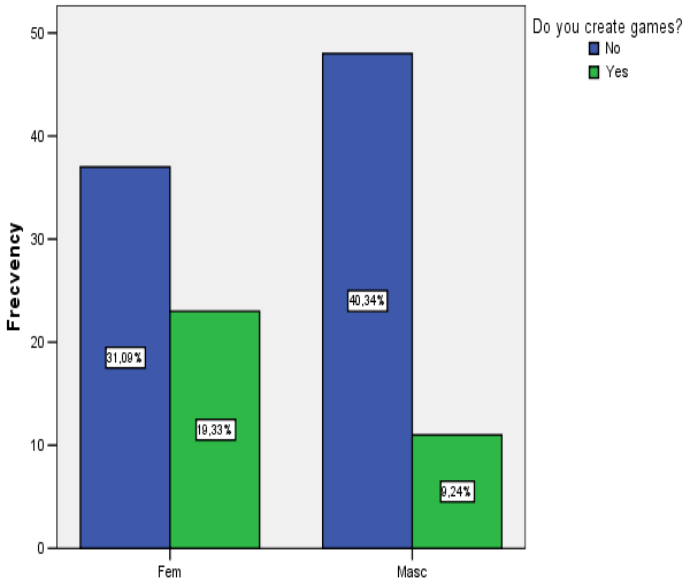

Figure 2. Creativity and coding literacy by gender

8. gender influences the existence of knowledge related to creation of animations $Z = -2.367$, $p = 0.018$; more specifically, female gender has greater experience in creating animations and this is illustrated in the Figure 3.

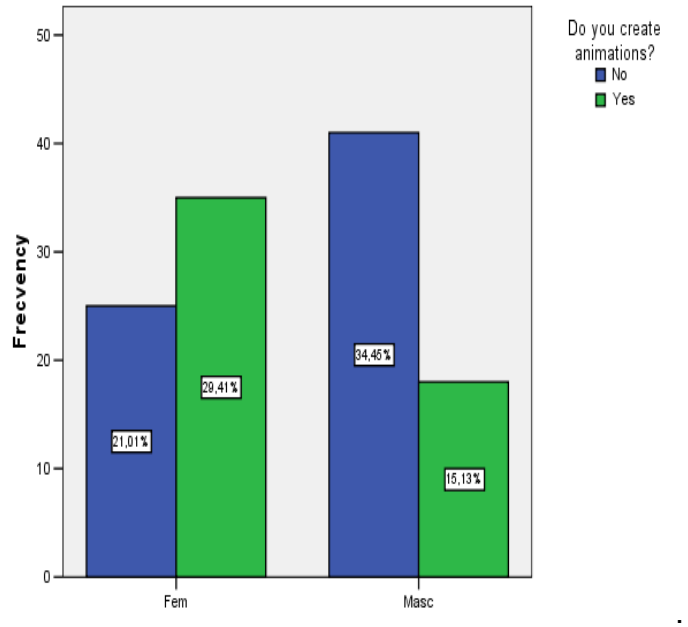

Figure 3. Creativity and intellectual curiosity by gender

From our study results that females have the skills of creativity and intellectual curiosity, respectively, creativity and coding literacy more developed than males.

In this context, we continued the analysis using the TwoStep method to find the number of clusters that exist in a sum of different types of data. The null hypothesis of this stage is the following: there is no difference between the knowledge of the digital competences of the student groups. In order to validate / invalidate this hypothesis, we applied the cluster analysis based on the variables studied. The null hypothesis is rejected, and the result demonstrates that students are grouped into two clusters based on the attributes considered in the study. These groups are characterized by the fact that the value of inertia between classes significantly exceeds the values of inertia within the same class. Therefore, differences based on responses are in the following dimensions: Do you use drawing software? (F = 32.762, p-value = 0,000); Do you work with documents and files (create, edit, delete)? (F = 50.509, p-value = 0.000); Do you use images, audio or video in documents? (F = 102.464, p-value = 0.000); Do you save images and audio files from the internet? (F = 22.618, p-value = 0.000); Do you use email? (F = 37.547, p-value = 0.000); Do you create animations? (F = 132.913; p-value = 0.000); Do you use CDs and USB drives? (F = 8.582; p-value = 0.004); Do you create games? (F = 83.321; p-value = 0.000).

The result of the cluster analysis (K-means method) based on the studied variables demonstrates that the students are grouped as follows:

The first group of students - 53.782% comprises pupils whose responses determined they have responsibility and adaptability.

The second group of students - 46.218% comprises the students who, based on the answers, have established themselves as having creativity and intellectual curiosity, creativity and coding literacy, information and media skills.

The difference between the two groups is due to the fact that those who have creativity and intellectual curiosity, creativity and coding literacy, information and media skills have not developed social responsibility and adaptability. A direct justification is given by the fact that many children grow up in front of tablets and computers (parents being busy working) and do not have developed communication skills and a desire to work in a team. On the other hand, through games they develop creativity and intellectual curiosity, creativity and coding literacy, media skills and also have access to information.

In conclusion, the participants in the study have skills generated by having devices and Internet access since early-life. This facilitates the almost native development of digital age skills, namely: information and media skills, responsibility and adaptability, social responsibility, interpersonal collaboration skills, intellectual curiosity, self-communication, on-line communication skills, creativity, coding literacy,

critical thinking and systemic thinking. Based on the study, we can say that a large number of children living in the big centers of Romania are digitally native, so assimilation of digital knowledge will not be a problem for them.

Based on the descriptive analysis made using the data collected through the questionnaire we validated the study hypothesis: more than half of the children participating in the study have digital competences at the beginning of the study. In addition, two clusters have been identified. The first cluster contains children who have the necessary skills to naturally use IT in learning, without traditional learning being a problem for them. On the other hand, the second group is more geared towards digitization, having potential difficulties in the traditional learning process. In this context, we can say that they will be able to successfully cope with a literacy program, developed accessible by the business community (non-pedagogues).

The results of our study support the results of research in the literature that digital literacy positively influences children's curiosity, problem solving, exploration, autonomy and the development of printed and non-printed skills. At the same time, digital literacy is expanding its awareness potential by increasig semiotic repertoire.

Similarly, we conducted a survey of the teachers involved in the project using the observation method. It highlighted the fact that they need mentoring to increase confidence in the importance of integrating digital technologies into educational programs for children. At the same time, the project demonstrates the need for a partnership based on professional respect between IT&C and IT&C pedagogues.

4. Conclusion

The dream of all teachers is to teach their students everything they know. They enter a classroom with the desire to succeed in this dream and often come out feeling disappointed and disillusioned. Pupils have different goals. Their interest in learning is somehow overshadowed by their desire to get a better grade, distraction from what is happening in their surroundings, and lack of direct involvement in classroom activities. Following the study, we found out that the participating students are not prepared to cope with PBDP in the same way. 53.782% of them have the necessary skills to naturally use IT in learning, without traditional learning being a problem for them. On the other hand, 46.218% of them are more geared towards digitization, having potential difficulties in the traditional learning process.

Most of the teachers are comfortable with the traditional teaching style. However, studies (Greer and Heaney, 2004) have shown that this transfer of information does not remain in children's mind for a long time. Lecture type teaching

is not an effective teaching method. Students should be actively involved in learning. The results of our study demonstrate that 4th grade children have all the necessary skills to participate in lessons where technology is involved. Thus, the lesson turns into an active learning space, the teacher-child relationship being one of collaboration. PBPD represents a simple way to introduce coding and robotics into the primary education. However, the process of introducing PBPD into the curriculum is slow. This is because the use of alternative teaching techniques depends on the size of the class, the availability of classrooms equipped with technology, the shyness of the students, the fear of being mistaken for colleagues, the lack of time, etc.

The general conclusion of the specialized literature derived from the definition of the PBPD concept is that the way of introducing this concept into primary education is possible, but through the game (McDonald, S., & Howell, J., 2012). PBPD has a beneficial effect on the education and training of the child seen as an adult consumer of digital culture.

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Measuring Physical and Virtual Presence in the digital economy era

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Abstract: In the present study, we analyze the students' reaction to the introduction of Web 2.0 as teaching-learning environment in digital economic theory, in a society where the internet was introduced in 1990. The article is the result of a research extended over two years. The research focuses on the study of behavior observed to the students with computer usage knowledge in relation to the translation of their activities on Moodle platform. The students belong to a department of Economics Informatics of a Romanian University. Specifically, we sought if Moodle with its facilities to assist/guide the student in the learning process can increase the percentage of those who will assimilate knowledge of databases theory apply in economic fields, compared to traditional ways of teaching. The outcome of this study can be considered favourable on Moodle application.

