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Persuading Youth in Civic Participation with Social Robots: What is Appropriate?

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Abstract. Engaging youth in civic participation is essential for sustainable societies. Social robots, as embodied and interactive entities, may be feasible tools to spark youth's interest. To start designing persuasive interactions for this purpose, we conducted a study addressing the question, what do youth consider as appropriate behaviour for a civic robot? We developed three scenarios describing social robots as persuaders for youth's civic participation. The scenarios were evaluated in three workshops with 51 fifteen-year-old Finnish participants. The credibility of the robot emerged as a central theme: a civic robot should emphasize its purpose and avoid any pretence – also when expressing emotions.

Keywords. Civic participation, youth, social robots, civic robots, persuasion

1. Introduction

Youth participation in civic and political processes is important for the sustainable development of societies. Young people are often open to new ways of interacting with people and technology and because they have their future ahead of them, they may have natural interest to contribute to the society. However, equal engagement of youth is not a trivial task – while some participate in a wide range of civic activities, many lack opportunities, motivation or belief in the impact of their actions [1,2]. In general, younger generations seem to prefer non-institutionalized ways of participation [3] and a self-expressive, creative civic style that represents actions outside the conventional, "dutiful" civic activities [4]. Digital technologies such as games can be leveraged to make participation an attractive and engaging experience, and to increase the reach of the participation channels [5].

Social robots are an emerging class of societal actors with a strong persuasive potential [6]. They are embodied entities that can be programmed to attract attention and proactively engage people into interaction with them. Prior research suggests that social robots can raise curiosity, provide entertaining experiences and serve as icebreakers [7,8]. They are also promising tools in education, e.g. as tutors or peers in language learning with children [9]. Physical embodiment and social cues are major sources of attraction for social robots [10,11]. A robot can be perceived as a social agent, and as such it can aim to persuade with rational arguments, but it can also attempt to display emotional expressions to evoke empathic responses in humans [12].

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Social robots could be engaging tools to persuade youth in low-effort forms of participation, e.g. casting a vote or suggesting solutions to problems in the local community. While the use of social media in relation to civic participation has been studied in schools with youth [13,14], no studies thus far have focused on social robots as a means for youth's civic participation. Our aim is to address this research gap by exploring how social robots could function as *civic robots* to persuade youth in civic participation and serve as accessible channels between youth and decision-makers. Civic robots could serve as effective persuaders especially in short-term usage situations in which the purpose is to engage young people to learn about topical issues and voice their opinions. To avoid potential pitfalls in persuasion, the first step in designing civic robots is to investigate not only what they *could* do, but also what they *should* do [15]. The aims of the exploratory study presented in this paper were thus to 1) uncover youth's *general perceptions on the use of civic robots*, and 2) examine what kinds of *persuasive behaviours and emotional expressions* youth deem appropriate for a civic robot.

2. Methods

The study was planned in collaboration with youth services of a medium-sized city in Finland. Ninth graders were chosen as the target group of the study due to the relevance of societal and civic participation in the school curriculum. Ethical approval for the study was acquired from the city officials. Parents were informed of the study through the participating school.

The study was done with a scenario-based approach. Scenarios are stories about people and their activities with technology [16]. The main benefits of scenarios are that they are concrete, flexible, and they evoke reflection and promote communication about the purposes of the studied system. Scenarios have been shown to be a useful way to concretely embody a view of users' actual and future activities with novel technologies such as mixed reality [17].

2.1. Participants and procedure

The study consisted of three 45-minute workshops that were arranged with ninth graders (15 years old) at a school during a school day instead of a regular lesson. In total, 51 Finnish students participated: 25 of them identified as male, 24 as female, and two as other/refrained to answer. Each workshop consisted of introduction (10 minutes), scenario evaluations (30 min) and closing discussion (5 min). Snacks were provided for the participants, but they received no other compensation for their participation.

In the introduction part, a researcher explained the purpose of the study, told that participation was voluntary and presented inspiration materials that included two palm-sized robots and pictures of various social robots. The students who consented to participate were divided into four table groups of 3-6 students, each of which had a facilitator. Three of the facilitators were researchers and one was a youth worker. The discussions were audio recorded.

In the scenario evaluation part, the students were handed a questionnaire that included the following sections: 1) background information, 2) the three scenarios with evaluation questions after each scenario, and 3) final questions about improving youth wellbeing and participation in decision-making. First, students were instructed to fill out the background information section of the questionnaire, including questions about their

attitudes or experiences of civic participation and robots. The five questions related to civic participation were adapted from a societal participation Likert scale used in a study by Pietilä and colleagues [1]. Then, students were instructed to read the scenario ("story") and answer the evaluation questions. The questions consisted of semantic differential scales about the story (boring-interesting; confusing-clear; unconvincing-believable) and the robot (useless-useful; does not encourage participation-encourages participation; boring-interesting; off-putting-attractive; untrustworthy-trustworthy), and open-ended questions about good and poor aspects of the story and the robot. Students were instructed not to evaluate the technological feasibility of the story. Once individual evaluations were completed, the facilitator in each table engaged the students in a group discussion about their thoughts regarding the story. Facilitators asked questions specific to the students' attitudes regarding the situation described in the story, the robot's behaviour in each scenario, and the attractiveness of the robot in general.

