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Collective Intelligence in Polish-Ukrainian Internet Projects. Debate Models and Research Methods

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Abstract: In this study, we focus on models of civic debate suitable for use in Polish-Ukrainian internet projects, as well as methods of researching collective intelligence that can help to monitor particular aspects of such debates and consequently create social bridging capital between these groups. The dynamic socio-political situation of recent years, both in Ukraine and in Poland, has created new conditions. Anti-government protests and social turmoil related to the war in Crimea and Donbas, as well as a high level of migration in the region in a short period led to the creation of a multi-ethnic society. This brings opportunities for the development of a new type of social capital: A new participative model of social life based on internet projects, with a relatively low entry barrier, space for creativity, and the widespread use of ICT technologies, can provide the new ways of debating, civic engagement, and collective action. Our research, based on a multidisciplinary literature review, as well as a series of qualitative in-depth interviews (IDIs), proved that the selected collective intelligence (CI) research methods and debate models can help to develop internet communities that will contribute to building bridging capital between Poles and Ukrainians.

Keywords: collective intelligence; research methods; debate models; migrations; central-eastern Europe; bridging capital

1. Introduction

Collective intelligence (CI) is a phenomenon studied in multiple disciplines such as decision-making, economics, internet science, computer and web science, sociology, political science, psychology, and even biology [1]. CI is defined as a form of universal, distributed intelligence, which arises from the collaboration and competition of many individuals [2], or the general ability of a group to perform a wide variety of tasks [3]. The idea of CI entails the utilisation of interactions in communities to create solutions, concepts, and ideas; selecting between the created alternatives, refining, implementation, evaluation, and gaining feedback. All this is based on collective work and cooperation, so the studies on CI mainly focus on the question: How groups of people collaborate together in a smart way. The most promising examples of recent CI projects are combining humans and machines, organisations, and networks [4]. The concept of CI is therefore closely connected with the development of Web 2.0 and the interactions between users in online communities to create "added value" based on collective work and cooperation. It enables synthesis of knowledge, visualisation of arguments, open innovation, a reduction in the number of errors, coopetition and collective decision making. Collective intelligence frequently manifests itself when collaboration, competition, or reciprocal observation gives rise to totally new solutions to the problems that a community faces or leads to an increase in the capability to solve complex issues. Empirical studies and theoretic simulations prove that a diverse collective can,

under certain conditions, achieve better results in problem solving than a narrow group of experts [5–7]. Furthermore, contemporary cognitive psychology shows that by analysing the way of thinking of a single person, we discover that this person's reasoning is largely based on the use of community of knowledge resources, and not just that person's mind. Either external resources of clustered knowledge available from experts in a given field or collective work on solutions by means of deliberation are used [8–10].

However, it is not difficult to notice that crowds, especially those gathered in online communities, can be both smart and inventive while also being irrational, biased, or overconfident. For this reason, studies on CI attempt to answer the question—in what situations and in relation to which issues can we create conditions conducive to emerging group intelligence [3,11,12]. Previous studies have also shown that collective work and cooperation is not only an effective method of work, but also a certain organisational culture that releases the potential of individual community members and creates relationships of interests and ties bonding the group [1,4,11].

The issue of CI in the public sphere, which we deal with in this article, concerns the kind of civic debate on public issues that helps in solving the problems that exist in this sphere. The public sphere, as evidenced by numerous studies [13,14], cannot function well in atomised, broken, distrustful, and insecure societies—societies where social capital is lacking. Social capital is a term specific to social sciences that describes intergroup ties. A high quality of social capital can mean mutual trust, reciprocity, and effective cooperation, which translates into social stability and a sense of community of interests that is necessary to raise the level of debate on public matters [15].

The research described below is focused on the possibilities of emerging CI in response to the social challenges specific to Central and Eastern European communities. This region of the world is currently affected by several social problems—both the new ones, resulting from the contemporary geopolitical conditions: The political crisis in Ukraine and the resulting migration, as well as old ones, derived from the legacy of post-communism: Low trust in political institutions and the loosening of social bonds, weakened norms of consensus and agreement, the low quality of public debate [16], and as many authors believe—the problematic quality of social capital [17–19].

For this reason, the study of the possible impact of internet-based CI initiatives on the public sphere in this region, specifically the possibility of creating new communication and cooperation platforms, engaging people with a low level of social activity, is a matter of vital importance. Both Poland and Ukraine, as a result of the experience of communism and the uncertainty associated with the political transformation implemented since the 1990s, struggled with a serious crisis of involvement in social life. Limited social activity was, to a certain degree, caused by the earlier compulsory aspect of membership in formal associations, additionally influenced by significant disappointment with the consequences of the transformation. This situation was more visible in Ukraine [18,19], but also observed in Poland [17,20]. However, the dynamic socio-political situation of recent years has created new conditions. Ukraine has experienced anti-government protests ("Euromaidan") and social turmoil related to the war in Crimea and Donbas. Poland has also found itself in a new social situation due to high immigration (especially from Ukraine) and emigration (toWestern European countries), which in a short period has led to the creation of a multi-ethnic society.

This new reality also creates opportunities for the development of a new type of social capital. Due to the increasing coexistence of people of different ethnicities and lifestyles, new types of relationships and new levels of cooperation are created; people interact with each other, interdependently building their relationships, identities, and common interests. The increase in cooperation opportunities for diverse groups living side by side can therefore lead to an increase in their bridging social capital [20–22]. A new participative model of social life based on internet projects, with a relatively low entry barrier, space for creativity, and the widespread use of ICT technologies, can provide the new ways of debating civic engagement, and collective action. This possibility becomes particularly valuable if we consider the erosion of the traditional public sphere, as observed by Jürgen Habermas [23]. In order to prepare for the implementation of this type of projects, and to determine

whether they will meet the CI paradigm, we need the most appropriate methods for tracking the various features of CI in existing and future Polish-Ukrainian online initiatives. We need methods of monitoring the factors conditioning group collaboration, and the circumstances of their occurrence, as well as the methods of sensing participants' incentives and attitudes. This need has been expressed in this study through the following hypothesis and research questions:

H: The existing CI research methods can help to identify the specific aspects of debate in online communities consisting of Poles and members of the Ukrainian minority in Poland, which will contribute to create social bridging capital between these groups.

RQ 1: What kind of model of civic debate will be suitable for use in Polish-Ukrainian internet projects?