Keywords: digital economic theory; Weeb 2.0; behaviour analysis; learning analytics, digital skills

In the present study, we analyze the students' reaction to the introduction of Web 2.0 as teaching-learning environment in digital economic theory, in a society where the internet was introduced in 1990. The article is the result of a research extended over two years. The research focuses on the study of behavior observed to the students with computer usage knowledge in relation to the translation of their activities on Moodle platform. The students belong to a department of Economics Informatics of a Romanian University. Specifically, we sought if Moodle with its

facilities to assist /guide the student in the learning process can increase the percentage of those who will assimilate knowledge of databases theory compared to traditional ways of teaching. The outcome of this study can be considered favourable on Moodle application.

1. Introduction

According (C.C. Aydin, G. Tirkes), (K. Brandl) learning computer science with the help of collaborative tools like Moodle requires development of learning communities in which individuals share their experience acquired during projects. In our study we present how Moodle can help in teaching computer science. Moodle has been chosen by our department to be implemented in all the disciplines. Moodle is designed on the socio-constructivist pedagogy (S. Bianchi, et all). This means that its purpose is to provide a set of tools to support investigation and an approach based on the discovery learning process. We believe that the learning process in computer science is perfectly suited to this theory. So, while Moodle is designed on this theory, Moodle will be more suited to the need of creating an open source community for learning computer science, idea supported also in (C.C. Aydin, G. Tirkes), (S. Bianchi, et all). Next we present a study of generating/discovering the student's behaviour in two of our courses. In one, we use Moodle to teach computer science for amateurs and in the other one we use Moodle for teaching English also for non-professionals. We decided that this study could be done as it imposes the same mechanisms for computer science learning and learning a foreign language.

In order to spread education, many universities of the world have been implemented Moodle learning environment system. Open University from Great Britain became the second largest user Moodle, with 607,536 registered users and 4731 courses. University of Malaga, Spain uses Moodle module for teaching practical of basic computer course (K. Brandl), University of Padua, Italy has developed English course for librarians services (D.L. Davids). University of Pune, India implemented Moodle in Library and Information Science Department (C.C. Aydin, G. Tirkes).

In the period 2000-2001, there were first initiatives for Romania to adapt EU Strategy for Development with particular emphasis on higher education and creating the necessary infrastructure for the implementation and development of e-learning. Then, in 2007, after Romania's accession at the European Union, its efforts in this area have increased. At the present, according to (K. Brandl), (D.L. Davids), most universities seem to have an infrastructure necessary for the implementation of e-learning, focused on management courses. Currently, in Romania many efforts are being made to study the

degree of the availability of both, teachers and students to transfer learning in an online environment. In this research area our study falls. According [8], e-learning platforms are used by students in order achieve both, personal or professional purposes. Also, students have access to e-learning platforms in the faculties where he studied. The research exposed in (P. Griffin et all),(***Moodle) show that the Romanian universities are concerned include to include Web 2.0 technologies in various teaching subjects. Moodle for e-learning course management system was implemented too in Romanian Education System. Many Romanian Universities are using Moodle platform for distance learning programs (Babes-Bolyai University, Cluj-Napoca, Transylvania University, Brasov, University for Agricultural Sciences and Veterinary Medicine, Iasi, University for Agricultural Sciences and Veterinary Medicine, Bucuresti, Agora University, Oradea, Vasile Goldis University, Arad), for students teaching training (Babes-Bolyai University), Postdoctoral School of Biotechnology (University for Agricultural Sciences and Veterinary Medicine, Cluj-Napoca).

Today, in Romania more and more students are accessing and using the Moodle platform and their facilities in the learning-teaching process. It is important to monitor the impact of this learning tool to quantify the amount of acquired knowledge in more and more areas. Moodle facilities are considered for Romanian teachers training (S. Bianchi, et all). The impact of this modern tool for learning-teaching process was analyzed in mathematics field (C. Felea, L.Stanca).

In the literature, the Moodle's impact in the learning process has been investigated by many specialists of whom we tried to fit the results obtained in the research a long aside

1. Escobar-Rodriguez and (T. Escobar-Rodriguez, P. Monge-Lozano) who analyzed students' intention to use platforms like Moodle to improve the teaching-learning process at the Technical University of Madrid. The result of their study shows that students believe that Moodle help them to improve their knowledge and skills.

2. Paragina et al (F. Paragina, et all),(S. Paragina, et al) in their study concluded that the management of a course through Moodle is a very complex activity which requires that people who use Moodle have to have very good knowledge of the platform on which to add then the e-learning skills.

3. In (C. Felea, L. Stanca) it is concluded that the learning tools based on IT technologies allow a flexible and interactive learning experience that institutions use to offer a high education, personalized for each category of students. According to (C. Felea, L. Stanca) student's needs in the global context require fast access to the information that eventually allows fast learning. In online courses, all statements are mediated by technology; in most cases this is a Learning Management System (LMS) such as Moodle.

4. In the literature, specifically in articles (G. Grosseck) (C. Felea, L. Stanca 2013), (C. Felea, L. Stanca 2014), (R. Lacurezeanu, et al),(A. M. Preda, et al.), (E. Popescu, D. Cioiu) efforts are focused to measure the degree of involvement of the students, the teacher being by default involved, in the educational process with Moodle's help. The involvement of the teacher is considered high due to his efforts to deliver material and organize the entire course management system. In (T. Escobar-Rodriguez, P. Monge-Lozano) it is studied whether teachers who develop such platforms have the attributes and behavior their students require: the enthusiasm for the subject and for teaching, the commitment to give to students the appropriate support in their learning process, its interest in getting directly involved in the learning process of students and find ways to help them learn.

This study will examine the involvement of students from the real domain in a specific course where Moodle has been introduced in the last year. In this context in the process of creating the teaching materials, we tried to answer the demands of the technological progress, which caused a large number of modern teaching methods: meaningful learning, collaborative learning, inquiry learning, etc. These methods promote the so-called competences of the XXIst century (21st Century Life Skills), ie creativity, critical thinking, collaboration ability and problem solving skills. Technology has eliminated physical boundaries of the country, so students need to have the skills to be able to turn both into global citizens as well as employees acting in global companies where there is a wide range of cultures that are necessary to live together in harmony to achieve success (P. Griffin) As a result of this development according to (M.A. Trenas, et al.), a teacher must design teaching materials and to organize the whole process of teaching and learning so that students are given a complex framework that promotes both structured and collaborative and individual learning. Consequently, the student will have to solve problems deeply rooted in the labour market, which require both individual and team work. The purpose of these scenarios is to simulate a working environment in which the student must be able to make and take decisions personally and collectively which they then assume regardless if they lead to success or failure. Reaching the goal required the development of a whole process of developing teaching material and course structure, as follows:

1. We joined the beliefs / ideas of (A. Bullimore, Q. Bullimore) whereby education through skills training is based on several principles: defining and developing skills for an appropriate socio-professional insertion or for the formation of mental abilities in different situations; integration of knowledge rather than individual acquisition; orientation to learning complex tasks; selecting motivating and challenging situations for the student to make significant; the assessment in an explicit way by proposing complex task;

2. According to (S. Bianchi, et al) education focused on skills creates opportunities for students through which they can develop integrated skills, performance-oriented, giving necessary and sufficient knowledge to solve various practical problems;

Following the effort to develop and align materials to a collaborative environment like Moodle we obtained a research that spanned over two years where we watched the new student reaction, measuring the degree to which he is prepared to extract information at his own pace.

Student's behaviour considered in digital economy implemented on Moodle. The course content will be exposed to the students in the classroom using power point presentations. The applied section of the discipline, organized as seminar takes place in laboratories equipped with computers. The course content is divided into 14 studied weeks. Every week there is a course and a seminar. At the course section, the teacher presents the theoretical concepts combined with practical examples. The seminars also comprise practical examples, starting from the course's theory. From both the course and the seminar homework is formulated. Homework will be resolved after completing the course information, the seminar examples and the bibliography. Each student hands a written homework to his teacher. The homework will be corrected and assessed by teacher. Also, each student will present to his colleagues an original project. The project theme will be chosen starting from the bibliography. In assessing the project it will be considered the originality, bibliography's compliance and presentation style.

The participants at this study are individuals who have medium or high level knowledge (formation) in the use of computers. The purpose of the course is to provide to the students the database theory. This topic is essential for a student at a business faculty. In the first year of the Moodle implementation at our faculty, both the teachers and the students were in the first stage of a special tool use in their activity. In the second year, the teacher better knows this teaching environment, and thus he can provide additional information to his students. The teacher acquires an overview of the respective strengths or weak points of the Moodle instrument use in learning-teaching process.

2. Material and methods

2.1. Research Objective

The assumptions of this study focus on the observation of the student who has ITC knowledge, in the context of learning-teaching activities translated on online Moodle platform. Specifically, we sought if Moodle with its facilities to assist /guide

the student in the learning process can increase the percentage of those who will assimilate knowledge of scripting language compared to previous years.

2.2. Method

The study was done on 124 students of the economic field for a period of two consecutive years. The first year of the study overlaps with the time when the Moodle platform was implemented in our department. Student's behaviour hypothesis analysis to Moodle changes from one generation to another.

