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SOTICS 2020 Editors

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SOTICS 2020

Forward

The Tenth International Conference on Social Media Technologies, Communication, and Informatics (SOTICS 2020), held on on October 18 - 22, 2020, was an event on social eco-informatics, bridging different social and informatics concepts by considering digital domains, social metrics, social applications, services, and challenges.

The systems comprising human and information features form a complex mix of social sciences and informatics concepts embraced by the so-called social eco-systems. These are interdisciplinary approaches on social phenomena supported by advanced informatics solutions. It is quit intriguing that the impact on society is little studied despite a few experiments. Recently, also Google was labeled as a company that does not contribute to brain development by instantly showing the response for a query. This is in contrast to the fact that it has been proven that not showing the definitive answer directly facilitates a learning process better. Also, studies show that e-book reading takes more times than reading a printed one. Digital libraries and deep web offer a vast spectrum of information. Large scale digital library and access-free digital libraries, as well as social networks and tools constitute challenges in terms of accessibility, trust, privacy, and user satisfaction. The current questions concern the trade-off, where our actions must focus, and how to increase the accessibility to eSocial resources.

We take here the opportunity to warmly thank all the members of the SOTICS 2020 technical program committee, as well as all of the reviewers. We also kindly thank all the authors who dedicated much of their time and effort to contribute to SOTICS 2020.

We also gratefully thank the members of the SOTICS 2020 organizing committee for their help in handling the logistics and for their work that made this professional meeting a success.

We hope that SOTICS 2020 was a successful international forum for the exchange of ideas and results between academia and industry and to promote further progress in the area of social eco-informatics.

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Interfaces of Political Participation: Challenging the Analysis of Communicative Spaces

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***Abstract*—Opening politics to direct citizen participation seems a double-edged operation that aligns communicative infrastructures with the governmental executive political sphere of participatory citizenship. While citizens' initiative platforms wave civic participation as a democratic opportunity, their relative distance from the executive core conditions their political effectiveness. This paper considers the participatory platforms as communicative spaces and analyses them following the four-mode model that considers communicative spaces under four facets: representations, structures, connections, and textures. This paper reports on the initial results of a study of the effectiveness of three participatory portals available to Russian citizens to test the analytical tool, and to adapt, expand, and challenge it. This brief paper is first at exploring the possibilities of the four-mode model of analysis of communicative spaces, applied to participatory portals.**

Keywords-direct participation; citizen initiatives; interfaces; communicative spaces.

I. INTRODUCTION

Opening politics to direct citizen participation seems a double-edged operation. The effort to facilitate grassroots movements showing "a renewed interest in community, place, and 'local identity'" [1] also challenges traditional governmental approaches that consider citizens as passive receivers and taxpayers [2]. Citizen participation is considered as a response to the civic engagement crisis within traditional democratic welfare states, moving them towards an XXI century-like active role of citizenship in policy-making processes, including volunteering, engagement with non-governmental organisations (NGOs), solidarity projects, or certainly, legislative initiatives. In this light, technology being both empowering and restrictive [3], helped the instalment of the transnational European Citizens Initiative (ECI), in 2007, and opened strands for research and critical discussion about the European Public Sphere [4] [5]; this trend has seen platforms sprout up either connected with national Parliaments (Spain, UK, Germany) or as non-governmental platforms (Belgium, Netherlands).

Online participatory platforms are considered to be communicative spaces [6] that can be analysed as such [7]. This paper explores how such an analytical model can be used to critically analyse participatory portals.

This piece focuses on the three main participatory platforms available in Russia today (the Russian Public Initiative [8], Petition to the President [9], and Change.org [10] the four-mode model (describing representations, textures, structures and connections) helps to compare them while suggesting ways of expanding the analysis to other platforms in the future.

The rest of the paper is structured as follows. Section II briefly describes the state of participatory spaces in Russia, theoretical considerations are discussed in Section III. Section IV is devoted to the methodology and the four-mode model of analysis and results are outlined in Section V. A critical discussion is provided in Section VI. The paper concludes with Section VII.

II. OPENING POLITICS IN RUSSIA

Russia has opened several participatory spaces [11], but research insists on pointing at an endemic disconnection between civic participation and executive power. Mamay [12] underlined that the concepts of e-government and e-participation were relatively new in Russia and unexplored in scientific discourse. Kuryachaya [13] criticised the development stage of the Russian e-democracy based on information shortage about the activities of the authorities, the absence of appropriate legal regulation, and the general inefficiency of the citizens' participation practices. The question looms, thus, on why do existing participatory portals not succeed at sorting this gap. Currently, several participatory platforms at a local level, such as "Active citizen" [14] in Moscow (launched in 2014) or "Our Petersburg" [15] also launched in 2014 [16]. Such platforms are aimed at building dialogue with local authorities; however, they do not provide any legislative power to the citizens, and because of their municipal range, they were not included in this study.

Instead, this piece considers three active portals that link citizens' direct participation with legislative processes at a national level. First, the Russian Public Initiative (ROI - The acronym comes from the Russian title "Российская Общественная Инициатива" and the web address "roi.ru") was established in 2012. It allows citizens to submit legislative initiatives on the federal, regional, and municipal levels. Second, Petition to the President - PP (established in 2007) collects initiatives directed to the President of the Russian Federation. The third platform, Change.org is the most active, however, it does not have any legislative power or responsibility towards its contributors [16]. To bridge the relative distance of these platforms from the executive power, the 2013 law RF N183 [17] called for the creation of expert groups liaised with Parliament. These groups assess the ROI initiatives with more than 100 000 signatures on the federal level. The political effectiveness of the two other

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platforms, instead, depends exclusively on actual parliamentary mediation.

III. Communicative spaces, interfaces and analysis of platforms

Platforms for citizen participation are interfaces and communicative spaces. For Scolari et al. [18], interface is a network that includes various actors, users, individuals, institutions, organisations or technological actors. Interfaces are also described as "the connections between human psychological, perceptual, and motor systems on the one hand and codes, software, and hardware on the other hand." [19]. Furthermore, new platforms of a cultural metainterface are built on the capitalisation of a net culture [20] and their industry is based on a "semio-capitalism" that generates data that can be used to anticipate user behaviour. In this sense, platforms of citizen participation are interfaces that facilitate connections between the highly bureaucratic governmental processes and grassroot initiatives. Platforms are allegedly aimed at reducing the e-participation divide.

Communicative spaces are structurally necessary for democracy, as they set the conditions for civic (dis)agreement and struggle [21]. Platforms, thus, are also communicative spaces because, as in the public sphere, they are places for meaningful interaction where the differences between participants, their access, and critical discourse are necessary conditions for achieving consensus on public issues [22][23].