RQ 2: How the existing CI research methods can be used to monitor particular aspects of the civic debate in online projects that contribute to building social bridging capital between Polish and Ukrainian communities?

2. Methods

The methods used to conduct the study included: In the first stage, a multidisciplinary literature review; in the second stage qualitative in-depth interviews (IDIs). The literature review covered the widely present topics in scientific literature that we considered particularly important to our research. These topics are: Debate models existing in the public sphere, methods of researching CI compatible with these debate models and suitable in identifying their features in online projects, bridging social capital, and factors affecting its level in internet projects. As a technique of literature review, following H. Snyder guidelines [24], we selected an integrative review that allowed us to critique and synthesise knowledge and was intended to create a theoretical framework to be used in later qualitative research [25].

The authors focused on the results published in the well-known data bases (Web of Science, Scopus, Science Direct, and Google Scholar). A cursory analysis was performed by reading through the titles and abstracts of each topic. The following criteria were used to select the articles for review: (1) the article discusses the selected topic; (2) the publication in which the article is published is listed in at least one of the above mentioned databases; and (3) the article makes a non-trivial contribution to the debate, meaning it involves more than a couple of references to the term. As for the subject of civic debate models and measuring deliberation, we also based our research on literature review performed by Steenbergen et al. [26], Stromer-Galley [27], Mouffe [28], and Paxton [29].

The analysis of the articles selected in that way allowed us to assess, to critically review, and to potentially reconceptualise the literature on the research topics to enable a new conceptual theoretical framework to emerge [24]. The review allowed: (1) determining the most important models of debate in the public sphere and their aspects, especially features important for conducting online debates; (2) selection of such methods of researching collective intelligence in internet projects that would be adequate to identify specific aspects of online debate; and (3) definition of such criteria for increasing the level of social bridging capital that would be possible, thanks to the implementation of internet projects that meet previously adopted assumptions. This work led us to prepare a theoretical framework that summarises the methods of researching CI projects and the corresponding properties of debate in the public sphere, adopting an additional criterion of the expected result, which is the impact on the increase in the level of bridging capital in the studied projects.

The second stage of our work was to subject the theoretical model to qualitative research. The sampling for the personal interviews was conducted through e-mails and telephone calls. As a result of the sampling, 12 respondents met our inclusion criteria. We conducted 12 semi-structured interviews using the IDIs technique. In order to perform an in-depth analysis, face-to face interview was chosen as the main method. This method enabled us to gain a wide range of information resulting in evaluation of the whole contextual environment. The selection of the participants for this study ensured the best combination of experience and broad knowledge of Polish-Ukrainian relations,

especially the situation regarding the Ukrainian minority in Poland. All of the interviewees were specialists in Polish-Ukrainian projects in NGOs, businesses, universities, and public organisations. Their work experience included past implementation of international projects involving Polish and Ukrainian people, working in mixed Polish-Ukrainian teams, and researching issues connected with this kind of cooperation. All participants were informed that anonymity of volunteers and their organisations would be guaranteed. The interviews lasted one hour on average, depending on the participant's responses. The interview consisted of open-ended questions and the procedure was semi-structured. The participants were asked seven questions in total, each containing some sub-questions. Pilot tests were implemented with two researchers to ensure the clarity and relevance of the questions. The interviews were recorded, transcribed, and coded. The scope of the interview included the following issues:

- What are the key problems related to the situation of the Ukrainian minority in Poland, its integration with the rest of society and the level of social capital?
- What kind of online communication is suitable for debating common Polish-Ukrainian issues? Which of the debate models presented in the theoretical framework will be particularly relevant to Polish-Ukrainian internet projects?
- Which of the presented CI research methods seem to be the most suitable for studying Polish-Ukrainian internet projects and why?
- Which of the debate aspects examined by these methods are particularly relevant in raising the level of social bridging capital in Polish-Ukrainian communities?

3. Results

3.1. The Literature Review and Theoretical Framework for the Qualitative Research

3.1.1. Debate Models Present in the Public Sphere and Their Features

Contemporary reflection of social sciences regarding the role of civic debate in policy-making was shaped by the opposition to the purely aggregative model of J. Schumpeter and R. Dahl, who basically gave public opinion the role of aggregation of preferences and interests existing in society, rather than creating any new values in the debate [30]. In contrast to this approach, a deliberative model was proposed by J. Habermas and J. Rawls, and it was further developed by J. Cohen, J. Fishkin, J. Elster, and others. This model emphasizes the important role of debate in shaping civic attitudes, involvement in community life, and creating social bonds. According to the deliberative approach, the main features of the debate are: Communication focused on reaching consensus, expression of reasoned opinion, judicious argument, equal participation, independence of judgment, critical listening, and earnest decision making [27]. An important feature of deliberation is its rationalism: In a deliberation, no force except that of the better argument is exercised [31]. In this model conflict is seen as a threat resulting from mutual non-recognition of validity claim. Furthermore, an inner stability of the group and common identification with the result is frequently more important than outcome of the debate. Creating a single, common outcome, and obtaining the widest possible acceptance for it, is a general assumption of deliberative stance. Emotional statements are generally unacceptable. Contemporary theorists, however, redeveloped Habermas'thought, also allowing in communication, apart from purely rational statements, the emotions and interests of the participants [32], and emphasising the role of external experts in assessing and moderating the debate [33].

Although some researchers consider the deliberative model as an obvious way of conducting civic debate in internet projects in a compatible form for CI paradigm [34], we believe that it is not the only possible and necessary approach. The agonistic model (the term is based on the Greek word agon) has been proposed to describe the public debate in an alternative way to the deliberative model. Theoretical foundations of this model are described in the works of C. Mouffe [28], and they draw on the achievements of H. Arendt [35], S. Benhabib [36], and others. In this approach, debate is seen

as a competitive space, characterised by a dynamic tension, as participants compete for recognition, precedence, and acclaim [35,36]. Contestation is seen as an important incentive and a cure for apathy, engaging people in debate. Competition and conflicts are not abuses to eliminate, but the core processes. Individualistic and/or "tribal" attitude is valued, and some participants usually gain a dominant position in the group (based on prestige). Interdependence of different positions is observed, as the alternative solutions are fueled by confrontation and developed in opposition to each other. Perseverance in defending an individual position against the majority is valued. Emotional statements are acceptable. The opponents (both the competing groups and individuals) should be treated with respect, as esteemed adversaries, not the enemies [37]. Through collective contestation, participants develop autonomy and group identity relationally. The result of the debate is rather a preference ranking than consensus [38].