Data was collected using logs on to Moodle platform. The data aim to quantify the students' interaction with the Moodle course page via views components. For the first year of study was chosen time period from October 2015 to February 2016. For the second year of study of the same students, period October 2016 to February 2017 was chosen. Analysis was designed in two stages. The first stage comprises dynamic of page views calculated for groups with different level of computer usage within each academic year. The results of the first stage generated the second step of the analysis. In this moment the medium level and the advanced level of usage computer was compared in the two consecutive academic years considered. In order to test statistical hypothesis SPSS 13.0 application was used. First we applied the Kolmogorov-Smirnov normality test. Then, based on the results of this test, we chose further nonparametric Mann-Whitney test, correlation and regression analysis and Kruskal-Wallis test.

Analysis of data collected via questionnaire provides the following conclusions: of the amount of 124 students surveyed 81.5% are female, while 18.5% are male. Also, from the total specified, 57.7% have a medium level of usage computer and the remaining 42.3% have an advanced level of usage computer. Regarding the interest for database theory, we conclude that: 45.6% have low interest, 27.8% average interest and the remaining of 26.6% have high interest.

The recorded data provides for the first year of study the following results: 50% of students show low interest, 27% have average interest and 22.2% exhibit a high interest for the study of database theory. Regarding the level of knowledge in computer usage we established: 55.6% have medium level of knowledge and the remaining of 43.5% has a medium to high level of knowledge in computer usage. Also, the average mark obtained for the seminar participants was 5.73 and the corresponding standard deviation was 2.31. The average values recorded via view inputs during December-January period were: October 0.87, November 2.6, December 3.24 and

January 3.16. Corresponding standard deviation was respectively: October 1.26, November 2.93, December 2.73 and January 4.11.

Regarding the 2nd year of study we concluded that 41.1% of students show low interest, 30.6% have average interest and 58.9% exhibit a high interest for the study of database theory. The level of knowledge in computer usage provides the following percentages: 58.9% have medium level of knowledge and the remaining of 41.1% has a medium to high level of knowledge in computer usage. Also, the average mark obtained for the seminar participants was 6.54 and the corresponding standard deviation was 2.60. The average values recorded via view inputs during December-January period were: October 1.44, November 3.41, December 4.40 and January 4.03. Corresponding standard deviation was respectively: October 1.76, November 3.39, December 3.98 and January 4.78.

The first step was to test the differences of view inputs between the two academic years. Through calculation of the statistical indicators of centrality we obtained the following results:

1. In 2015-2016 the mean value for view inputs was 2.41,

2. In 2016-2017 the mean value for view inputs was 3.821

Consequently, the Mann-Whitney test ($U=178$, $p=0.04<0.05$) indicated that there exists differences between the number of visits from the two years namely the mean value of view inputs recorded in the second test is greater than the value of view inputs from the first year. In this context we analysed each month to check where the differences are coming from. The test continued with the application of the U Mann-Whitney test for each month of study and we observed that the number of view inputs significantly increases in the second year only in October, November and December that concludes that the desire of students to get involved increased from one year to another.

Table 1. View comparison of the two years of study

Year of Study	Month	Average	Stdev	U-Mann-Whitney
2015-2016	October	0.87	1.256	U=6406.000; p=0.012
2016-2017		1.44	1.763	
2015-2016	November	2.23	1.912	U=6638.000; p=0.04
2016-2017		3.91	1.395	
2015-2016	December	3.23	1.725	U=6460.00; p=0.027
2016-2017		4.40	1.988	
2015-2016	January	3.75	1.074	U=6883.000; p=0.139
2016-2017		4.03	2.785	

From the above table we could observe that in the second year, students show interest in getting involved right from the first month. In January, the interest has increased in both years. This is justified by the fact the January is the month designated for practical exams.

Statistical analysis imposed the application of the Kruskal-Wallis test for independent and unequal samples in the two years of study. The hypothesis we have tested is: There exist differences in the desire to study the database theory given by the student's desire in the online activity. The student's implication degree could be measured by the number of view inputs generated by them. After the study we have observed that in both years there exist three categories of students. From the first year of study we observed that we have students with a low activity with an average of 4 visits/month, students with average activity with 8-10 visits/month and students with high activity with more than 10 visits per month. The resulting statistical result is 9.94 based on a p value <0.01 with 3 freedom degrees which means that we dismiss the hypothesis of null test and we obtain that the differences between the categories in terms of the degree of processing information / material provided by course and therefore in terms of the degree of knowledge assimilated during the semester.

In further study, we tried to determine the existence / non-existence of a correlation between the number of view inputs and number of messages for each category of student identified. The result obtained and interpreted according to Colton (1974) (T. Drugan, et all) is as follows:

For the first year of study:

1. In the student's category with low activity with an average of 4 visits / month we computed the Pearson Bavaris' correlation coefficient and we obtained $r = 0.37 < 0.5$ which means a weak correlation with low degree of association. The regression line that approximates the tendency of the dot cloud is based on the equation: $y=0.86 x + 305.4$ and of the coefficient of determination $R^2 = 0.045$. This equation has a very low level of trust, with a coefficient of determination of only 0.136, which means that there is a correlation between the activities only for three users in a hundred.

2. In the student's category with average activity of 8-10 views / month the Pearson correlation coefficient is $r = 0.768$ which means a good correlation between view inputs and messages. The regression line that approximates the tendency of the dot cloud is based on the equation $y = 6.762x + 145$ and the coefficient of determination $R^2 = 0.589$. The trust level of this equation is good, with a coefficient of determination of 0.589, which means that there is a correlation between the two activities for six users in ten for this group.

3. In the category with a high activity, i.e. more than 12 visits / month, the Pearson correlation coefficient was r = 0.45 < 0.50 which is a mean to weak correlation with a low degree of association as shown in the below table and chart. The regression line approximating the tendency of the dot cloud is based on the equation: y = 0.361 x + 276.61 and on the coefficient of determination R^2 = 0.456. The level of trust of this equation is very low, with the coefficient of determination being 0.207, which means that there is a correlation for the two activities for two users in te for this group.

For the second year of study:

1. In the student's category with a low activity with a mean value of 6 visits / month, the Pearson Bavaris' correlation coefficient is r = 0.40 < 0.50 which means a weak correlation with low degree of association. The regression line that approximates the tendency of the dot cloud is based on the equation: y = 0.83 x + 405.4 and of the coefficient of determination R^2 = 0.16. This equation has a very low level of trust, with a coefficient of determination of only 0.2, which means that there is a correlation between the two activities only for three users in a hundred.

2. In the second category with 8-12 visits / month, the Pearson correlation coefficient is r = 0.787 which means a good correlation between view and messages. The regression line that approximates the tendency of the dot cloud is based on the equation y = 6.962x + 245 and the coefficient of determination R^2 = 0.619. The trust level of this equation is good, with a coefficient of determination of 0.619, which means that there is a correlation between the two activities for six users in 12 for this group.

3. In the third category with high activity with more than 12 visits / month, the Pearson correlation coefficient was r = 0.48 < 0.50 which is an average to weak correlation with a low level of association as presented in the below table and chart. The regression line approximating the tendency of the dot cloud is based on the equation: y = 0.361 x + 276.61 and on the coefficient of determination R^2 = 0.389. The level of trust of this equation is very low, with the coefficient of determination being 0.23, which means that there is a correlation for the two activities for three users in ten for this group.

5. Conclusions

We consider the results of the analysis encouraging since the students accept and engage in the new teaching environment created through the usage of web 2.0 tools. This gives us the desire to continue the research further on in order to have an overview of the student's behavior in this environment. Though small-scale the present study may be considered as evidence that Web 2.0 tools can be used successfully in

higher education, in particular for participation and response to digital economic theory. However, in addition it is required a regular observation of both classroom and online participation to confirm the results of this study and to improve the interaction of Moodle's participants. Further, our research will focus on more in-depth analysis of how the new learning environment can support a systematic and efficient acquisition of databases theory to facilitate collaborative skills of students. Therefore, we decided to conduct a content analysis on various products of individual and collaborative work performed on Moodle and to analyze, compare patterns of participation-interaction (teacher-student, student-student) resulting from such web 2.0 environment.

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Methodology for Creating Data Visualization. A Case Study for Interdisciplinary Timelines between 1750-1900

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Abstract: The present study was originally aimed at creating a helping tool for teaching and understanding art history through the use of visual schemes. Despite the fact that timelines are often present in both history and art history books their status is rather that of footnotes (Wolf, Gombrich 656-663, * * * 392-395) and a study for their methodology and usage was truly lacking. Considering the way in which simple data visualization can comprise vast amount of information and deliver it in an efficient manner, it makes it worthwhile to ensure its scientific quality and accuracy through proper methods, as well as to actually creating ones that are both simple and eye-catching. Thus this paper is a result of a personal interest in the development of such tools and the challenges encountered along the way. Offering valuable information in a short glimpse through simple graphics over the life and the artistic creation of various artists is only enhanced by the opportunities provided by digital tools and the virtual environment, so it is perhaps an auspicious time to start seriously considering this type of research.