Even if the Internet public sphere can be fragmented [24], citizen participation platforms can function in their double role as interfaces and as communicative spaces facilitating deliberation by allowing the complex flows of communication within the interface: "...discussion forums, chat rooms, and other virtual communities' may very well be ideal discursive spaces for political deliberation" [25]. In this sense, the democratic potential of the Internet which functions globally and enjoys the freedom of regulations has been seen as a utopian rebirth of the Habermasian concept. Yet, research insists on showing that there is an "e-participation divide" – when the initiatives of the citizens do not meet the requirement of "the bureaucratic complexity of official decision-making procedures" [16] and while the European Union (EU) rhetorics includes the "potential shift from government-led to community-led planning" [1], the success rates and implementation levels of the initiatives are low. Factors are diverse, but evaluation of the viability of the platform seems favourite - "its ability to sustain the level of efficiency, popularity and, broadly, the changes in government – society relations it brings." [16]. The participation of the public "relies heavily on whether political leadership is stable and long-lasting to suppress or change stable informal institutions" [16].

Antecedents in the analysis of participatory platforms [26] identified four groups of factors to assess ROI: 1) organisational development; 2) technological parameters of the portal; 3) regulatory support, review procedure; and 4) the openness of procedures for citizens and feedback possibilities. Each group contained four discrete sub-factors to answer with "yes" or "no". Also, Fedotova et al. [27] developed a model assessing e-informing, e-consulting, e-involving, e-collaborating, and e-empowerment participation levels of various Portuguese platforms, indicating, in percentages, the degree of public availability of these factors per platform. These authors employed quantitative approaches to measure efficiency and compare the portals. Chugunov et al. [16] used a combination of quantitative and qualitative techniques to study the popularity and viability of the portals.

Following Scolari et al. [18] and the concept of metainterfaces, we argue that a quantitative approach to analyse these platforms is not sufficient and that instead, a qualitative approach can bring a more comprehensive understanding, particularly if considering the involvement of specific narratives, attributes, and contexts embedded in the design of the platforms.

IV. Methodology

This paper analyses the three platforms available in Russia: ROI, PP, and Change.org. The analysis of the platform interfaces follows the four-mode model for the analysis of communicative spaces as described by Rodriguez-Amat and Brantner [28]. The model assumes the non-neutrality of the communicative spaces and helps dismantle the assumption that the public sphere is neutral. As an empirical tool, the four-mode model discerns the features of such non-neutrality, highlighting where participatory platforms become factors of inequality. The four modes upon which the analysis rests are:

1) Representations: the mode involves how platforms are perceived (by third parties), used (by participants), and how they are designed (as agents/actors) in the intentional shaping of the (conflicting) understandings of the public debate. Questions that guide this mode are the following:

a) What are the prevalent contents and the recurrent topics, what is understood as politically relevant? (Narratives);

b) What types of actors do the platforms distinguish? (Actors);

c) How much participation had the petitions? What is the success rate? (Diffusion and reach).

2) Textures: the symbolic charge of the site in which interactions happen. Some precedents identified as textures include the communicative value of places on their own, nuancing the conditions for the debate and the speech formulated from a historical balcony adding value to its contents [19]. The discussion of the historical success rates of the platforms settles a non-intentional precedent for forthcoming initiatives. The following questions may be asked:

d) Who owns the platform and where is this platform hosted? (Ownership);

e) When was it established and why? (Symbolic capital);

f) What ideological or political attributes does the platform have? (Attributes).

3) Structures: explain the (communicative) inequalities generated by the platforms: (un)equal access, barriers, transparency, direction, and channelling of information, priorities, centrality and peripheral interactions, or communication flows. This requires an analysis of the conditions for participation and the implicit conditions for success. The guiding questions are:

g) What mechanisms are there to disable or enable participation to the citizens? Are the contents moderated? (Access and Moderation);

h) What data is collected from the participants? (Privacy and Transparency).

4) Connections: explain what virtual possibilities of interaction enabled by the platforms and the identification of factors that multiply the network of contacts (social media sharing, engagement, media coverage). Connections are the imaginary territory of possibilities of interaction. The following questions are in the centre of attention:

i) Does the platform facilitate the sharing of the initiative across social media platforms? (Shareability);

j) Does the platform incorporate spaces of participation (such as comments, support, fundraising)? (Engagement).

The extension of this paper allows only to open the strands of future specific analyses of the Russian participatory platforms and sheds some light on the possibilities and challenges of the model to be applied in this context.

V. Results

Tables I-IV represent a comparative overview of the analysis of the three Russian platforms for citizen participation aligned by the four modes – representations, textures, structures and connections. Tables I-IV visualise the answers to the ten questions *a)-j)* formulated in the Section IV (all data from June-July 2020).

A. Representations

The analysis of representations was structured along with three sets of questions (columns) that identified 1) Narratives and Understandings, 2) Actors, and 3) Diffusion and Reach (see Table I). The combination of the three and the general diversity or homogeneity of the contents are good indicators of how the platform can become an emerging space of discussion or rather a closed territory of status-quo confirmation.

The first look at the most popular topics (Figures 1-3) presents these differences: whereas the Change.org calls for more universalist principles such as human rights, the ROI is more specifically oriented towards regulatory decisions. The initiatives submitted through ROI are aimed at the legislative system and describe the measures, policies, or laws (for example, medical education reform with >50k votes). The PP includes more general value-loaded measures (against an increase of retirement age with >160k votes or increase of the period for legal abortion). Most of the petitions do not include any legislative propositions, and instead are broader and connected to general values: ecologic statements, animal protection, and health protection issues are considered politically relevant on this platform. Change.org has more human rights entries and has more cases-oriented character (for example, petitions to "free a journalist").

The analysis of actors and participants is a fundamental feature of representational mode. The latent presence of "The President" in the same title of the Petition to the President gives a specific frame to that platform. This actoral analysis also needs to include the possibility of interactivity between participants. The anonymity seems to increase the participation but at the same times does not let identify the iteration - how many times one posts a petition or if there is a political organisation behind a petition (in case of PP). Instead, the necessity to sign with official state documents (ROI) grants the traceability of the authors. In the representation mode the perception plays a central role, for example, the chance of writing comments (Change.org) helps to believe that the 'debate' is permitted even if the platform has clearly fewer chances of generating laws. The official character of ROI is further consolidated by the presence of the Committee and its reports written in bureaucratic language.

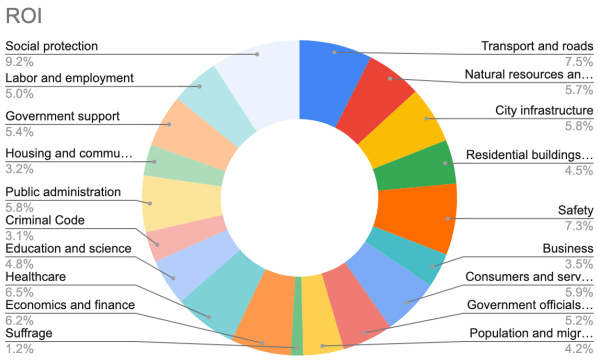

Figure 1. The main topics for discussion (ROI)