3.1.2. Methods of Researching Collective Intelligence Suitable to Identify the Aspects of the Public Sphere Debate in Internet Projects

The review of the literature allowed us to identify the most important research methods that have been used so far to study specific aspects of CI on the internet. A full overview of these methods, their strengths and weaknesses, as well as proposed changes and modifications, were described in our previous article on this topic [39]. In this paragraph, we will briefly present those methods that we considered to be compatible with the public sphere debate models described above and the most adequate to examine the aspects of communication on public issues conducted online.

The first method shows the purely behavioral aspects of CI by calculating metrics of online communication, measuring several aspects of users' behavior, identifying and mapping meaningful patterns and finally applying algorithms and statistical analysis to detect meaningful anomalies from those patterns. Analytical software, dedicated to gathering and processing the data arising from a particular debate, seems to be the most adequate tool for this work. Using real-time online analytics (often powered by AI algorithms) would allow the extraction of elements from the debate such as: Issues, ideas, arguments for and against an idea, users' clusters, users' relations, communication patterns, and decisions. The advanced analytics allowed us to generate customised metrics, alerts, and reports to give the participants and the moderators a sense of how the debate is going, and how they can contribute best [40]. Theoretical background of this approach is based on a scheme developed recently by M. Klein [40–44], and earlier by H. Rittel [45–47]. Using such a system would allow us to identify hot spots in the debate, measure the level of involvement in the discussion, useful contributions, and other key issues. Among the metrics already available in the existing software [43], and the proposals of their possible extension, we found the following as the most promising:

- Maturity—indication how mature the discussion for an issue is, estimated by gathering statistics on the topology of the branch for the debated problem: The greater complexity of the threads and the coverage of them by arguments, the better;
- Controversy—a topic that generated a large number of conflicting opinions;
- Inequality—measuring to what extent the community support is unequal for the ideas related to an issue;
- An individual participant's level of expertise and integrity, evaluated by other participants and/or the AI algorithms during the debate;
- Clusters—identifying clusters of posts that tend to be liked, rated, and viewed together;
- Support consistency—measuring to what extent an idea's average rating is consistent with the ratings for the underlying arguments;
- Social graph—returning a graph showing which users have interacted (rated, commented on, responded to, or edited posts created by the other user);
- Groupthink—estimating the level of groupthink in the deliberation for a given issue. Groupthink occurs when a particular group converges prematurely on one solution, without giving adequate

attention to competing ideas. This can help to detect such phenomena as polarisation and balkanisation [43,44];

- Social interaction strength, level of confidence, the density of social relations, scope of distrust, and the value of interdependence [48–50].

The advantage of this approach is a high level of objectivity: The assessment is independent of the individual interpretations of the researcher and is based on the processing of directly obtained numerical data. To identify the features of the deliberative model, metrics can be used that reveal: High level of equality (no dominant opinion leaders), low polarisation and/or balkanisation, low conflict level, low level of controversy in the top rated contributions, low level of distrust and criticality towards users who gained a high metric of expertise, and active content assimilation by making consistent arguments. To identify the agonistic model, metrics can be used that indicate: High level of inequality (clear leaders), high level of polarisation and/or balkanisation combined with high groupthink metric, high conflict level, high level of controversy in the top rated contributions, high level of participants' independence from each other, and higher (than in deliberative debate) level of distrust and criticality towards users who gained a high metric of expertise. The disadvantage of this method, however, is the need to adopt a research technique in the form of organising experiments using a dedicated technical infrastructure—it is not possible to study online behavior in live communities operating on platforms other than those dedicated to the particular experiment.

The second approach focuses on the less obvious and more diverse aspects of CI, to which, however, valuation in a graded scale of points is possible. This kind of assessment means using composite indexes and scales typical to the social sciences - the models, mainly quantitative and presented in numerical format [51]. Here it should be taken into account in the following aspects of the deliberative debate: The substantive value of the arguments [31,52]; respect for the opponents' arguments [26]; sensitivity of community members [31]; inclusiveness and diversity; shared responsibility [27]; sense of common interest; focus on consensus [23,32]; and decentralisation [23], as well as the following aspects of agonistic debate: competitiveness; group identity; strong rivalry among participants; respect for outstanding adversaries; focus on recognition, precedence and acclaim; and the existence of highly influential participants [28,30,37]. In addition, we should state how different types of attitude translate into: Effectiveness in problem solving, self-organisation, and quality outputs (ideas, activity, and structured opinions). An important distinction between deliberative and agonistic debates that is possible to capture with this type of evaluation is the presentation result of the debate: Is it either a preference ranking (agonistic model) or consensual agreement (deliberative model); is it a result of dynamic tension or the functional consensus [30,38]?

The most promising solution of this type that we found—the CI potential index (CIPI) was developed by Skaržauskienė et al. [53]. The authors of this method also provided several sub-indexes, covering various CI dimensions and created different components to measure each dimension. The sub-indexes and their components, that we found most suitable for our studies, are:

1. CI capacity index (studied at macro-level: Crowds), whose main dimensions are:
    a. Capacity for creativity; components: Degree of diversity in the source of ideas and degree of diversity in engagement forms.
    b. Capacity for aggregating knowledge; components: Degree of interdependence and degree of adequate supply of critical mass ("swarm effect").
    c. Capacity for decision making and problem-solving; components: Degree of decentralisation, efficiency of problem-solving, and degree of independence.
2. CI emergence index (studied at mid-level: Internet communities), whose main dimensions are:
    a. Potential for self-organization; components: Adequacy in the form of self-organisation to a community task and degree of development of transparent structure and culture.

b. Intensity of emergence; components: Degree of development of new qualities in the form of ideas, activities, structured opinions, competencies, etc. based on distributed memory system (Web intelligence).
c. Potential for adaptivity; components: Degree of development of improvements and learning processes within the community and development of life-long learning.

3. CI maturity index (studied at micro-level: Individual participants), whose main dimensions are:

a. Maturity of social impact (behavioral); components: Degree of civic engagement and degree of sustainability.
b. Maturity of social motivation (psychological); components: Level of maturity of social motivation of a community, level of social sensitivity of community members, and the degree of mutual trust between the participants.
c. Maturity of Social Orientation (cognitive); components: Level of maturity of reaction to social issues, degree of diversity in cooperating partners and financing, and level of maturity of generated content.