Keywords: digital tools; data visualization; visual schemes; timelines; learning

1. Introduction

Seeing as though the beginnings of this research date back some years to when the realm of Digital Humanities was relatively unknown, especially in Romania, the very first obstacle it encountered was the delivery method of the visualizations. So lacking the concept of interactive use of the timelines the very first projects were simple image-based documents fit either for a screen, or eventually even for printing.

Also due to the fact that everything had to fit in one single image, the greater scope of offering a global, long-term view in a single picture was unfeasible and had to be abandoned. This of course led to the creation of separate images for various time frames: one spanned from 1250-1600 (Fig. 1) and contained the Renaissance masters, 1450-1700 – the Baroque era (Fig. 2), 1650-1900 (Fig. 3), the Impressionists 1800-1950 (Fig. 4) and the modernists between 1850-2000. The overlap was of course intentional as they were meant to be used together rather than singularly. Through these images the aim was to demonstrate a certain simultaneity and concordance between contemporary artists even those living and working in different countries, and for each period a number of 25 artists were chosen, each also represented by 2-3 significant artworks. The manner in which they were received, both by fellow scholars, but also by younger students has proved, be it only on a personal level, the relevance of a synoptic vision in the field of art history and more so in the way this could be connected to the larger field of history.

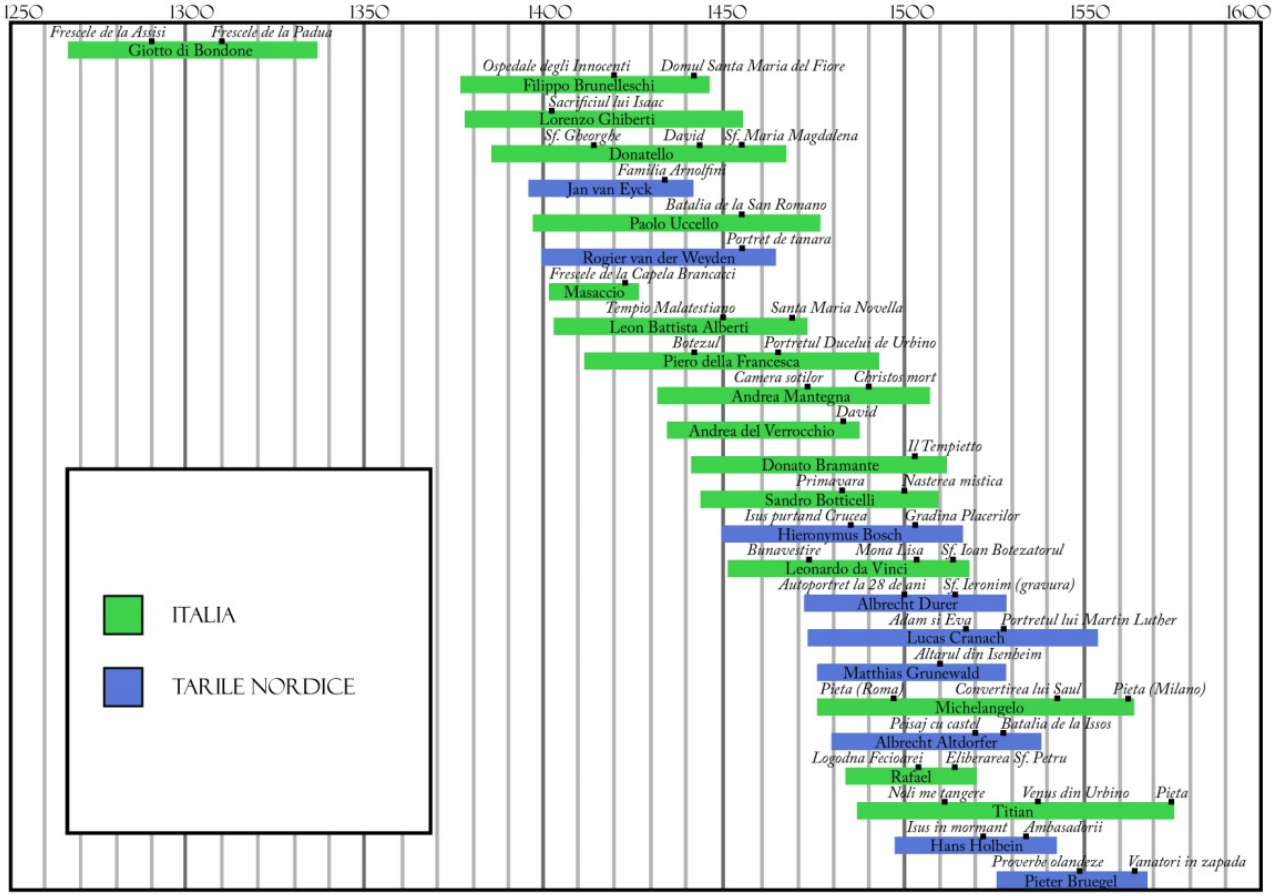

Figure 1. Timeline of artists between 1250-1600

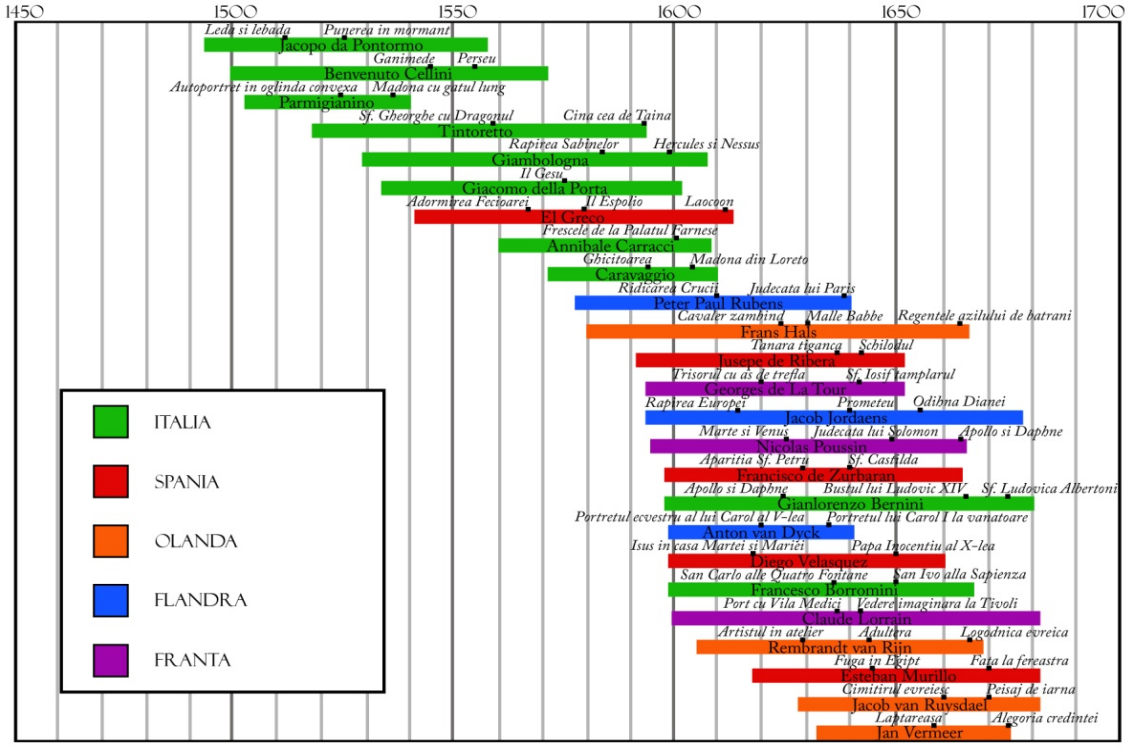

Figure 2. Timeline of artists between 1450-1700

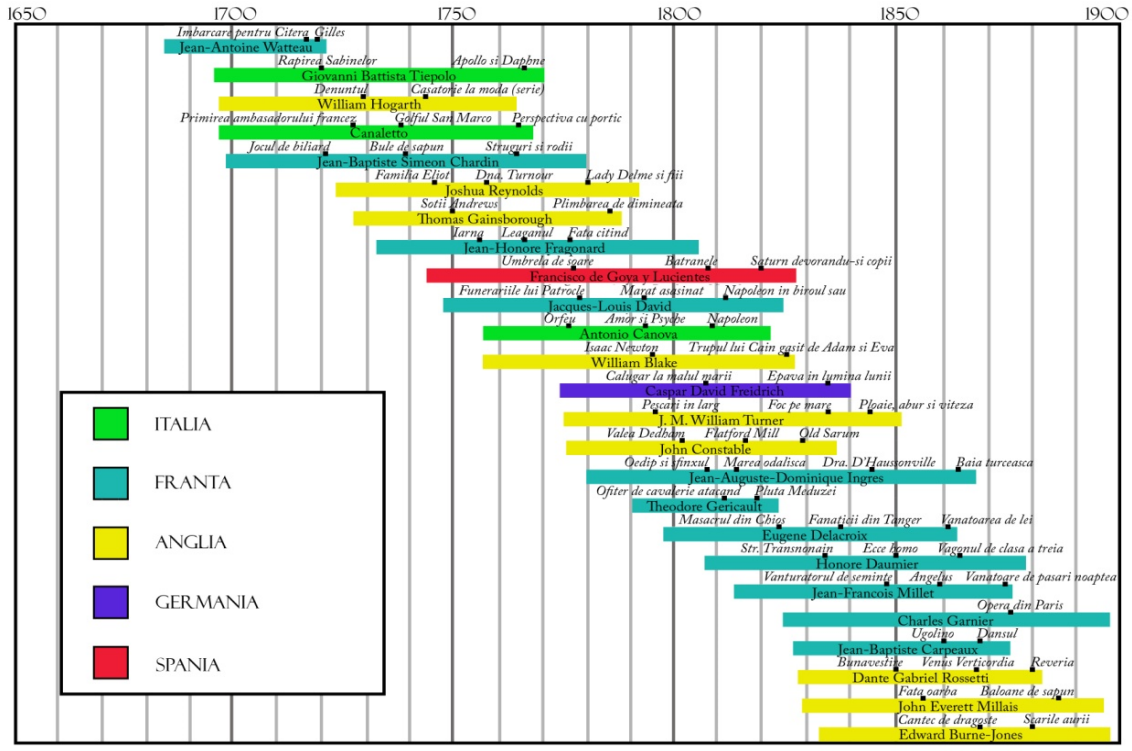

Figure 3. Timeline of artists between 1650-1900

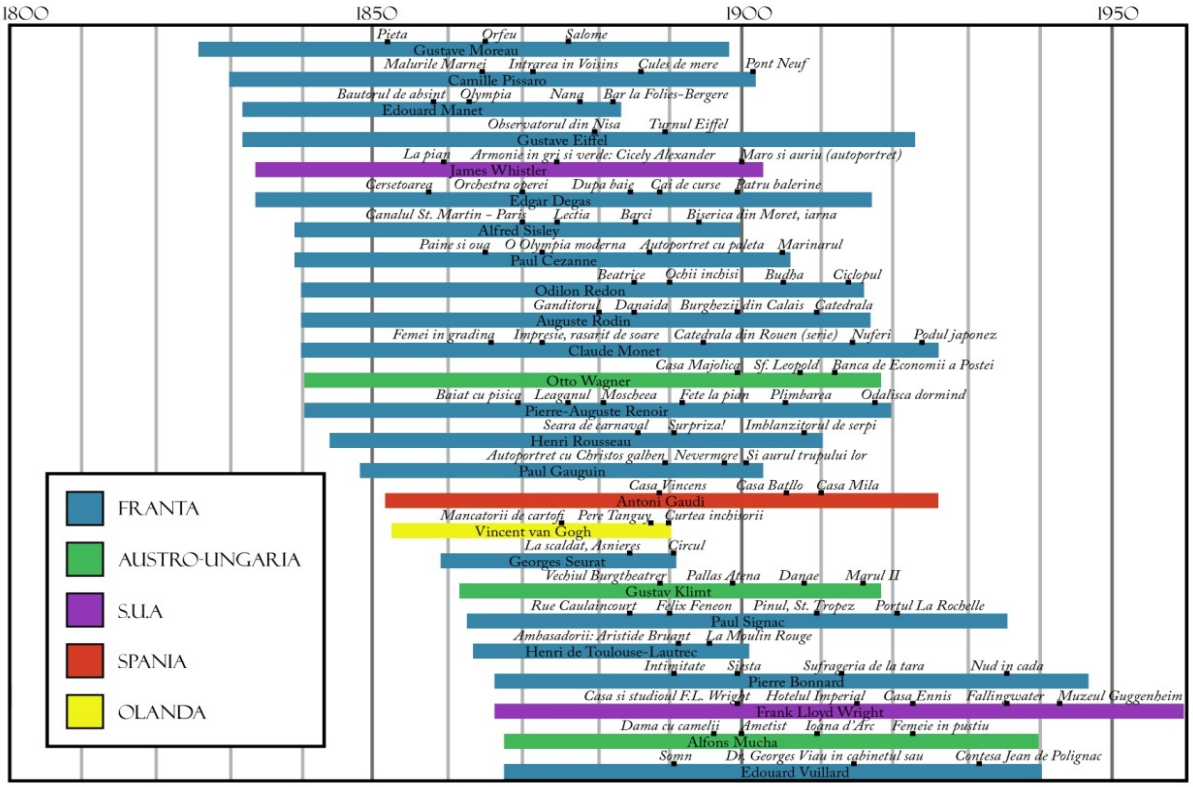

Figure 4. Timeline of artists between 1800-1950

The general lack of simultaneously presenting in front of a classroom both historical and artistic events that take place at the same time but maybe in different geographical spaces, although understandable due to sheer lack of time, makes for a biased understanding of said events. They often lead, in the younger minds of students towards a fractured picture of the era as if these events happened independently from one another, particularly when the connections are more subtle. For example when it comes to teaching Renaissance art, there is always a clear distinction between Italian and Northern manifestations, and more often than not, it is always implied that the second derived directly from the former. It is thus lost in this oversimplification, the fact that the masters of Northern Renaissance were contemporaries with those of the Italian Quattrocento, a fact which is almost never mentioned, nor particularly implied. The sheer vastness of European Baroque as well as its geographical particularities also means it is fit to be taught in the sense of national schools – first Italian, then Spanish, then Flemish and eventually Dutch and the French Classicism is in a group of its own – again greatly fragmenting the greater picture. Timelines come in to bridge this gap through a simple visualization, the picture is complete again: you can find out rather surprisingly that Gianlorenzo Bernini was a contemporary of Claude Lorrain,

and that they were both still alive and still working during the untimely death of Jan Vermeer van Delft. These three masters, are never presented simultaneously due to the great geographical and stylistic difference between them, but this only deepens an unjustifiable gap and creates an erroneous picture of the time frame in which they belonged, somehow making it seem more uniform that in actually was.