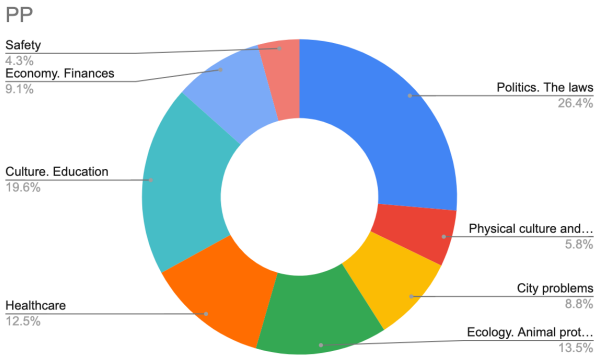

Figure 2. The main topics for discussion (PP)

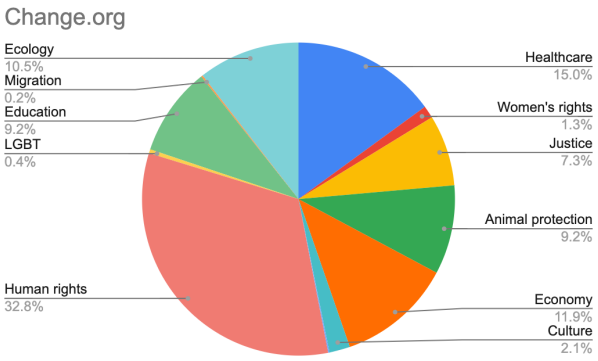

Figure 3. The main topics for discussion (Change.org)

TABLE I. COMPARATIVE ANALYSIS OF THE REPRESENTATIONS

	Representations		
Platform	*Narratives and Understandings*	*Actors*	*Diffusion and reach*
ROI Established in 2012	Popular initiatives: medical education reform, toughening liability for offences on trains, prevention of domestic violence, "waste" reform, animal protection, e-government, corruption, retirement age, labelling of drugs.	- Authors (not visible); number of votes (visible). Number of votes on main page (votes against only on the page of initiative). - Committee resolves to forward (or not) initiatives to Parliament. Committee reports are available online. Committee Chair is known, not the rest of members.	- 17219 initiatives (8 years), 1983 active. 12 initiatives with >10 000 votes, (2 under revision). 35 (0,002% revised and approved by Committee, claimed success rate of 51%). 7 initiatives were supported by expert Committee (27,7%). - 2 were approved by Parliament and implemented: 1) Equip all railway crossings with video registration systems; 2) Green Shield around Moscow.
PP Established in 2007	Popular initiatives: against raising the retirement, increase of the "legal abortion" period, ban of animal hunting, suggestions to award Putin, support of a convicted mayor, suggestions regarding coronavirus, revival of monarchy or the Soviet Union.	- Authors are visible (pseudonyms allowed). Anonymity allows provocations: "Stalin" posted initiative for revival of Soviet Union. Comments can be logged in from any of 19 social media sites. - There is free legal chat support available. on site	- 1 902 petitions published (13 years) - 6 petitions >10 000 signatures. - Petitions allow comments. - Latest comments featured on the main page.
Change.org Established in 2007	Popular initiatives: petitions related to coronavirus payments, proposal of 5 steps to support the Russian economy.	- Authors, politicians, organisations, victims, promoters, etc. Network of actors on the platform. - Author or organisation are visible; can be followed. Some initiatives can be followed too.	- Petitions allow comments. Not discussion. - It is not possible to choose most popular or petitions with more than N votes. - Algorithms decide on "popularity".

Similarly, with the analysis of the diffusion and reach of each platform, the possibility of success should taint the activity in the platforms. Instead, the blind leap between the Committee publishing the assessment of the petitions and the Parliament results opens a space of uncertainty to the reliability of the platform as political space. PP does not count on this connection with the parliamentary activity and this makes the platform free in terms of content, the same is true for Change.org. This also turns the platforms into the spaces of discussion without further political consequences.

B. Textures

The textural analysis involves the values that come from the platform itself, as an aprioristic condition. Textures, therefore, derive from the crystallisation of the representations. The analysis of textures is done along three lines: ownership, symbolic and cultural capital, and attributes (see Table II).

The ownership of the platforms nuances their role. For instance, the distance of the site from the centres of power is the first point of reference. Whereas the owner of ROI is a former vice-Minister of Digital Development, PP was initially embedded within the Presidential official (currently it is disconnected). The aim of PP was to provide a more direct and personal channel of communication with the President. Change.org, instead, is a lucrative global platform with servers located in the United States of America (USA). Such nuance is also built by the accumulated cultural and symbolic capital: PP appeared within the liberal agenda of

President Medvedev in 2007, which explains its disconnection from the current Presidential site. Change.org was created by Ben Rattray – a private individual (citizen of the USA), whereas ROI belonged to Putin's presidential campaign in 2012. The ideological colours of the three platforms also have a strong weight: Russian national symbols are visible in the outline of the interfaces of PP and ROI against the global map that characterises Change.org as a platform.

C. Structures

Structures of communicative spaces are the settings that generate centres and peripheries of the interactions: who can interact with whom, and where are the barriers and the operations allowing or restricting these activities. The structures describe the efficiency of these barriers, their validity, and capacity to affect. Therefore, two columns helped the analysis of structures (see Table III): one involving access features such as identification and moderation, and another about privacy, transparency, and data management features of the site.

The condition of access to online platforms is a key factor explaining the e-divide. PP makes it particularly easy for Russian citizens to register and to participate since it does not require any official digital identification. Both ROI and PP require knowledge of Russian, which limits inhabitants not knowing the language. The case of Change.org requires online registration which means access to an email account. The possibility of logging in from other platforms (such as Google or Facebook profiles) is also indicative of flows of data between the corporations, and ultimately how the citizens and participants' digital footprint can be traced back to other sources of information.

The data collected by the platforms, and the policies involving its storage have multiple implications, such as secrecy of the vote or ideological leaning of the Russian citizens who aim to participate. The possibility of deleting the digital footprint of inappropriate initiatives immediately shows the conditions for participation and the presence of a

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dominant-authoritative operation of decision making. The moderation of petitions also establishes invisible conditions regarding what can and what cannot be petitioned and voted for, what can be discussed or not. It is impossible to determine which of the many possibilities of initiatives have been simply dismissed on ROI due to pre-moderation. In this sense, the diversity of calls on PP shows a more open approach as it allows all types of initiatives not necessarily formulated as legislation initiatives.