The main difference affecting the range of the study, compared with the earlier described method, is that using CIPI would allow us to monitor aspects of all theobserved projects, regardless of whether they are integrated into a specific analytic environment or not. This offers the opportunity either to conduct unobtrusive research on platforms where there are naturally organised communities, or organise an experiment. In addition, it should be noted that the experience of using this method described by Skaržauskienė et al. [53] clearly indicates that it works well at the level of medium and large groups, but encounters difficulties in testing individual participants.

The last method includes the most subjective, qualitative assessments, adequate to describe the incentives, interests, and emotions related with communication processes. Generally, it means to verbally explain and classify the structures, processes, goals, and incentives in CI projects, and therefore describe phenomena that are not directly transferable to numerical indicators. Several aspects of online debate just cannot be measured with the use of parameters, but should be described in context. Numerous works prove that this kind of research is an appropriate way of analysing the motivations of the participants of an online project, as well as their individual interests (disclosed or hidden), their emotions, cognitive styles, etc. Because these features are not subject to grading, but only a qualitative description, a general framework to prepare such an account should be selected. Therefore, we proposed [39] the use of CI genome framework, a widely accepted concept presented by T. Malone, R. Laubacher, and C. Dellacroas [6]. The method is based on the development of the taxonomy of building blocks (referred to as "CI genes") and identification of the set of behavioral patterns, along the lines of queries such as: Who contributes and undertakes the activity? Why do they perform a specific task? What motivates people to take part? How do they operate?

As one of the most important questions in the context of possible Polish-Ukrainian projects we found an investigation of reasons why individuals would contribute to such projects. The motivators indicated in the CI genome framework as the most common are money, love, or glory. Money is a traditional extrinsic motivator, while love and glory represent more intrinsic ones, that reflect an individual's enjoyment of doing an activity or their desire to boast about their achievements. Malone also called for further expansion of the genome framework, which found a response in S. Wise's work [54], whose team identified the new genes specific for projects related to public issues: Civic duty and interest.

In our previous work [39] we also suggested adding a new gene to this model. This gene was supposed to accurately capture some aspects of the Central-Eastern European social behavior. This would be a "contestation" gene, which we understand as flaunting a disagreement with the existing situation, a peculiar protest, an expression of frustration. According to our pre-tests with randomly selected working groups, the contestation gene would be one of the most important factors

motivating the participants of the group we are interested in. The contest can be either a creative or destructive force, the contest term would be useful to catch the specific character of Central and Eastern European social attitudes, marked by the street revolutions (Polish Solidarity movement, the Ukrainian Orange Revolution, and Revolution of Dignity) and based on contesting the existing situation.

According to Habermas and Rawls, in a deliberative debate model, factors such as the participants' personal emotional involvement and the articulation of their own interests are not seen as enhancing the quality of the debate, therefore, among the above-mentioned incentives, only civic duty meets their expectations. [23,55]. Conversely, in the agonistic model: Interests and emotions are seen as an important element of group differentiation; and especially the pursuit of glory and contestation are the most important incentives engaging people in debate. According to agonists, it is through collective contestation that citizens gain autonomy and particularise their identity; contestation is therefore a proposed cure for social apathy [30,38]. In recent years, however, there has been an evolution of the position of deliberativists on these issues: Many have adopted the opinion that the inclusion of emotions and self-interest are in some situations acceptable, but they should not dominate the communication rationality and the pursuit of consensus [32,33]. Qualitative analysis of the participants' motivation and incentives can therefore be an important element of studying CI projects that will allow researchers to position them closer to a deliberative or agonistic model.

3.1.3. Bridging Social Capital and the Factors Affecting its Level in Internet Projects

As the subject of our interest in the present study is a debate on public issues through internet projects, for such a debate it is necessary to reach in society a certain level of willingness to co-operate with other people. Our literature review has confirmed that the public sphere cannot function well in atomised, broken, distrustful, and insecure societies, where social capital is lacking. In recent years, the concept of social capital, broadly defined as cooperative networks based on regular communication and trust, has been applied within cross-disciplinary social science research, primarily by sociologists, political scientists, and economists, of which the most notable are: Putnam, Bourdieu, and Fukuyama [13–15,56–58].

As numerous studies prove, the insufficient level of social capital is a specific feature of all the post-communist societies in Central and Eastern Europe. Qualitative political science studies concerning how social capital have proliferated in Eastern Europe indicate, that the negative social capital heritage can be traced to the communist era, as in Poland [17] and Romania [59,60]. Paldam and Svendsen [61] claim, that the original accumulation of social capital has decreased in the countries of Central and Eastern Europe, destroyed by the communist regimes.

An insufficient level of social capital is therefore a feature of both Polish and Ukrainian communities treated separately, which hinders the implementation of civic projects and the debate on public issues, both mono and multi-ethnic. Bridging social capital describes connections that link people across a cleavage that usually divides society (i.e., ethnicity, social identity, and religious beliefs), in contrast to bonding capital, which characterises closely related groups: Putnam enthuses about the importance of moving beyond our social and political and professional identities to connect with people unlike ourselves [14]. These sorts of associations cooperate to pursue common interests, bridge between communities, groups, or organisations, respecting different people, values, and beliefs through contact with others. An additional factor conditioning this issue is the question of problems related to migration and their impact on the mutual perception of the groups subjected to them.

The recent research made by Chen [62], as well as numerous elder works [63–65] prove that online communication under certain conditions can have a positive impact on social capital (both bridging and bonding). Therefore, we decided to include the increase of bridging capital as an expected effect of the online projects, where inter-group trust, cooperation, and inclusion occur [14,66], and the resources are accumulated through personal relationships [67]. The quality of bridging social capital therefore is affected by the level of trust, extent of networks, density of relationships, obligations and reciprocity, forms of common knowledge, operating norms, and sanctions for breaking rules. One method of

generating and increasing the bridging capital is to build interactions and networks among distinct groups of citizens as well as between the citizens and public or private organisations [68]. This type of social capital is considered as fundamental in increasing civic engagement, reducing opportunistic behavior, gaining access to new knowledge and addressing community problems: It is not shared values that unite diverse citizens, but participation in a shared process [69].