Things get increasingly more complicated as we venture on, since art history, taught and written predominantly as a history of styles, seems to be unable to manage individual personalities that do not easily fall in a category – just look at the examples of Goya, Ingres or Constable, which are rarely mentioned among their contemporaries. Concerning modern art, things are more difficult still due to the multitude of currents, isms, and artistic groups which are active during the same time. Timelines do not become less valuable or less interesting, but rather through them one can take note of how a certain geographical space is favorable for a certain style or aesthetics. Just like as the German Expressionists and the French Fauves have very different approach and results despite the fact that they fully overlap time-wise.

A particularly interesting aspect of the timelines, specifically from a pedagogical perspective, is that they are perfectly suited for an interdisciplinary view, something which is no small feat, especially in this day and age where most domains tend towards such an approach. Thus the size and complexity of such visualizations is limited only by the discourse that they follow. A timeline can simply be an axial section – even for one single year which is particularly interesting for one's research and it can contain worldwide events from the most varied of domains and activities (history, literature, fine arts, music, science, medicine, sports, etc.). Until then this has been a rather rare method of using timelines, obviously limited by the printed medium, but exceptions still exist (Wolf). But this is ultimately unfortunate, because it is of course easy to see and say that artists are influenced by one another, but it is not less true that they are also influenced by many other factors as well – history, literature, music – and that the influences often go both ways! Seeing that art is at a loss when taken out of its larger sociological context (Hauser 6), a point should be made to offer as large a context as physically and visually possible (Gariff).

2. The Methodology of Constructing a Timeline

2.1. The Need for Interdisciplinary Timelines

The main reasoning behind the creation and use of timelines basically comes from the fabled ignorance over the proper chronology of facts. As with history itself, art history is also tributary to the principle of causality, so for the truthful knowledge

over a phenomenon, first one must be aware of its source. Timelines offer the opportunity to view these chronological facts in an explicit way. Since the source of art often stems from historical events, literary works, or contemporary personalities, the need for synoptic charts (* * * 392-395) or timelines for multiple fields, is quite obvious. Consulting a graphic scheme makes the discovery of connections much easier and also helps in quicker remembering the "landmarks". From all the aforementioned interdisciplinary connections the most important one is the one the arts have with history. In the case of historical events, the direction of the influence is notably a one way street: there are perhaps thousands of artworks illustrating various wars and conflicts for example, but there is yet to be a war that started from a work of art. Just like La Marseillaise provided the soundtrack for a revolution, and Delacroix's Liberty Leading the People gave it a symbolic image, along with Gavroche that dies on the barricades in Hugo's famed novel – all of which creating an assembly of the era, but none of which actually influenced the developments of the French Revolution. And such examples can go on and on. What is interesting though is that the need for connections, even though not quite so evident, still remains even for works that are not so deeply embedded in propaganda, be it only for the relevance they have for other fields such as music, or literature, but also since no work of art can truly and definitively be extracted from its historical environment.