TABLE II. COMPARATIVE ANALYSIS OF THE TEXTURES

	Textures		
Platform	*Ownership*	*Symbolic Capital*	*Attributes*
ROI	- Non-profit organisation - Private but known owner (linked to the Gov-t)	Established for Putin's presidential campaign (sign of Internet Freedom)	- Colours of Russian flag. - Similar design to Parliament sites. - Interactive map of Russia with regional numbers of petitions
PP	- Hosted in presidential website (no longer connected to it)	Product of Medvedev's liberalisation agenda	- Cyrillic URL - Design not changed since 2007 - Flag (movicon) - Flag and Russian Kremlin as background
Change.org	Private organisation, servers in the USA	Links to Russian Gov-t not known	World map as icon

TABLE III. COMPARATIVE ANALYSIS OF THE STRUCTURES

	Structures	
Platform	*Access and Moderation*	*Privacy and Transparency*
ROI	- Russian language, Version for visually impaired. Registration through Russian e-government system (18+) - Petitions published after moderation (up to two months) - Singular votes collected for a year, a vote is permitted once	Login through the system of e-government
PP	- Russian Language - No registration required for voting: vote permitted every 24h with no log-in - Petitions pre-moderated, comments not	Comments after login from 19 social platforms
Change.org	- Many Languages - Registration required - Author can chose vote target - Petitions not pre-moderated	Login with Google and Facebook accounts (asks for photo when publishing)

TABLE IV. COMPARATIVE ANALYSIS OF THE CONNECTIONS

	Connections	
Platform	*Shareability*	*Engagement*
ROI	- Initiatives can be shared: via platforms: Odnoklassniki, vk.com, mail.ru, Facebook, Twitter, Mail - Petitions need to be structured: Problem-Result of implementation-Steps to be taken	No other forms of engagement
PP	- It can be followed and shared via platforms: Odnoklassniki, vk.com, mail.ru, Facebook, Twitter, Google+. - Initiatives can be followed on social media	No other forms of engagement
Change.org	- Sharing and donation request - Comments allowed if voting, comments can be liked - Change.org has Facebook and Twitter account	Alternative forms: fundraising, events, news, campaigns, involvement of celebrities or politicians

D. Connections

Connections explore the virtual network of possible interactions. The connectivity of a communicative space is a factor to make it legitimate and valid. To analyse the connections, Table IV shows two columns: shareability and engagement. The former refers to how much social media platforms can help expand and increase the knowledge and impact of the campaign. If the initiative is located only on the platform, citizens are required to visit it, whereas if it can be shared on social media, other users might show interest. The case of engagement involves the chances of the campaigns to be grown by activating new users in the promotion and development of the initiative, for instance, fundraising.

ROI and PP incorporate a possibility to share the initiatives on the social media platforms that are more visible within the Russian cultural landscape such as Odnoklassniki ("Classmates" with 200 million users mostly from the former Soviet Republics), vk.com ("Russian facebook" - social media platform with more than 500 million accounts, mostly Russian speaking) or the service Mail.Ru, as well as on Facebook, Twitter or via email. Such similar connectivity of both platforms shows a preference for the Russian social media landscape, as a difference to what Change.org offers. The platform requires a vote before sharing while enabling the possibility of fundraising, events, news, campaigns, as well as the involvement of celebrities and politicians.

VI. DISCUSSION

The four aspects analysed in the communicative spaces as modes are not independent of one another. In this section, the columns defined as analytical operations are explored in

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combination to eventually respond to the underlying question: do participatory platforms in the Russian political landscape demonstrate serious efforts to enhance participation?

The analysis of the platforms has shown that the level of diversity and dispersion of topics among them is not straightforward. Whereas there are some overlapping combinations amongst them, and they could be assumed to give a comprehensive understanding of the political relevance and efficiency of the e-democratic participation, the differences between platforms show that they are established with different purposes. There is a clear tendency on Change.org to engage with topics beyond the strictly national debates and involve universal values. The textural analysis has shown, precisely, that the three platforms are loaded with aprioristic intentions and that they emerge as part of previous political strategies: PP is related to a Medvedev strategy that ceased with his presidency and ROI aligns with Putin's strategic interests.

The analysis of the structures also complements those findings. There are clearly several forms of barriers that insist on the nationalistic framing of the debates. Even then, if they do not say it explicitly, the platforms set rules and conditions about who can and who cannot participate. Even if from the representations the debates seem diverse, structures show three kinds of barriers:

- identity (established through conditions for registration);
- language (established by the conditions of the interface access, impaired access enabled only in PP);
- skills and legislative knowledge.

ROI requires a high level of formality for an initiative to be considered by the Commission. The set of requirements and rules (a necessary high number of adhesions, and a complex niche legislative language used by highly bureaucratic and law-educated committees) work as the perfect mechanism of exclusion for the public participation in the debate. These three structural barriers still do not consider other external factors: how many citizens have access to the Internet to participate in the public debate, how many of those citizens know about the platform, and how many of them would try publishing initiatives that would later be moderated as irrelevant. Connections also insist on the setting of national and cultural boundaries to the participation in the platforms. This includes, for example, the prioritization of Russian social media platforms. The sovereignty of legislation still resides on the national citizenry, but considering the formal difficulties identified in the structures, this operation of visually and conceptually appealing to the national community might respond more to a form of flagging the nation than an actual form of empowering citizens. Allegedly, the apparent openness of Change.org could be a counter-argument to this, but the fact that it is a for-profit platform and that it does not have any link to the Russian government only confirms that the gap remains. These initial considerations are already pointing out that the platforms are not immediately empowering spaces to enhance the public debate. Some of those interfaces work more as activating devices of national pride through language and flagging symbols, or as propagandistic tools to "consolidate" a democracy for a show, or eventually to channel the social outrage as disconnected spaces of highly emotional interaction.

VII. Conclusion

This article has analysed the main three platforms of political participation in Russia. The analysis has been done by considering them as interfaces planted as a way of sorting the gap between the society and government and as a communicative space that should enable the citizens to engage in public debates. This analysis is based on a model that identifies four aspects of the communicative spaces: representations, textures, structures, and connections. Such a model helps move beyond the quantitative research that could count the effectiveness of the initiatives by simply measuring their success. Instead, the analysis has led to the formulation of questions about the openness and closure of the three platforms. However, there are still some limitations: even if the model could incorporate the press coverage as forms of representations of the platforms, it cannot analyse invisible processes such as the petitions that were not considered or moderated out or external factors such as the extension of Internet access among the citizenry or their knowledge of the platforms.

The analysis has shown that the three platforms are not neutral. They are neither innocently enabling the flow of information from the debate to the parliament, nor are they free of intentional preferences. All the platforms considered are loaded with historical and symbolic capital that taints the result and balances the expected equality of opportunities of the initiatives. All three platforms appear disconnected and limited in their capacity of fulfilling their expected role. ROI includes highly complex legislative features while requiring the participation of rather broad citizen numbers, PP's openness and lack of moderation make it a space of fast-spinning emotional posts. Similarly, Change.org seems to have more in common with any social media platform than with a political participatory platform. The initiatives expect to have some impact on the public opinion and then to be picked either by the media or by the political organisations. The gap seems, therefore, to remain. The signs suggest that the platforms were never established as a real instrument of political participation, but rather as one-directional interfaces from power.

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Does Social Media Behaviors Reflect Users' Anxiety

A Case Study of Twitter Activities

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***Abstract*—Anxiety has been a common mental health disorder that affects many people, especially young adults, but it is often undetected or untreated. Meanwhile, mental health professionals and services available are insufficient for the assessment and treatment of mental illnesses, including anxiety, due to cost, availability, and other factors. Therefore, there is an urgent need to develop new approaches for mental healthcare services. Considering that the number of young adults using social media has increased significantly in the last decade, data from social media activities could possibly be a new approach for individual's mental health assessment. In this study, we recruited 95 participants and examined their Twitter activities to learn if young adults' social media activities are relevant to their anxiety level. Twitter activities were assessed between two groups of users, namely, those participants who reported symptoms, and participants reporting few or no anxiety symptoms. Our preliminary results show that certain social media behaviors differ for individuals that report anxiety symptoms and those with less or no symptoms of anxiety. Results from this study could be beneficial for both researchers and mental health professionals as a supplemental source of information and could potentially provide a new approach for mental health assessment and treatment in the future.**

Keywords – Social media behaviors; Mental health; Data analytics.