3.1.4. Theoretical Framework for the Qualitative Research

The direct result of the conducted literature review is a theoretical framework that was used as a reference point in later qualitative research. This framework is intended to summarise the methods of researching CI projects and the corresponding properties of debate in the public sphere, as well as the factors affecting the level of bridging capital on the internet, relevant to the study of Polish-Ukrainian online projects. The framework synthesises the concepts, research findings, existing theories, and definitions gathered in the literature review, as well as references to the relevant scholarly literature [70,71]. The brief version of framework is presented in the Table 1 below.

Table 1. Theoretical framework: Collective intelligence (CI) research methods, civic debate models and social bridging capital in online projects.

CI Research Method	Research Technique	Civic Debate Models: Aspects Possible to Examine	Social Bridging Capital: Aspects Possible to Examine
Calculating metrics of online communication Statistical analysis; Detecting meaningful patterns; Extracting issues, ideas, arguments, users' clusters, users' relations, decisions.	Quantitative research; Experiment organized in a dedicated ICT environment; Directly obtained numerical data; Highly independent of the subjective opinion of the researcher.	**Deliberative debate:** High level of equality (no dominant leaders); low polarisation and/or balkanisation; low conflict level; low level of controversy in the top rated contributions; low level of distrust and criticality; consistent arguments. **Agonistic debate:** High level of inequality (clear leaders), high level of polarisation and/or balkanisation combined with high groupthink metric, high conflicts level, high level of controversy in the top rated contributions, high independence, noticeable level of distrust and criticality.	Extent of networks; density of relationships; intensity of relationships.
Using composite indexes to evaluate diverse aspects of CI in a graded scale of points Valuating: Effectiveness of problem solving; self-organisation, quality outputs (ideas, activity, structured opinions); creativity, critical mass, independence, transparent structure and culture, adaptability, social impact, motivation, orientation	Quantitative research; No need to integrate with any specific analytic environment; Unobtrusive research of live communities or experiment; Valuation dependent on the opinion of a researcher.	**Deliberative debate:** Value of the arguments; respect for the opponents' arguments; sensitivity of community members; inclusiveness and diversity; inclusiveness and diversity; shared responsibility; sense of common interest; focus on consensus; decentralization. Result of debate: consensual agreement. **Agonistic debate:** Competitiveness; group identity; strong rivalry among participants; respect for outstanding adversaries; focus on recognition, precedence and acclaim; the existence of highly influential participants. Result of debate: A preference ranking	Group cooperation to achieve common interests; mutual trust; reciprocity; common knowledge; operating norms; sanctions for breaking rules.
Creating qualitative CI assessments Verbally explaining and classifying the structures, processes, goals, and incentives in CI projects; Describing contextually the incentives, interests and emotions related with communication processes.	Qualitative research; Illustrating phenomena that are not directly transferable to numerical indicators.	**Deliberative debate:** Civic duty is legitimate incentive, emotions and self-interest are in some situations acceptable, but should not dominate the communication rationality and the pursuit of consensus. **Agonistic debate:** Interests and emotions are seen as an important element of group differentiation; especially the pursuit of glory and contestation are the important incentives engaging people in debate.	Trust and motivations on an individual level; respecting people of different ethnicity, culture, values, and beliefs.

Source: Developed by the authors.

3.2. The Qualitative Research: In-Depth Interviews

3.2.1. Situation of the Ukrainian Minority in Poland

The first discussed topic referred to the key problems of the Ukrainian minority in Poland, its integration with the rest of society, and the level of social capital of Polish and Ukrainian communities living side by side. Participants of our study noticed the heterogeneous nature of Ukrainian migration to Poland. Among them a visible, but relatively small group consisting of families settling in Poland permanently (some of them already have children who were born in the new country). Many of them assimilate quickly and have a sense of influence on the local community. Other groups that integrate to a much lesser extent are people working in Poland to finance their relatives living in Ukraine—seasonal workers, and students. Students rarely integrate, they have their own separate environments, e.g., their own meeting places and clubs. In addition, the situation varies depending on the size of the city. Integration in large cities is easier; it is harder in small and medium-sized towns.

Participants believe that there are currently no major conflicts between Poles and Ukrainians. Although mutual prejudices sometimes occur (more often on the part of Poles towards Ukrainians than vice versa), contrary to stereotypical and publicised opinions these prejudices do not create great barriers in practice. The prejudices are of several types; first of all, participants mention those connected with historical and cultural pasts. On the Polish side, they are associated with the resentment associated with the loss of eastern parts of the country that now belong to Ukraine. On the Ukrainian side there is a fear of losing their identity—linguistic and cultural closeness is sometimes seen as an additional threat. However, these fears are not very significant for the average citizen (unlike for professional historians or activists). Furthermore, there are prejudices related to the labor market situation, i.e., the alleged taking of local jobs by migrants, and hindering the work of honest, migrating people due to excessive administrative obstacles. These conflicts were marginal during the economic prosperity of recent years, but in times of crisis caused by the coronavirus pandemic, they gain in importance. Participants in our study also paid attention to the "credit of trust" and sympathy that arose between Poles and Ukrainians as a result of the latter's involvement in the conflict with Russia.

Participants are generally convinced of the existence of significant similarities between Poles and Ukrainians. Despite the different political situations prevailing in these countries in recent years, participants agree that both nations belong to the same geopolitical region and are following a similar path of development. The common opinion is that Poles have already undergone certain stages of social change that Ukrainians are now experiencing. At the same time, however, there are divergent opinions about the nature of possible differences between Poles and Ukrainians. Opinions are generally divided in half. The first group of study participants believe that the differences are insignificant and do not result from civilisation and cultural background, moreover, there is no significant difference in the level of social capital, which is at a similar level in both groups. Rather, they think that any differences are related to the generational nature of migration, the typical effects of changing the country of residence, and the professional situation of migrants on the labor market. However, the second group of participants sees, despite similarities, significant cultural differences between the two nations:

1. They notice a different way of accumulating social capital in both groups. In Ukrainian communities, mainly due to the omnipotence of the state in the Soviet era and the outward presentation of participation in civic life, true social capital is expressed primarily in informal, and friends-and-family ties (this is "bonding social capital", according to Putnam's theory). There is high integration at the level of informal ties, but formalised cooperation is more difficult, and relations with institutions are distrustful. On official level, these kind of people present "safe" rather than honest opinions, which hinders the real public sphere debate. One of our participants gives an example of the specific way Ukrainians do business in Poland: They prefer cooperation with compatriots and people who they know on an informal basis, and they generally do not believe in equality of competition. As for Poles, despite some similarities, informal and formal ties are much more balanced.