The interdisciplinary ties and influences perform in a crisscross manner and on multiple levels: fine arts and history, literature, and music, literature and music, history, literature, and music respectively. Due to this great number of complex variations the need for an encompassing timeline chart is clear. In order to build a data visualization that is as close to the true dimension of the phenomena the only feasible solution, that can begin to depart from the utopical realm is employing digital means. One cannot obviously view *everything* all at once, not even on a scheme, but nor do they need to, however through an interactive timeline that uses filters and or layers the viewer/user is offered a great number of options so that the timelines become useful in individual and general ways.

Besides the interdisciplinary connections, the timelines have an indisputable added benefit, namely that of creating connections between artists and their themes. These can function among contemporary masters but just as well among those separated by long spans of time. Through timelines one can observe the iconographic evolution of a particular theme or motif with the constants as well as the mutations in the representations and concepts. For example one can trace the modifications brought in the representations of David during the Renaissance and Baroque from Donatello, to Verrocchio, to Michelangelo, and ultimately to Bernini and better analyze their

stylistic differences. But on a larger time frame one can also observe the frequency of certain poses such as a reclining nude that can all be traced to Giorgione's *Sleeping Venus* (c. 1508), first through the takeover of the much more famous Titian (1534), but then also through the more modern replicas of Ingres (1814), Manet (1863), Matisse (1935) up to the statement of the Guerilla Girls (1989).

This is without doubt a very rich subject and it is also here where the bias of the discourse also comes in. When selecting the artworks, and even when creating the filters, the author of the timelines can lead the visualization the way they see fit. Or even if they choose to be objective, the user can ultimately select whatever it is that they see relevant and thus interpret the data in a very subjective manner. However we should not consider this as a pitfall for timelines themselves, much more than it is proof of a subtlety that is not necessarily apparent when one first comes upon them. It is perhaps best to acknowledge it and proceed forth with caution, and not take them utterly for granted as always being truthful, just as a good scholar would do with any tool or historical text, where critical thinking is expected to be employed.

2.2. Applicability of Timelines for Various Historical Eras

As we have shown before timelines are not limited to a certain period, but the same principles should be followed in order to create a timeline for any era or even for a longer-spanning historical even versus for a single year. Of course the specificity of the period should always be taken into account. A relevant example is the timeline illustration in Gombrich's famous volume (656-663), suggestively titled *5000 Years of Art History* comprising the time span between 3000 B.C and 2000 A.D. The vertical columns belong to centuries, while the horizontal lines mark the geographical spaces according to their past and present relevance. On this single chart you can see the extension of various styles and cultures beginning with the Akkadian one and ending in Postmodernism. What is striking at first glance is how much the span in time shrinks for each style as if time really started to flow faster. Thus the Middle Kingdom of Egypt and the Bronze Age in Crete-Mycene both span approximately 600 years or so, the Gothic is only about half as long. The "lifespan" of currents from Renaissance to Romanticism is of only 100 years, with the first also being the longest running, and they are followed by the drastic compression and congestions of styles in the modern era from Impressionism to Op Art that has a span of approximately 20 years.

All of this ultimately means that the graphics need to be both consistent in order to maintain the same structure and relevance, but also adaptable enough as to accommodate each era and to be just to its specificity. Needless to say from a

strictly visual point of view and also from the challenges in delivering an efficient visual scheme – the timelines themselves tend to get increasingly more crowded as time moves on. But as we have seen this is not necessarily something that cannot be overcome.

2.3. The Content of the Timelines

Considering the data itself and the information that is to be available in the timelines, these will always be in direct connection to the discourse the timeline author favors, and in this sense they can become rather subjective or take into account very narrow themes. For example if the interest lies in following equestrian statues throughout history, then those particular examples will be chosen or highlighted. Thus the situation might arise that some notorious artists could be potentially left out since they did not approach the equestrian theme in their careers, just as well as some lesser known artists might make an appearance due to the fact that they focused on animal, particularly horse sculptures. Also it is worth to mention that the time span itself is also left to the decision of the author. In this sense the timelines will not be crowded and they will be extremely efficient in a narrow iconographical study.

There is no right or wrong way to construct a timeline as long as it suits the needs of a research as long as one stays true to the data and of course the chronology. However a greater scope would be that of offering a holistic view over the course of art history. This goal should be approached with realism as there are a great deal of general art history books and textbooks that claim to be exhaustive and yet they are far from that. This rings true for graphic representations and data visualization as well since the tendency to overcrowd them is not at all beneficial as it will make them impossible to read and thus render them useless. So, even though the present case study is aimed toward a “bigger picture” it is still conditioned by certain spatial limitations. These limitations are greatly expanded in the digital medium, but they are there nonetheless, and a more honest approach would be to be conscious of them and focus on capturing the essence and the main protagonists, similar to Gombrich, which still proves timeless.

According to this principle, the selection used for the timelines presented here have been conditioned mainly by the degree of presence artists have in art historiography especially when considering textbooks or general art history texts. There are of course artists and authors that could not have been left out of any scholarly research even if only because of the fact that they are too deeply embedded in the collective conscience. The usual suspects so to speak. No matter how redundant the

presence of Picasso, Dickens or Beethoven might seem, their inclusion is compulsory specifically because they are so well-known and popular and can be used as a milestone for the readers. Even when addressing a more elevated audience their presence is still useful as it can serve as the scaffolding for the entire project.

Another criteria strictly connected with the first is the degree of popularity the artists have among the viewers. The more popularized they are, the further along in the collective memory and attention they are, and thus there is an ever increasing interest in their work, albeit on a more superficial level. It is beyond the scope of this research to unravel or judge the obvious stereotypes and they have thus been included. More rarely the criteria of popularity during the artist's lifetime has also been used, even though they might have fallen out of fashion later on, or they had little to no influence in the development of artistic styles. Such is the case of the Academists whose popularity was neither the result of genius, innovations or influences, but rather directly connected to their context and current ideology. Their art was already considered obsolete during their lifetime, and are largely left out of general studies, but they have had a considerable presence which is not easily ignored for the sake of truthfulness of the epoch.

The most relevant and valuable criteria are those that reference the implications of the artworks or better said their influence over other artists. In this sense certain artists that have had a considerable influence be it on their contemporaries or further along down the (time)line. These models are of higher value than popularity, or a particularly interesting biography. Just as a new style does not come out of thin air, the particularities of a period will be superficial if one does not acknowledge the initial starting point. This is why it is of high importance that the timelines marks the beginnings and the permutations of a model and its conclusions.

Besides the stylistic innovations, attention must be paid to the technical ones that have since propagated. This can be either a new technique in sculpture, or the pioneers of oil painting, or even photography. These innovations are often interdependent with stylistic ones just like oil paints offer a different aesthetics than water-based ones, and so the medium an artist uses is just as important in an analysis of his works, and one might notice a predisposition for one manner of the other. Yet another major criterion laid in identifying not only the artists that bring along a new style, but also those that provide the peak of a current. The degree of interference provided another reason in the choice of artists, especially considering the interdisciplinary nature of the timelines. In this case it must be mentioned that it applies rather to the choice of works than to that of the artists themselves.

Due to the fact that the very first difficulty lays in the immediate sense that a style-based art history is inefficient offering a global perspective on art and causes major rifts in chronologically overlapping eras, the present case study has been chosen as a fixed period of time and was meant to offer a cross-section through many currents. Specifically they are artists born between 1750 and 1850 regardless of their style. This hopefully proves the full potential of the timeline visualization, as complete and as objective as possible. The chosen time frame thus passes through a number of styles, demonstrating the universal applicability of timelines. This was also done for the connected domains I have mentioned beforehand.

For the art history layer of the timelines a number of 32 artists were chosen, from Henry Fuseli (1741-1825) to Vincent van Gogh (1853-1890). Concerning the layers dedicated to literature and music the criteria for choosing the authors was the as described above for artists. Thus the literature layer contains 28 authors from Goethe (1749-1832) to Oscar Wilde (1854-1900), philosophers like Hegel, Schopenhauer of Nietzsche, but also art historians. The composers are the least represented, numbering 17 of them from Mozart (1756-1791) to Debussy (1862-1918). The criteria here were much stricter and followed those who brought an immeasurable record in universal culture or have been in a deep relationship with artists and writers.

The history layer contains events of major involvement like the two World Wars, but also national events that had repercussions on the fate of the entire continent, such as the French or the Bolshevik revolutions. Important historical characters have also been marked like Napoleon or Queen Victoria whose reign defines an entire epoch, Otto von Bismarck or Abraham Lincoln.