I. INTRODUCTION

While mental health is a growing concern around the globe in recent years, anxiety disorders have been one of the most commonly diagnosed mental illnesses. According to National Institute of Mental Health, about 18% of U.S. adults aged 18 or older are affected by anxiety in any given year [1], and over 20% of those adults with anxiety disorders have severe symptoms. Moreover, 31.1% of U.S. adults are estimated to experience anxiety disorders at some time in their lives [2]. In particular, anxiety disorders are very common among children, adolescents, and young adults. Statistics show that about 30% of young adults aged 18-29 in U.S. have some type of anxiety disorders [3]. However, assessments and treatments for mental illness have been considered to be insufficient in the recent past. A previous study in 2017 [4] pointed out that although effective treatment may be theoretically available, healthcare services are still lacking for many mental illnesses including anxiety disorders. According to a survey study by National Comorbidity Survey (NCS), about 75% of nearly 10,000 people with generalized anxiety disorder or social anxiety disorder did not receive any treatment [2]. Therefore, it is necessary for researchers and mental health professionals to explore new approaches to provide more effective and efficient mental healthcare services besides the current applied methods.

Nowadays, interactive communication technologies such as social media have become ever more popular all over the world. Research studies have found that 72% of the US population uses some type of social media [5]. Especially, social media continues to be popular among young adults. Reports found that usage of social media for young adults has increased from 9% in 2005 to 89% in 2013 [6]. Social media is mostly used by individuals to share information, express feelings and emotions, catch up with latest news, and connect with other people. Hence, the information from an individuals' social media activities which provides a great reflection of their daily life could be helpful in determining their mental wellbeing.

This research study aims to examine the relationship between young adults' social media behaviors and their mental health status, especially general anxiety level. We selected Twitter as the social media platform to observe and analyze in this study based on its large number of users and content. As of 2019, Twitter has 139 million active users per day [7] with a total of 500 million Tweets being posted [8]. To understand the relationship between individuals' Twitter activities and anxiety level, two research questions will be addressed when conducting the study:

- Is there a relationship between Twitter activities and one's anxiety level?
- Are there any differences in Twitter activities among people with symptoms of anxiety and people without such symptoms?

The subsequent parts of this paper are organized in the following way. In Section II, previous literature will be reviewed and summarized to provide an overview of the current practices related to social media analytics and mental health predictions. Section III will explain the methodology used in this research study, including the process of data collection, and elements measured in the study. Results will

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be displayed in Section IV, and Section V will discuss the characteristics of the preliminary results. We conclude the work in Section VI.

II. LITERATURE REVIEW

Although typical diagnosis on mental health status is based on self-reported information and mental status examinations [9], social media provides reflections of an individual's personal life given its massive amount of information on people's personal experiences, feelings, and emotions that is being shared. Individuals use social media for various reasons: social interaction, information seeking, entertainment, relaxation, or expression of opinions [10], and each of these activities involve significant personal data collection, sharing, and processing. Previous research suggested that social media activities could be used for personal identification, including age, gender, and personality [11]. For example, one research study reported that users' personality traits could be predicted by their information shared publicly on Facebook, and the results of the predictive models were more accurate than the predictions made by close friends and family [12]. The statistical models also provided accuracy rates on predicting other personal information, for example, sexual orientations (if someone was homosexual or heterosexual), or political opinions (if the user was Democrat or Republican) [13]. In addition, expressed emotions on social media websites have been used by commercial companies to improve their business decision making and tailor their marketing strategies [23].

Previous studies on social media found that individuals' social media activities could be used to assess, identify, and predict their health status. For instance, a study on Twitter behaviors by Choudhury et al. [9] found that people with major depression may behave differently on social media compared with people without any symptoms. Another study also suggested that people with depression symptoms may have different perspective on sharing personal information on social media compared with people without such symptoms [21]. Besides predicting depression, similar work by Choudhury et al. [14] also applied predictive models to forecast if new mothers could possibly experience significant postpartum changes by analyzing their social media activities. Social media behaviors are not only used for personal health assessment, but also could be used for overall community healthcare. Social media analytics have been widely used in the field of medical sciences, examples including biomedical outcome prediction [15], infectious disease risk prediction [16], predicting and tracking the trends of disease outbreaks [17]. Using social media for health predication have also been shown to have accuracy rates in previous studies. One such study found that Facebook postings on two health issues were very similar to the actual results on official reports about the same topics [18].

III. METHODS

An online survey was designed and used to conduct this research study. Participants were recruited randomly via Amazon Mechanic Turk (MTurk), which is a crowdsourcing platform. The online survey used General Anxiety Disorder-7 (GAD-7), which is a seven-item, self-report questionnaire, to assess participant's health status based on the scores. The GAD-7 has been used in both research and clinical settings to detect individual's anxiety level [19]. The survey also includes questions on Twitter usage, as well as general demographic information. Participants were asked to provide their Twitter links and give permission to researchers for observing their Twitter activities. No personal identifiable information was collected in this study. The recruitment process and the online survey were reviewed and approved by the Institutional Review Board. In addition, relevant resources were provided to participants at each page of the survey in case they felt upset or needed any help during the study.

By using filters on MTurk, only adults aged 18-25 in U.S. holding a Twitter account were recruited in this study since the aim of this study is to analyze the relationship between young adults' social media activities and their mental health status. A total of 200 participants were randomly recruited from MTurk, and 95 responses were recorded after excluding noisy data (i.e., incomplete survey or filling out the survey within extremely short time period), with 52 out of 95 (54.74%) participants being female. The average age of participants was 25.35, and 65 participants (68.42%) held a bachelor's degree or higher. Over half of the participants (56 out of 95) indicated that they use Twitter every day. Participants' responses on their health status were converted to numerical scores based on GAD-7 guideline. Total score for each participant was calculated, and participants were divided into two groups, participants with symptoms of anxiety and participants with less or no symptoms of anxiety, by using the cut-off point (10 or greater) recommended by GAD-7. There were 34 participants who received a total score of 10 or greater, while 61 participants received less than 10 in the GAD-7 questionnaire.

By using Twitter links provided by each participant, data on all the publicly available information was collected, including information on user's profile, followings and followers, Twitter postings (Tweet), liked Tweet, and photos. Twitter's developer API was used to retrieve content of Tweets from user's timeline. One notable exclusion during the retrieving process was that only historical Tweets posted before the participant took the survey were collected, since the measurements on GAD-7 are based on previous experience. In addition, this step was taken to minimize social desirability on Twitter based on the study participation. A total number of 353514 Tweets were retrieved from the 95 participants' public Twitter links.