2. Some of our participants claim, that Polish culture is characterised by a much more "individualistic" approach, and Ukrainian a more "collective" approach. This is due to the impact of different civilization patterns (in Poland-Western, where the human being is the center of attention, and in Ukraine-Eastern, where the collective is more important).

In addition, participants mostly agree that contesting and social opposition to oppression are the elements of culture connecting Ukrainians and Poles. In the cultures of these nations there are stereotypes of "Cossacks" inciting rebellion against injustice, or "insurgents" fighting against foreign occupation. These images found their contemporary expression in the Orange Revolution and "Euromaidan" in Ukraine, as well as the Solidarity movement in Poland. On the other side, participants also see the risks associated with it (contestation exaggerated to self-destruction).

According to participants, the best level for future integration and cooperation is on the local scale (environment, city, region), and in the case of domain issues (e.g., simplification of regulations related to work permits, which are demanded by both Ukrainian employees and Polish employers). In these areas there is the greatest chance to create bridging capital.

3.2.2. Online Communication on Polish-Ukrainian Issues. Debate Models

The second topic that we raised during the qualitative research concerned the kinds of online communication that would be suitable for debating common Polish-Ukrainian issues. Referring to the debate models presented in the theoretical framework we asked which would be particularly relevant to existing or future Polish-Ukrainian internet projects.

Participants of the study paid special attention to the problems associated with current Polish-Ukrainian communication in social media. They claim that the visible, but unreliable opinions in social media, which are the work of "internet trolls" (widely recognised as people paid by "foreign organisations" benefiting from disrupting Poles and Ukrainians), are a significant problem: "There are powerful organisations involved in breaking up good Polish-Ukrainian relations online. A solution would be introducing very strict moderation, but it will not solve everything". They provide examples of highly critical internet comments regarding the introduction of the Ukrainian language in public transport in Polish cities. These comments, due to phraseological and stylistic similarities, gave the impression of being written by one person or people using one pattern who pretend to be unrelated internet users.

Participants see a need for AI "self-learning" algorithms that could detect top-down manipulated content. This kind of software should be used in filtering Polish-Ukrainian debates to allow the free exchange of opinions. In addition, they draw attention to possible difficulties in encouraging people to use dedicated online platforms for debate, because media outlets such as Facebook and Twitter dominate. This is related to a reluctance to engage in "official" cooperation, existing among both Ukrainians and Poles. Social media guarantees some anonymity and allows for free communication, but on the other hand using this kind of media does not translate into a real impact on civic life.

Another equally important issue, is the choice of language that would be used to conduct a debate in a mixed Polish-Ukrainian community. Among the existing options (possible choice of Polish, Ukrainian, Russian, or English), most of the survey participants indicated that in the case of communication between members of the Ukrainian minority in Poland and the natives it should be Polish, as most Ukrainians living in Poland quickly gain fluency in this language and want to use it. Great linguistic similarities favor this. A certain barrier is the question of a different alphabet, however, the Latin alphabet is generally known among Ukrainians, but knowledge of the eastern alphabet is rather rare among Poles. Using Russian language, despite its popularity, as the official way of communication would now be burdened with negative stereotypes, and the use of English, although the most neutral, would limit communication to a small group of well-educated people, although it could be useful in the case of discussions on specialised topics.

The last important issue in this topic was the reference to the debate models presented in the theoretical framework. The participants were asked which of them will be particularly relevant

to existing or future Polish-Ukrainian internet projects. The answer to this question is complex. Conducting a debate in accordance with deliberative principles is certainly "safer", because this kind of debate is intended to seek a common denominator, mitigate the heterogeneity of participants, and focus on a common result that would be acceptable to all. In the face of existing (to a greater or lesser extent) contentious and emotional themes, often artificially fueled by "internet trolls" and unrepresentative media, focusing on consensus and substantive arguments seems to be a good method for developing cooperation between mixed Polish-Ukrainian communities. Participants claim that "if we want effective cooperation, people must act primarily for the common good. There will always be differences, but you can only work well with some consensus and respect for other groups". Virtually all participants in the study agreed that for the debate on issues of local communities or concerning labor law, it would be necessary, at least in the initial stage of the debate, to consider primarily deliberative principles.

At the same time, some participants note that ignoring issues related to group identity and diminishing competition between the users and the groups can artificially limit the freedom of discussion and cause a lack of depth. "You can't sweep the differences under the rug. Even if Poles and Ukrainians share different points of view, they can be discussed. If we maintain a certain culture of debate, then taking into account emotions, cultural codes and other group experiences can significantly influence the quality of communication". Some participants share the view that because of a different approach to social life—more attached to personal freedom ("individualistic") specific for Poles and more "collective" for Ukrainians—both sides can learn a lot from each other; the interaction of different styles of thinking draws the debate out of apathy, and becomes a method of realising self-interest and cultivating identity. Such a process affects the creation of social capital. According to participants, Internet projects are an opportunity to raise the level of such debate, because "The internet faciliates debate more freely than in person", and "after realising the differences, you can make an effort to achieve the common good".

3.2.3. Most Appropriate Methods of Researching CI in Polish-Ukrainian Projects

The next topic of the survey was a question: Which of the presented CI research methods seemed to be the most suitable for studying Polish-Ukrainian internet projects and why? The study participants agreed that in order to prepare for the implementation of internet projects, it was necessary to determine the method of verifying whether these projects meet the adopted assumptions, and to set criteria for achieving success, defined in our case as achieving a certain level of collective intelligence. To this end, a research method should be adopted to determine whether or not group intelligence has emerged, and if we detect the factors that influence its emergence, we could influence the participants to communicate intelligently with each other.

Participants agreed that there are various factors and situations that motivate us to more or less intelligent debate. "The idea is not to waste time on pointless shouting on internet forums, but to launch a project in which we can reliably check if it works", and therefore to determine in what situations in joint Polish-Ukrainian projects the intelligence of the group is emerging and in what situations the group works well etc.