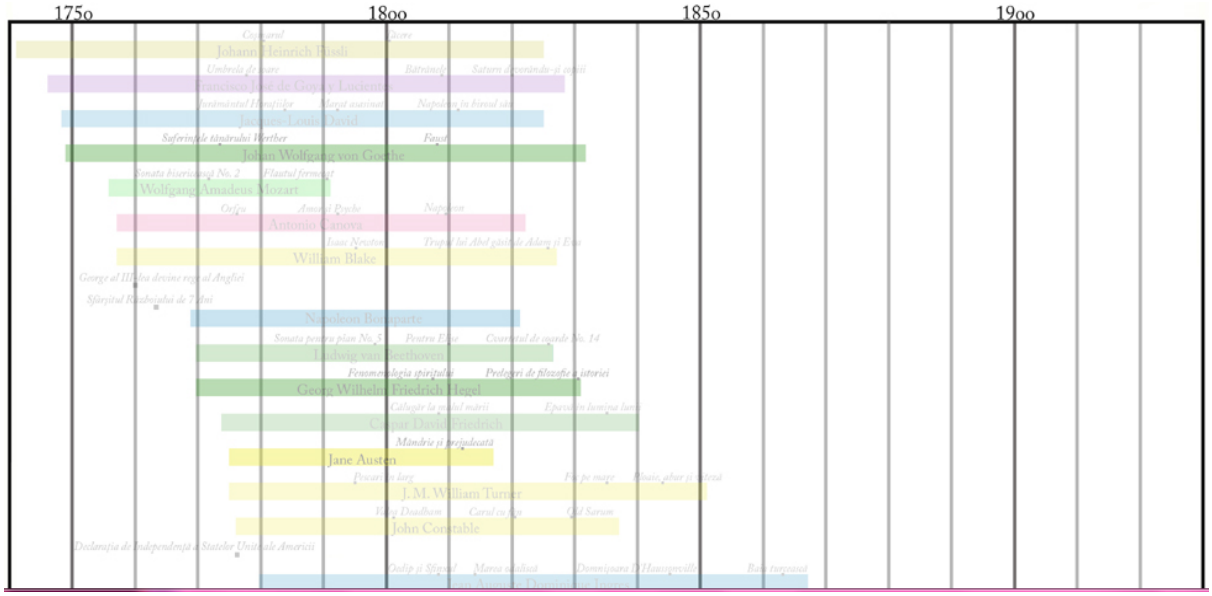

Figure 5. Detail of 1750-1900 timeline with all four layers in various opacities

When it comes to the chosen artworks, a couple examples have had to suffice, but an effort has been made in choosing relevant artworks from various stages of an artist's life and career. In the case of the literature stylistic changes are harder to pinpoint, and thus the most remarkable writings have been chosen, same as with philosophers. A different facet is however the writings on art which easily mark the values of an era and the way they are reflected in contemporary art. For example Wincklemann's eulogy of antic art is perfectly inscribed in the revival of classical values and their imitation (Tătaru 13) as seen in the works of Jacques-Louis David. Or the influence John Ruskin's works have on the revival of the Gothic and on the art of the Pre-Raphaelite Brotherhood (Ruskin 55, Marin 19).

Concerning musical works the compositions were chosen on the degree of popularity and relevance, a task which proved difficult due to the large number of works by the same composer. The focus on art history is of course the visible bias in this methodology, since if it were created for a different field the proportion would have been reversed. But for now, the main motive behind the choices lay in their capacity to establish clear interdisciplinary connections.

Such examples are the Edgar Allan Poe's poem *The Raven* (1845) and Paul Gauguin's painting *Nevermore* (1897). A direct relation between a writer and an a composer that is easily observed is Stéphane Mallarmé's *The Afternoon of a Faun* (1876), the musical replica belonging to Claude Debussy *Prelude to the Afternoon of a Faun* (1894), and yet another example is Emile Zola's novel The Masterpiece based on the life of Paul Cézanne, and which eventually caused a permanent rift between the two former friends (Rewald 19).

The nuances and examples shown here are meant to demonstrate how flexible these timelines can be, as they are suitable for a large number of discourses and uses. Also one can note how varied and complex the information gathered from them can be, despite their apparently simplistic appearance. The challenge in creating them being to not make them appear too crowded or filled with apparently useless data, but in the same time to be able to maintain all the coordinates above in order to infuse them with as much meaning as possible.

2.4. The Graphic Aspect of Timelines

Simply and honestly put, the way in which the timelines look is an extensively important factor in the way they are perceived and even used. The rules here are however pretty simple and common sense – a clean, unambiguous design, an easy to read font in a suitable dimension are aspects that concern their ultimate level of

success and popularity with the users. The importance of the visual aspect of an informative tool, especially one meant for teaching is recognized by educators and ideally these should appeal to the intellect of the user but also as much as possible to strike an emotional chord (Felezeu 7).

In a graphic sense, timelines are made up of a sort of table where the years are represented by the vertical lines and the horizontal bars represent the lives of the artists. This is pretty standard for timelines in general (Admiraal 53). In this particular case the markings are for every decade and not every year, and a darker tone marks every half century. The horizontal bars are inscribed with the name of each corresponding artist and the artworks are marked by dots according to the year in which they were created. The artists have been placed in descending order according to their year of birth and in the case of artists born in the same year, the one that passed away younger is placed above. The only exception is to be found on the history layer, since most of the notes there were not personalities but rather specific events which were marked as self-standing dots, similar to those that mark the individual artworks.

In the case of these particular timelines the colors are also important, as they add yet another piece of information, but in a non-aggressive manner. The bar designated for each artist has different colors according to his place of birth. Thus along with his lifespan it offers the minimal amount of biographical information, but also it can help with placing the said artist in a group with his co-nationals from different fields. Another yet more important aspect is the fact that a so-called red wire can be traced among the tendencies of a geographical area as distinguished from those of another.

An interesting aspect arises from the use of different color, such as the preference of certain countries or areas for different mediums in various eras. For example you can easily note the fall in the dominance of Italian artists to be replaced by the French, or the way the Netherlands make a comet-like appearance during the Baroque era. Due to the introduction of color, the timelines necessarily have a reading key explaining what each color stands for (Fig. 6), but this is easily integrated and does not distract from the visualization itself. For now the colors strictly represent the place of birth of the artists despite the fact that they might have lived and worked in a different one. This is quite a contestable decision, however it opens up the possibility to change to color on a bar according to the travels and movements of the artist in his lifetime, thus introducing yet another piece of the “puzzle”.

Figure 6. Detail of the color scheme key for the timeline between 1750-1900

New information that can be gathered from the color scheme is to notice how some zones excel in a medium while being completely unremarkable in others. For example the Russian area which brings us writers and composers of an incontestable value, especially in the time frame we have analyzed, and yet the red is missing from the art history layer altogether. France on the other hand is completely the opposite as it has only one composer but makes up for it with the large number of artists.

3. The Pedagogical Destination of Timelines

These chronological chats have been conceived as didactic materials, stemming from a need for a better structure of the information available. Thus they are dedicated to students and scholars with the mention that they are suitable for modification in order to better fit individual needs. They are a methodology and a model much rather than a final product which is yet a project in progress.

Chronology and timelines themselves are constitute one of the first lessons in the study of history since the principle of time framing an event or an era is vital to the understanding of the field (Păun 81). Timelines can vary from simple – those that mark on the axis of time the main cultures and epochs of humanity – to more complex ones that are further divided into shorter time spans (Felezeu 100). One of the main principles on which timelines are based is that of causality, which is considered as one of the most important phenomena in the study of history. This is

based on the belief that the same set of causes will provide the same effect, so that any slight difference in the causes or context will necessarily generate different effects (Felezeu 82).

History itself should not be perceived as isolated, but in a tight interdependency and causality as things are in reality (Felezeu 86). The human connections and relations between the artist need to be understood since they are not some characters living in a proverbial ivory tower, and timelines manage to make this human dimension seen much more easily, preventing the history of art to resemble a row call of names, artworks and stylistic characteristics.

The schematic aspect of any data visualization should not fall into irrelevant details, and it must be mentioned that the point of the timelines in not to teach/memorize dates, but rather to better understand the systematic correlations that further help in the creation of a critical opinion yet one that is firmly based on the available data. Learning becomes dysfunctional when useless dates are forced in the forefront in the disservice of a global, holistic understanding that offers a historical culture (Felezeu 107).

Another educational principle that stands at the base of these chronological timelines is that of the comparison. This is the process through which a phenomenon from the past is explained by analyzing the similarities and the differences between historical events (Felezeu 183). This comparison can be of two different kinds both of which can be explored through this type of data visualization. Firstly there is the concomitant comparison which implies the analysis of facts and events in the same period but in different conditions. Such an example is the Baroque art from protestant Netherlands and the one in catholic Spain. This is extremely useful for establishing connections and comparing two coexisting styles, or contemporary artists, or even connecting fields in order to identify a similitude. The second kind of comparison is a successive one, namely the comparison between similar notions or events that happed in different times. Timelines are also useful in this situation, for example an analysis on the evolution of the portrait and its typology in various historical periods, and noticing their similarities and differences.