To analyze participants' Twitter activities, three elements were measured: overall engagement, negative emotions, and level of personal information revealed publicly. In a previous study, Choudhury et al. have defined and explained the measurements of engagement [9], and similar methods were applied in this study. Besides that, since posting personal content on social media is on the rise [10], we were also interested in assessing negative emotions and the level of

personal information revealed on participant's Twitter links to see if those two elements are also related to their mental health status.

- **Engagement:** Number of Tweets, Retweets, replies, liked Tweets, followers, and followings. We considered those elements to be a reflection of how active an individual is on Twitter. For example, if an individual posts a huge number of Tweets in a short time period, it may imply that he or she spends a lot of time on social media every day. We also considered Retweets and replies to be related to the interaction with other people, and the number of followings and followers to show how close the individual connects to the social media community [20].
- **Negative emotions:** Sentiment analysis has been widely applied in Twitter data analytics. For example, models of sentiment analysis such as polynomial regression, classification modeling, and lexicon-based sentiment analysis models, all have been helpful in categorizing data and hence enabling fast decision making [22]. To analyze the negative emotions expressed in participants' Twitter activities, we considered and examined two specific elements: frequency of words with negative sentiment used in original Tweets, and if any negative attitude was exhibited in Twitter activities other than original Tweets, such as liking or re-posting negative Tweets, or including negative words in profile description. Content and sentiment analysis were applied to assess the negative emotions.
- **Level of personal information shared publicly:** In a previous study on depression and social media activities, results showed a relationship between the level of personal information shared publicly and the person's depression [20]. More specifically, we observed activities such as using selfie as a profile photo, posting photos or videos related to personal life, or adding personal identifiable information on profile description. Therefore, examining publicly shared personal information might potentially indicate if individuals are open and willing to disclose and share their personal life publicly with the online community, including both acquaintances and strangers.

IV. PRELIMINARY RESULTS

As described in Section III, three elements are analyzed based on data retrieved from participants' Twitter activities: engagement, negative emotions, and level of personal information shared publicly. For each of the two groups, participants with anxiety symptoms and participants with few or no symptom of anxiety, the results were recorded accordingly and then compared. The results and comparisons for all of the three elements are shown in the following sub-sections:

A. Engagement

To analyze the engagement element, the average number of Tweets, followings, and followers are recorded. The statistics on the engagement for both groups are shown in Table 1.

TABLE I. STATISTICS ON ENGAGEMENT

Participants	With anxiety symptoms	Without anxiety symptoms
	N=34	*N=61*
Average # of Tweets	4970.30	4138.04
Average # of followings	449.96	373.13
Average # of followers	190.18	229.42
Ratio of Followings/Follower	2.37	1.63

From the table above, statistics show that participants with anxiety symptoms have a slightly larger number of Tweets posted. One reason could be that the sample size is small and outliers exist when analyzing the data (for example, there is one particular participant who posted over 30,000 Tweets, and another participant only posted 1 Tweet although the Twitter was registered in 2011). Note that the number of Tweets recorded in Table 1 includes both original posts, re-posts (Retweets), and replies, and most of the participants with larger number of Tweets have a lot of Retweet, which increased the total number. Although outliers may influence the results, those outliers were not excluded from our analysis because the number of Tweets could be a determining factor when evaluating how active a participant is on a given social media. Only Tweets posted before the participant took this study's survey were collected. One challenge that we faced was related to collecting all of the user's historical data and relating that to their mental health condition because, for this study, we did not asses or know the onset of anxiety. Therefore, our study results may be limited in explaining the relationship between participants' Twitter activities and their anxiety level. Further research studies with more comprehensive survey questions that assess the onset of the mental health condition would be recommended to have more precise results.

Based on observations of the data collected, participants with anxiety symptoms had significantly higher percentage of Retweets in their total number of Tweets, for example, sharing an external link from other websites, or re-posting a celebrity's Tweet. However, people with less or no symptoms of anxiety were more likely to post original content or interact with others by replies.

Also, participants with anxiety symptoms have more followings but less followers than participants with less or no symptoms. Ratios of number of followings to number of followers for these two groups are 2.37 and 1.63, respectively. Further observations found that participants with anxiety symptoms are more likely to follow verified Twitter accounts (celebrities, organizations' official accounts, website accounts), while participants with less or no

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symptoms tend to follow personal accounts like their family and friends that are close to them in real life.

B. Negative Emotions

To understand the emotions expressed on participants' Tweets, only original posts (Tweets) and replies were retrieved and analyzed as measurement, since content on re-posts (Retweets) were not created directly by participants themselves. Although those Retweets may also imply participants' attitude, in this study, we only focused on posts from the participants directly. The first step was to analyze word occurrence and frequency for Tweets and replies. After excluding common used words like pronouns and prepositions (i.e., "my", "you", "the"), or words without clear sentiment (i.e., "time", "video", "do"), Table 2 shows the top 10 most frequently used words (with sentiment) for participants with symptoms of anxiety and participants with few or no anxiety symptoms.

TABLE II. WORD FREQUENCY FOR ORIGINAL POSTS

Rank	With anxiety symptoms	Without anxiety symptoms
1	love (0.27%)	love (0.74%)
2	good (0.20%)	good (0.52%)
3	new (0.12%)	new (0.52%)
4	better (0.10%)	liked (0.41%)
5	great (0.09%)	best (0.40%)
6	best (0.09%)	chance (0.38%)
7	happy (0.08%)	right (0.37%)
8	over (0.07%)	never (0.37%)
9	stop (0.06%)	happy (0.33%)
10	bad (0.05%)	amazing (0.27%)

From Table 2, we could see that there are similarities for the most frequently used words with sentiments between the two groups. However, although participants with anxiety symptoms mentioned positive words in their original posts, the percentage of word occurrence (how many times the word occurred / total number of all the words) for those words is lower than the one for participants with less or no anxiety. For example, the percentage of word occurrence for the word "love" is 0.74% for participants with less or no anxiety, but only 0.27% for participants with reported anxiety symptoms. It is similar for the words with positive sentiment like 'good", "new", and "best". Another observation from Table 2 is that the group with anxiety symptoms frequently used some words with negative sentiment, for example, the word "bad" was ranked 10th for participants with anxiety symptoms, but was not in the top 10 for the other group.

Since there were too many words in the list, we took a closer look at the words with negative sentiment. For participants with anxiety symptoms, the frequency of words with negative sentiment in their Tweets and replies was higher than the one for participants with less or no symptoms. For example, the frequency for the word "sad" was about 0.07% for participants that reported anxiety, but was less than 0.01% for the other group.

Participants with anxiety symptoms were not only expressing negative emotions on Tweets, but also on their Twitter profile descriptions. One example was a participant who described herself as "an awkward girl trying to find herself" in her Twitter profile, and there was another participant from this group using the phrase "pseudo human" in his profile description.

C. Level of Personal Information Shared Publicly

In this study, the level of personal information shared publicly on Twitter is examined by three sub-categories:

- **Profile photo:** Is the user's selfie being used as profile photo? If so, is the photo clear enough to identify the person?
- **Profile description:** Is there any personal identifiable information disclosed in the profile description? For example, gender, age, education level/school, geolocation, occupation.
- **Media posts:** Is there any media post (photo or video) related to the user's personal life? For example, selfie, photos of personal experiences (hobbies, travels, daily life), or photos with family and friends.