The participants' opinions about individual research methods varied. The first of the presented methods—calculating metrics of online communication and performing their statistical analysis—was considered valuable by 8 out of 12 participants. They observed its impartiality and accuracy, and the ability to process large amounts of data (scalability). At the same time, some of the respondents thought that using this method, it would be difficult to capture the nuances associated with the motivations of the participants in the debate. This method also seemed difficult because of the technical requirements (dedicated work environment, analytical server). Due to the experimental nature of the study, the debate groups should be artificial, recruited communities, so it must be ensured that their structure is representative of real-life society. Purely statistical data processing raised doubts whether it will be possible to delve deeper into understanding interpersonal relationships. Some participants

believed that due to the cultural differences that exist among the participants, the results of the study may be distorted and the "machine" will not catch it.

Despite this, most participants of our study highly appreciated this method, although with certain reservations: "this method is by far the most objective, but also the most impersonal. Thanks to this method we have statistics that can be complex and multi-faceted, but the statistics don't always show where people's behavior comes from". To point out one advantage of this method, participants mentioned the opportunity to acquire new knowledge, which is not based on the repetition of heard opinions, but on an unbiased analysis of data. Knowledge about how people took part in the debate, whether there were conflicts, whether they argued in a coherent way, which subgroups formed, whether there was herd thinking, may surprise us, because it is possible that stereotypes will not find confirmation. Of course, this data requires in-depth analysis using other tools to examine intentions, emotions, honesty, etc.

The second method, based on using composite indexes to valuate diverse aspects of CI in a graded scale of points, may according to participants allow the study of real online communities, regardless of the laboratory experiments carried out. It will allow the obtainment of data closer to the real state of Polish-Ukrainian online communities. This may allow the showing of a change in attitudes in these communities over time, and to verify whether a minority (Ukrainian) group will show willingness to work together with Poles. Much depends here on determining the scale of the study (how many communities, what are their goals, what period of study we will take). The advantage of this method, according to participants, is the combination of quantitative research with qualitative criteria relating to the attitudes of members of online communities. It will work well if an experienced researcher, who understands contexts of human behavior, uses it. The disadvantage of this method, however, is the possibility for researchers to use unclear criteria when allocating points within specific categories. In addition, translating collective intelligence to one overall factor may not be enough to explain what is really happening and what we can do to increase group intelligence.

The last method, consisting of qualitative CI assessments, contextually describing the incentives, interests and emotions related to communication processes, was considered by almost all (11 out of 12) participants to be very useful. A condition of its usefulness was, according to participants of our study, the extent of the knowledge and experience of the researchers using it. If this can be ensured, then knowledge about the motivations, real aspirations, and emotions of the members of online Polish-Ukrainian communities will be very interesting research material. "An experienced and aware researcher will recognise the quality of arguments, separate valuable discussants from dilettantes and from trolls. Thanks to this it will be possible to recognise the source problems while the other methods will not show. The other methods generalise, and this one does not". However, there are reservations that although this is "the best method of all three, researchers may have a subjective approach and interpret using some form of prejudice". Therefore, most participants indicate that combining this method with another, most likely the first method (obtaining fully objective data from an analytical server) would be the optimal solution.

3.2.4. Relevance to Creation of Social Bridging Capital

The last topic discussed in our study was the question: Which of the debate aspects examined by the CI research methods are particularly relevant in raising the level of social bridging capital in Polish-Ukrainian online communities? According to the participants of the study, the most important are those aspects that can be observed by all participants of the Polish-Ukrainian community, in an objective and trustworthy manner and how mutually beneficial cooperation is possible.

Here, first of all, the features examined by objective analytical methods come to the fore. Without expressing sympathy for particular people, these methods will allow the study of performance in a group, showing their consistency of argumentation, impartiality, intensity, and nature of communication (including conflicts) with other users. Again, we have proof that methods based on processing raw data from the server have an advantage in this aspect. At the same time, participants

note that by examining, at the most personal level, the motivations, intentions and own interests of individual members of the community, we can help them better understand their similarities and differences, which will allow them to communicate more freely.

Both of these approaches seem to be useful in achieving the goal that was pointed out by the participants of our study as particularly important for building trust, i.e., filtering out users intentionally distorting communication (internet trolls). According to the participants of our study, this is one of the most important factors that can contribute to building social capital between Poles and Ukrainians. Identification of common "genes" affecting intelligence (including, for example, the contestation gene) can also, according to participants, foster better understanding and cooperation among community members. Other ways to build mutual trust would be gaining knowledge about the extent of networks, reciprocity, and fulfilling community norms. This can be tracked both by the analytics server and by the composite index method.

4. Discussion

Based on both the literature review and the opinions of the participants in our study, we conclude that the presented CI research methods and debate models can significantly help to develop internet communities that will create bridging capital between Poles and Ukrainians. The presented models of civic debate, both the deliberative model and the agonistic model are applicable to our case. The deliberative model, focused on consensus-building and rational argumentation, happen to be good at mitigating the contentious and emotional themes, increasing group cohesion, and increasing interest in the common good reduced to a universally acceptable outcome of the debate. This model is especially relevant for the debate on issues of local communities or labor law. On the other hand, the agonistic model can also be used, because preserving group identities and supporting competition draws the debate out of apathy, and even becomes a method of realising self-interest. Depending on the topic for debate, both consensual agreement (specific for the deliberative model) and preference ranking (specific for the agonistic model) can be a useful result in an online CI project.

In the existing literature, the issue of the public debate model in CI projects has been treated in one way only. Collective intelligence has been implicitly combined with the deliberative democracy model, supplemented by the cognitive diversity criterion [34,72,73]. What is more, researchers on this topic emphasise the need for further work due to insufficient knowledge of the actual relationship between the deliberation process and the development of valuable results in internet projects [72]. The conclusions of our research meet this need. Noting the possibility of two alternative debate models in CI projects, that have been identified in social sciences (deliberative and agonistic model), we open the possibility of further work that should be focused on verifying the adequacy of these models to specific public issues implemented in CI projects and the possibility of combining some of the features of these models in the various projects. The impact of cooperation and competition factors on collective intelligence processes has been noticed in some previous work [74–76], but it has never been thoroughly analysed in relation to online debates on public affairs. The most interesting attempt in this direction was the recent work of V. Lowndes and M. Paxton presented in the text: Can agonism be institutionalised? Can institutions be agonised? Prospects for democratic design [38], where practical possibilities of applying the agonistic model in the form of preference rankings in public online projects were pointed out. However, there is still a need for a dedicated, comparative study in this field.