Timelines are meant also to counteract the unnecessary fragmentation of art history that comes as a consequence of a style-based teaching. It is also the case that most books are organized on chapters that present the art of the same period in different geographical areas (Tafrali), but timelines help implement in the viewers conscience that things often happened simultaneously, in direct connection to one another, and they annul the dangers of lacking a larger vision. They can also be useful for better integrating functional knowledge. One can choose any “slice” of time and check the social realities in different corners of the world – how many Romanians

realize that Mihai Viteazul (1558-1601) was William Shakespeare's (1564-1616) contemporary? The presence of timelines in Gombrich's iconic volume suffices as demonstration for their utility alongside maps which are already consecrated as tools for teaching history (Păun 103). The digital medium could eventually even provide a means for combining the two in one vivid and relevant visualization.

Despite the fact that it cannot be completely overrun, the presented timelines are as objective as scholarly possible without any political or ideological manipulations, or even less justified personal preference (Căpiță, Căpiță 94). However the bias is still there due to the inescapable eurocentrism that plagues the textbook study of art history in general.

4. Conclusions

Recently the literature seems to have opened up towards the utility of timelines and their usage in the study of art history, such as the work of G which can be seen as a popularization book. This is also natural since timelines are educational tools rather that expert and scholarly ones and they focus on enhancement of previous knowledge and its quick delivery, which in reality marks a trend in this direction. However the true span of this raise in interest can be seen on the internet where there are a large and constantly increasing number of websites that include ample timelines (The Metropolitan Museum, The Art Story, Art History for Dummies) or even are dedicated solely to them (Oxford Art Online, Arty Factory). The visual element of these chronological charts as well as their complexity makes them highly suitable for the digital environment, and thus there is little surprise that in a true Digital Humanities fashion there are a number of free tools where users can create and curate their own timeline (Timeline JS) one even quoting Albert Einstein in saying that the timeline is "a great visualization of any data in the 21st century" (Time Graphics). This of course opens up a great realm of possibilities for both timelines and their users, and the general direction continues to be interdisciplinary and visual with elements that can only continue to increase in the complexity of the information they deliver through ever simpler and clearer means.

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Book Review

Ying Jiang, *Social Media and e-Diplomacy in China. Scrutinizing the Power of Weibo,* New York: Palgrave Macmillan, doi:10.1057/978-1-137-59358-0, 2017, 147 p.

Once the advances in technology evolved into being recorded, and awareness regarding globalization processes strengthened, it became facile to observe the rhythm and the series of changes produced in societies, political systems or economic and cultural life, as well as the transversal effects that resurface. And unequivocally these effects become implied in most areas of activity. Thus, an example of this could be the appointment of the first Digital Ambassador, namely that of Denmark, "based out in Silicon Valley, in order to create a line of communication between the US tech companies and the Danish government"[1].

In short, the action of the Danish government does not entirely resemble e-governance, but rather devotes itself to an exponent of adaptability and the desire to assert, to abandon anonymity, while seeking visibility and digital success. On the other hand, it becomes a conclusive exponent of the importance of technology within a community. That is why nowadays the specialized literature extends, enhancing interdisciplinary vectors, as is natural, and focuses on those unconventional developments that were, at least in the past few decades, nonexistent.

In the light of this disclosure, Ying Jiang, Senior Lecturer at the Department of Media, University of Adelaide, Australia, introduces a "systematic research of Weibo usage by embassies in China from September 2015 to March 2016"[2], being "*the first in the academia* to explore the challenges that the use of Chinese Weibo (and Chinese social media in general) posed for foreign embassies"[3].

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[1] Derek du Preez, "Why Denmark appointed the world's first Digital Ambassador" in *Diginomica*, 19.09.2017, https://government.diginomica.com/2017/09/19/denmark-appointed-worlds-first-digital-ambassador/, accessed 26 June 2018.

[2] Ying Jiang, *Social Media and e-Diplomacy in China. Scrutinizing the Power of Weibo*, New York: Palgrave Macmillan, 2017, p. xi.

[3] *Ibidem.*

From an inclusive viewpoint, it is puzzling to determine how the author exhibits digital innovation and its reproduction procedure, and creativity, comparing examples of embassies, mostly generic, based in the Chinese capital. Along these lines, it can be identified that these degrees differ according to the emitter establishment (polished according to a particular culture, and different diplomatic practices, opinions and ideals) and the receiver (in this case a segment of the Chinese society). An eloquent example is presented in this regard, *i.e.* a reference that points out both "Weibo entries of the Korean embassy" *vs* "Weibo entires of the US embassy"[4]. On this account, the Embassy of the Republic of Korea seems to be more keen on promoting aspects that pertain to Korean-Chinese cooperation as in comparison to American-Chinese cooperation, while the diametric-opposite ascertainment is related to the spread of American news against Korean ones[5].

The key to success, therefore - through analytical derivations -, might be in those models that understand the fundamental importance of PR, communication (including here strategic communication), and marketing strategies. Indeed, the blend of these sciences with public diplomacy and their connection to public diplomacy as an emerging discipline, under the auspices of the larger study of international relations, remains undetermined.

In a more concrete way, this review takes note of the fact that the projection of Chinese digital diplomacy does not represent the main narrative of Ying Jiang's book, yet one that exclusively concerns the use of Weibo by foreign diplomatic representations in Beijing. In the absence of other social media platforms, it has been observed how foreign diplomatic establishments accept and desire to satisfy, even in an eccentric way, the expectations of the Chinese public; an increasingly sophisticated public, as yet very radical in its expression of (cyber-) nationalism and patriotism.

From a definite viewpoint, the structure of the book - an ardent pyramid that begins with debates of some basic concepts - shows balance, because through the analogies between those Western models described (see here the examples of the United States, Canada, Korea, or Norway6), the narrative is heading towards a relative versatile and even holistic resolution which, for example, does not lose sight of those cases pertaining to censorship. Accordingly, the book is divided into three distinct parts, namely: The first part, entitled *Social Media Landscape Differences Between China and the West*, highlights whether "China's cyber-nationalism brings any challenges to foreign embassies' practice of e-diplomacy [and] what sort of challenges is cyber-

[4] See *Ibid.,* p. 113
[5] See *Ibid.*
[6] See *Ibid.,* pp. 79-83.

nationalism bringing to e-diplomacy"[7]. This part comprises two chapters, each of which are, to a degree, problem-introductory sections that also state the main directions of the research conducted. What remains of undetermined interest throughout this section is the relation created between the usage of Weibo and public diplomacy[8]. Hence, Jiang questions whether Weibo behavior improves the practical paradigm of public diplomacy, and tries to determine exactly the nature of this - a paradigm that reaches its crest barely in the third part of the book.

Analyzing the Embassies' Use of Weibo is the second part that altogether contains another three different chapters which further advance the study. As endorsed by the author himself, it sketches "an overall picture of foreign use of Weibo… [and classifies] the top five embassies that use Weibo frequently. It seeks to address three gaps in existing knowledge by empirical research…"[9] What is of current interest throughout this second part predominantly revolves around *cross continental* examples. Jiang brings into light the success of Obama's 2008 campaign, for example, that has significantly been sustained by social media (Twitter, to be precise), or the social media experience of US Embassy in Venezuela. Both of these instances provided, although analogical, seek to outline a conceptual framework for Weibo[10].

Indeed the last part of the book is dedicated to both public diplomacy and Weibo, although similar contentions were clearly indicated in the previous parts of the book. Debates are linked *inter alia* to the Global PR Theory[11], for instance, and examines the limitations that Weibo imposes for public diplomacy. As a result, "in analyzing the practice of using social media as a public diplomacy tool"[12], Jiang concludes that there are two major challenges imposed by Weibo, that are indeed cultivating innovation. It is important to assess the fact that the author created thus this innovation to the extent that he applies various theories, conceptions, and principles gathered from a welter of disciplines, a multidisciplinary basket, and projects them on Weibo[13].

This review does not deny the idea that further debates indeed need to be cultivated and answers sought, yet it argues that more accountability within this study should have been present. For this reason, the resolution of the book remains cramped and unclear, as it does not incites clearly the sustainability of Jiang's research. Nonetheless, the aesthetic rhetoric remains questionable: symbolically

[7] *Ibid.,* p. 3.
[8] See *Ibid.,* pp. 2-43.
[9] *Ibid.,* p. 45.
[10] See *Ibid.,* pp. 49-50.
[11] See *Ibid.,* pp. 125-139.
[12] *Ibid.,* p. 119.
[13] See *Ibid.,* pp. 104-146.

easy to observe, on the cover, since the content of the book is exclusively dedicated to e-Diplomacy and China, why has the author decided to adopt a 19th century Indian illustration? What is the message he seeks to convey?

Furthermore, it is important to point that there is an approval of the fact that "the power of Weibo might have been overestimated"[14], a reason that could also argue the ascertainment according to which Weibo users are not mature, nor friendly internet users. Samples of comments and reactions posed by Weibo users are provided throughout the study, all of which expedite a rhetoric: Could such agressive Weibo behaviors be an expression of the constant growing rights consciouness? Is this cyber-nationalism a fundamental characteristic of developing nations? Or could it be a pure reversal of both the conscious supression and the historical conscious of the Chinese?

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[14] *Ibid.,* p. 146.