The results showed that participants with less or no anxiety symptom (21 out of 61, 34.4%) are more likely to use their selfies as profile photos than participants with anxiety symptoms (7 out of 34, 20.6%). For participants who reported anxiety symptoms, 6 of them were using photos that were not clear enough to identify their faces in different ways: some of those pictures included blur effects, some pictures were taken from far away, and some selfies were taken from the right/left side of the face. Most of the participants with anxiety symptoms were using irrelevant pictures as profile photos, like animation picture, landscape, celebrities, and so on.

For profile description, 13 of the 61 participants with few or no anxiety symptoms had detailed information about themselves in the profile description. Most of them were indicating their job occupations, school and graduate year, place (state or city) of residency. However, only 2 of 34 participants who reported anxiety symptoms included some basic level of personal information in their profile description.

Participants with few or no anxiety symptoms were also more willing to post photos and videos about themselves, their family and friends, and photos related to personal experiences. On the other hand, participants who reported anxiety were more reserved to post any media that could potential disclose their personal information. They were more cautious with media posts shared publicly, and they were more likely to only post default gif pictures by Twitter, or irrelevant pictures from the Internet.

Overall, from the comparison between the two groups in the three sub-categories described above, participants with

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few or no anxiety symptoms are more open to reveal their personal information or daily life in their profile and posts. The level of personal information shared publicly is much lower for participants with anxiety symptoms.

V. DISCUSSION

Based on the preliminary results described in the above section, there are some initial findings on the relationship between social media behaviors and individuals' mental health status. In our study, we found that participants with reported anxiety symptoms behave differently on social media like Twitter compared with participants with few or no anxiety symptoms. For the social media engagement, study participants with high anxiety level are more likely to re-post content from others instead of creating original content. Considering they have much more followings than followers, this may be an indication that they are less active in connecting with others or with a community since they tend to follow verified accounts like official organizations or celebrities instead of interacting with others. Our sentiment analysis from Twitter content showed that participants with anxiety symptoms tend to be more passive and negative by using more words with negative sentiment and fewer positive words being mentioned. In contrast to participants with less or no symptoms of anxiety, who are more likely to express their negative attitude (for example, loneliness, sadness, anxiety, or frustration), not only on Twitter posts, but also on their Twitter profile descriptions. The results also reveal that participants with anxiety symptoms are more cautious with sharing their personal information publicly via Twitter, while participants with few or no anxiety symptoms being more open to share their photos, information, and personal life with the Twitter online social media community.

Considering the preliminary results found in this study, as well as previous research studies on social media and mental health, social media behaviors may be a useful source of information for individuals' general mental health status. Thus, in our quest of wanting to provide more timely, cost effective, and broader coverage of mental health services, perhaps social media data analysis may provide a way forward. Also, such information could be potentially used as a novel and effective approach to identify, detect, and predict one's mental health status other than traditional methods like self-reported information and screening tests, with two additional benefits. First, this approach is easy to implement and it includes rich content coverage of an individual's online activities. Second, compared to traditional methods, this approach could provide more efficient, objective, and unbiased information sources since it is entirely based on individuals' behaviors in their daily life without their awareness of being assessed or tested when applying traditional methods.

However, it is important to address privacy violations that may occur given the fact that people with reported anxiety symptoms could be identified according to their social media activities. There are already some commercial companies or third-party services using social media users' data to categorize them into certain groups and send targeted advertisements [21]. While data sharing and personal identification might be unavoidable given current circumstances for the online environment, it is vital to recognize the importance of user privacy protections since social media users with mental health disorders may be more vulnerable and sensitive. Thus, such social media analytics should only be considered if and when privacy protections are of the highest priority.

Still, more research studies are needed to pave the way forward as our study is the first one and it includes some limitations. First, although our preliminary results suggest relationships between individuals' social media activities and their mental health status, especially anxiety level, more research studies with larger sample of participants and more accurate mental health assessment are necessary to confirm the results since the sample size is small and the mental health assessment is based on self-reported information. The crowdsourcing platform (MTurk) used for recruitment in this study also has its own limitations such as not being a representative of all populations and only including online participants. Second, only U.S. participants were selected to be involved in this study, but young adults from other counties may have different social media behaviors because of cultural differences. Studies on other social media platforms, such as Facebook and Instagram are also suggested to analyze individual's behaviors on various social media platforms, since this study only focused on one specific platform (Twitter). In addition, while social media activities could provide supplemental information for clinicians and researchers when assessing individual's mental health status, it is also important to address privacy protections when such level of personal information is involved.

VI. CONCLUSION

This research study shows initial findings that individuals' social media behaviors may be relevant to their mental health status, and people with symptoms of anxiety may behave differently than people without such symptoms. Information from social media activities could potentially be considered as a new method for mental health assessment and treatment along with traditional methods given how much it reveals an individual's personality and daily life. Results from this study may provide the initial steps towards a new direction in mental healthcare services that can be timely and reach broad and diverse populations.

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Managing Role Identities on Various Social Network Sites

Analysis of the Use of Social Network Sites by Latvian Youth

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***Abstract*—Since the beginning of the Web 2.0 era, social network sites have been an important method of self-presentation in the digital environment. Although the result of self-presentation is often reduced to a distinct digital identity, it can also be seen as a reflection of the complexity of the individual's self, which includes various role identities one can possess. What makes social network sites as a research field interesting is the potential of context-collapse. In opposition to real life, where one can organize different flows of behavior for different audiences and situations of role identity activation, this environment exposes the individual to a combination of various audiences, thus, it is the individual's choice to select which role identities will be presented. This article offers a pilot research that focuses on the habits of presenting role identities on various social network sites, aiming to understand which role identities (for example, being a student, an employee, a friend, etc.) are more likely to be presented on which of the most popular social network sites (*Facebook*, *Instagram*, *Snapchat*). The methodology includes an assisted paper-based survey (n = 76, first-year college students in Latvia), consisting of production task and Likert scale statements. The results offer an evaluation of the potential of the tested methodology and give insight into some differences between various social network sites in the context of role identity presentation, as well as help to understand some of the challenges of self-presentations that are perceived by the youth when trying to take care of their digital self.**

Keywords-role identities; self-presentation; social network sites; youth.

I. INTRODUCTION

In recent times, society has become much more complex; people tend to get involved in various activities and take on many status roles, therefore the number of life decisions to be made also continues to increase [1]. As education is available at various stages of life, multiple workplaces can be combined, and people can network while pursuing a common hobby or volunteering project. The increasing complexity of the society is tightly connected to the development of the social network culture where people maintain a few long-lasting ties and many accidental or temporary ties [2].

At the same time, the social media era has given a platform to social network sites that help individuals to construct their selves in the digital environments, as well as to build virtual connections with people significant to them [3].

The theoretical approach of symbolic interactionism states that the individual chooses which part of self to communicate depending on the conversational partner [4] or the public; also, the performance of one's role depends on the presence of one's counter-part [5].