The review of the selected CI research methods revealed that each of them is seen as potentially useful, although they can help identify different aspects of CI. So far, the results associated with the use of each of these methods provide examples of their effectiveness in relation to the specific features of online debates. Calculating the metrics of online communication and using it to extract issues, ideas, and arguments, as well as detecting users' relations, decisions, and meaningful patterns, was assessed by J. Capella et al. as one of the most appropriate factors affecting intelligent decision-making in public deliberation [72]. The outstanding examples of practical use of this method for monitoring the level of collective intelligence have been carried out by M. Klein and his collaborators. Studies conducted

with the use of Deliberatorium software have included: Large-scale argumentation on the use of biofuels in Italy, conducted in the University of Naples, debate on the controversial questions about possible changes to Italy's election laws [40], and Intel conducted deliberation on the possible use of "open computing" [11]. The results of these projects showed how software algorithms can help users allocate their effort in a large-scale debate, as well as how debate metrics can be used to generate personalised attention mediation suggestions [41], although it is sometimes difficult for users to switch from the conversational attitude to formalised argument-based discussion. When used properly, argument mapping helps to organise and summarise information, but as with other formal knowledge representations, it does not work well for mediating dialog, nor does it support the movement from less structured exploratory dialogue to more structured knowledge representations [77]. It was also confirmed in our research, that this method, on the one hand, is attractive because of its objectivity, but on the other is the most "impersonal": The calculated metrics may not always show where people's behavior comes from.

CI studies conducted so far with the use of a composite index, were primarily based on the CIPI that was developed by Skaržauskienė et al. [53]. The major research project which used this method was "Social Technologies for Development Collective Intelligence in Networked Society", where 15 online communities were studied. The application of this methodology primarily allowed for evaluation of the creativity, problem solving level, and civic empowerment in these communities. During the study, however, problems arose, due to the large number of accepted sub-indexes and monitored factors, it turned out that it was not possible to collect uniform data everywhere [53]. Our research results pointed out, that assessment using indexes and scales with qualitative criteria allow for the performance of more flexible study than using purely numerical metrics. At the same time, however, it turned out, that an overall factor may not be enough to explain what is really happening and what we can do to increase group intelligence. Some elements of the index are more and others less applicable to the study of specific communities. In our opinion, therefore, individual sub-indexes should be selected to study specific aspects of community performance in CI projects.

The last examined method, that is creating qualitative CI assessments with the help of a CI genome framework, was used in several research projects, mainly by T. Malone et al. [6] and Wise at al. [54]. In these projects, respectively, approximately 250 online platforms [6] and over 120 plaforms were studied. This work led to identification of different kind of CI "genes", the conditions under which they are useful, and the constraints governing how they can be combined [6]. The used framework, although certainly not showing the detailed behavior of online community members and not describing all the possibilities, allows an overall picture to be formed. Our study refreshed the possibility of using this method, by applying it to specific types of communities. Our proposal to include the contestation gene in the study of Polish-Ukrainian CI projects was appreciated by the study participants. Therefore, carrying out this type of research in the future would be a contribution to the development of the framework used in this method.

The conclusions of our study accommodates the hypothesis that the use of a combination of the described research methods in relation to online Polish-Ukrainian projects can bring valuable results. The optimum solution for future research would be to combine the examined methods to mutually complement their characteristics. The proposal to conduct a study using multiple approaches to capture various aspects of the phenomenon being studied is in our opinion the best approach to the study of collective intelligence in complex social situations, as is the case in Polish-Ukrainian relations. This proposal goes beyond the projects implemented so far. Each of these methods, as analysed in our research, was found suitable to examine certain aspects of communication in these kind of online projects. Especially combining the quantitative methods, processing numerical data from the server, with qualitative assessments clarifying the incentives, interests, and emotions related with communication processes, seems to be a promising approach. On the other hand, using composite indexes to valuate diverse aspects of CI in a graded scale of points may allow monitoring the real online communities, regardless of the laboratory experiments carried out.

The presented debate models and CI testing methods may also significantly contribute to an increase in bridging capital in online projects. This may occur especially by building mutual trust, which is a necessary component of social capital: By gaining knowledge about the intensity and density of networks; reciprocity; fulfilling community norms, as well as common CI genes (including "contestation" gene). Studies conducted so far prove that internet communication under certain conditions can have a positive impact on social capital [62–65]. Relations between emerging collective intelligence and an increase of social capital have been indicated in several publications [53,78–80], but have not been the subject of separate research in recent years. That is why we encourage researchers from various disciplines to take up this topic in their future work. Additionally, an issue that our participants pointed out and which should be analysed in more detail, is filtering out users intentionally distorting communication (internet trolls), which shouldhelp to maintain the community standards. This can be tracked by the analytics server, composite index method or by qualitative assessments.

The results of our work, both the literature review and qualitative studies, open up the possibility of conducting further research that would allow the validation of their accuracy using empirical methods. First, experiments should verify which of the debate models, as well as the debate topics will actually be appropriate for specific Polish-Ukrainian online communities: What kind of community features and the issues raised in the debate will work better with the deliberative model, based on consensus and dispute mitigation, and when will the agonistic model, based on competition and allowing group identities and emotions, be more appropriate? This can be tested by selecting several more or less controversial debate topics, recruiting groups with different user profiles, and setting the purpose of the debate either as a common, widely acceptable result, or as a preference ranking. Another possibility of further work would be evaluating the performance of existing communities to find out methods for detecting "internet trolls", i.e., people, who purposely disrupt communication to provoke other participants. However, it should be also examined whether stigmatising such behavior leads to abuse by restricting freedom of expression and introducing censorship. Another question to be further explored is how does the choice of the language of the debate affect equal participation, communication intensity, and conflicts, and in which situations is bilingualism necessary and in which optional.

As for the presented CI research methods, the actual suitability of each of them should also be checked during empirical research. Specific issues that should be explored in the case of the calculating metrics method, relate to its ability to detect nuances associated with the actual motivations of the participants. In the case of the method based on the CI potential index, it should be particularly examined which of the existing sub-indexes have a specific impact on Polish-Ukrainian communities. Then, in the case of a CI genome study, it would be interesting to verify the existence and impact of the contestation gene on community activities. Another particularly interesting topic that appeared during the IDIs, and which should be examined during empirical research, is the question of behavioral patterns present among Poles and Ukrainians: Whether differences in "individualistic" and "collective" attitudes are related to cultural differences between people, or are actually related to age and social situation, regardless of ethnicity. We hope, therefore, that the work we have done will create the opportunity to carry out many interesting research projects in the future.

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