Yet, the communication environment defined by the use of social network sites makes the picture more complicated, as it is often described by using the term context-collapse [6], meaning that the social and physical borders of various groups of people disappear, thus the individual is exposed to an unknown audience, causing overlap of different social circles. At the same time, people, especially youth, often use more than one social network site; this leads to the fact that there are multiple facets of self presented on social network sites.

Taking into account the above-mentioned points, this paper advances the following research questions:

1. Which role identities are more likely to be presented on which social network sites (*Facebook*, *Instagram*, *Snapchat*)?
2. How do the youth perceive the presentation of role identities, maintaining a coherent image and avoiding contradictions between the meanings implied by the various roles?
3. How is the view of the youth influenced by the multiplicity of the social network sites they use?

This being a pilot research, the sample consists of 76 first-year college students in Latvia, all being 18 – 20 years old.

The rest of the paper is structured as follows. In section 2, the theoretical background of the research is described, which consists of the ideas of symbolic interactionism regarding self and identities, as well as differing approaches on separating digital self from real-life self. Section 3 offers an outline of the methodology used. Section 4 presents the most important findings of the pilot research. In section 5, the conclusion is given, as well as the limitations, and the advantages of the current research are evaluated.

II. THEORETICAL BACKGROUND

The approach chosen for the paper is based on symbolic interactionism (opting for its structural direction, instead of the traditional one), as well as key insights about digital self and self-presentation on social network sites.

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A. Multiplicity of Self and Role Identities

Symbolic interactionism sprung from the ideas of G. H. Mead [4], who spoke of self as a social structure born in social experience and reflected in communication. Although the meanings are conveyed through communication and conversation, later on, it can be a mere cognitive process, as the individual already has ideas about how he/she is perceived. What Mead also stated was that, in the communication, the individual does not reflect all of self, but rather a part of self - the aspect of the self that is relevant to the context.

Being affiliated to a group was defined by G. Simmel [7] not only as a component for the formation of an objective group, but also a forming aspect of one's personality, as each individual realized the participation in a group in a unique way; thus, the combination of multiple groups one is affiliated with "creates in a turn a new subjective element".

The idea of the role as a basis for an identity (a subunit of a multifaceted self [5]) was taken up by G. J. McCall and J. L. Simmons, who described role-identity as an imaginative view of a person of oneself that is based on what one thinks of oneself as an occupant of a specific position [8]. Regarding the specific meanings, each role identity includes idiosyncratic and conventional meanings, thus, the individual, on one hand, follows some of the societal norms, and, on the other hand, creates one's own performance of the role.

B. Digital Self and Presentation of Identities on Social Network Sites

The approaches on how to differentiate the digital self (or identity) from the "real-life" self have changed over time, as the role of social media in everyday life has increased and the meanings of both environments almost completely overlap. Yet, it is important to mention one of the first explanations of identity in cyberspace, given by S. Turkle. She used a metaphor of windows to emphasize that any opened site can offer a possibility of self-transformation and development of a new self, which is a great alternative to having just one real-life self [9]. However, when keeping in mind the complex personality one has described in the previous sub-section, it might be more rational to stick to the view of S. Zhao who used the term "digital self" to address the self, expressed in the digital environment, yet, which is not considered as a different part of a person, rather a dimension of communication [10].

All that being said, when an individual acknowledges the presence of various social groups in social network sites, he/she must make a decision (even if unconscious) of which role identities to present and fulfill in each of the sites, at the same time working his/her way through possible discrepancies. This problem is the focus of the paper.

III. METHODOLOGY

The research uses a survey conducted in person. Because of the complexity of questionnaire design, in person communication was needed. The sample consists of 76 first-year college students (18 – 20 years old).

The first part of the survey consists of a production task – a table where each person was asked to fill in the roles he/she considered to possess and all of the social network sites he/she used on a regular basis. Then, each person was asked to select which identity they considered they presented on each of the social network sites; also, each person was asked to evaluate how important each of the identities was (using a scale from 1 to 10).

The second part of the survey included 24 statements about the process of maintaining a coherent image on social network sites to be evaluated using a Likert Scale. Among them, there were statements about maintaining a united image, being aware of contradictions between various roles, trying to present most of the roles one possesses, as well as whether or not one reflects about the possible reactions of various audiences, etc.

IV. EARLY RESULTS AND ANALYSIS

When considering the differences between various social network sites, some peculiarities could be observed. *Facebook* was most likely to be used for presenting the student role (92% of students using it considered this identity as presented there; whereas, for *Instagram* it was 64% and for *Snapchat* – 67%), as well as for professional, volunteer, child and relative identity. Yet, speaking about professional identity, it could be observed that when a person considered this identity to be important, he/she was more likely to present it on *Facebook*. In turn, if the importance of the role was evaluated as low, he/she was more likely to present it on both *Instagram* and *Snapchat*. This fact could be interpreted as willingness to complain about having a boring work or other similar messages to peers, instead of presenting oneself in a professional context (here, it should be mentioned that very few respondents claimed to use *LinkedIn*). Consequently, the representation of a specific role may rely on one's relationship with the role or attitude toward its realization.

Also, there were some significant correlations between some of the statements and the facts drawn from the production task. For example, people who tended to agree with the statement "It is complicated to take care of one's image in the digital environment" were also more likely to provide a greater number of various social network sites they used for self-presentations (.308; sig.=.007; here and further the Spearman correlation coefficient is used, where the first number is the correlation coefficient, while the second number describes the significance level – the smaller, the more significant), and to agree with the statement "Some of the roles I possess restrict what I can / want to post on social network sites" (.284; sig.=.011). It was also visible that more youth (52%) tended to agree with a statement that they feel worried about reactions to their content by people they did not want to show the content to, yet, fewer of them (37%) were worried that there were strangers who saw the content. This goes together with the view of D. Boyd [6], who emphasized that the youth see privacy as being protected from being observed by people they know (mostly authorities, for instance, parents or teachers), meanwhile

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striving for publicity and being seen by broader audience of people they do not know.

V. CONCLUSION AND FUTURE WORK

The correlations help to understand that the maintenance of a coherent digital self is considered as a more complex task when more role identities and more social network sites are involved, as well as when this process is rather conscious (people tend to reflect about it).

However, the stage of life when one starts to attend a college is also a period when the set of role identities is not stable yet and a lot of transformation is experienced. Although these youth have more potential role identities than previously, during the school years, adults could have a wider range of role identities and a more complex approach to control their presentation. Having said that, a broader sample could bring many interesting findings, yet, the interpretation of the current results makes it clear that, in order to explore the process that regards identities, an integration of qualitative methods would be helpful to assign meaning to the various approaches of the individuals revealed by the quantitative data. Analysis of the content posted by the individuals to present each of the roles also could be of interest to gain more concrete insights.

Having that said, the pilot research aims to find a way to analyze the interaction and presentation of all the role identities one possesses, rather than focusing on some distinct ones. The data gathered serves as first insight in the exploration of the topic and can be used to understand the way the youth treat their digital self, possession of various roles, and being aware of the social network audience.

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