2.2. Scenarios

The students were presented with three different text-based scenarios. Each scenario had two variants (A and B) in terms of the robot's behaviour and emotional expressions. The robots in the A variants displayed neutral or mildly positive emotions, whereas the robots in the B variants expressed emotions with negative valence: depression, anxiety, fear. The purpose of the variants was to provoke discussion about which aspects in the robots' behaviour and emotional expressions were considered (in)appropriate, and whether students empathized with emotional robots. The A variants were given to half of the groups and the B variants to the other half. Due to practical reasons, the distribution was slightly uneven: 22 students received A variants and 29 received B variants.

The three scenarios were designed to encapsulate a range of different combinations of contexts, roles, and characteristics for the robots (see Table 1). The robots' behaviour in the scenarios was written in a slightly exaggerated way to encourage discussion on the appropriateness of robots and their appointed tasks.

Table 1. Characteristics of the robots in the three scenarios.

	Scenario 1 (S1): Robot on a Climate Strike	**Scenario 2 (S2): Interview with a Robot**	**Scenario 3 (S3): Follow the Robot**
Context	School, outside lessons	Event for students	Shopping mall
Role	Climate striker	Reporter	Attractor
Appearance	Humanoid, stationary	Humanoid, stationary	Non-humanoid, mobile
Interaction	Speech, tablet, gestures	Speech, gestures, microphone prop	Gaze, sound, movement, text display
Emotions and behaviour	A: Neutral, assertive B: Depressed, anxious	A: Confident B: Nervous	A: Cautious, non-intrusive B: Panicked, intrusive

The scenarios are presented below. The variant parts A (neutral/positive) and B (negative) are surrounded by square brackets and marked in italics.

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2.2.1. Scenario 1: Robot on a Climate Strike

Ninth-graders Sophia and Max have heard that a climate striker who wants to collect proposals for the city for new climate actions is visiting their school. The students find the climate striker in the school's hallway. They get amazed and amused that the striker is a robot. *[(A) The robot is standing in the hallway and waving at the students, "Come here, I have a task for you!" "What?" Sophia asks. "I would like suggestions on climate actions. Could you help me?" / (B) The robot looks depressed and complains to himself "I am distressed, I need help". "Why?" Sophia asks. "I would like to propose a climate action, but I'm just a robot, so my suggestions are not taken seriously. Could you help me?"]* A bulletin board is next to the robot, who is asking students to add suggestions for climate actions over the upcoming week. Students take up the challenge. This makes the robot happy and it asks if it can take a selfie with them.

Within a week, Sophia and Max become enthusiastic about asking the robot all sorts of things about climate change and society. They are surprised at how much information the robot has and are inspired to come up with ideas based on that. By the end of the week, the school's children have come up with lots of suggestions inspired by the robot. The robot says that the proposals will be published on social media and that all residents will have the opportunity to vote on them on the city's participatory budgeting website.

2.2.2. Scenario 2: Interview with a Robot

Ninth-graders Vivian and Vera are at the "Influence Days" organized for students. In the crowd they see a robot interviewing people. The robot is small, the size of a fire extinguisher, and has a reporter microphone in its hand. *[(B) The robot seems scared and it stares at the walls and floor, its hands are shaking.]* Vivian and Vera approach the reporter robot curiously. The robot looks into the girls' eyes and says, *[(A)"Hey, could I interview you?" / (B) "H-hey, c-could I interview you?"]* The girls nod, and the robot asks: *[(A) "What is the most important thing affecting your well-being?" / (B) "I am a bit nervous, I'm sorry, I'm not sure if I know how to interview you because I'm just a robot, but I'll try my best. W-what is the most important thing affecting your well-being?"]* Vivian replies: "Friends and family are obviously the most important things for me, because I can talk about everything with them." The robot says, "Okay, interesting!" Next, Vera replies to the robot, "The most important thing is that I can be myself and influence my future." The robot continues the interview by asking what the city could do to promote the well-being of youth. Finally, the robot lays down the microphone and says *[(A) "Thank you for the answers" / (B) "Wow, I got good answers from you, maybe I'm not such a bad interviewer after all"]*, after which it gestures cheerfully and says "It's so nice that I can now communicate your ideas further."

2.2.3. Scenario 3: Follow the Robot

Ninth-graders Alex, Michael and Anya have just met in the mall and started walking together when Michael notices that someone is following them. They stop and turn to wonder at a meter-tall robot who is *[(A) watching / (B) staring at]* them. The robot resembles a barrel in appearance, it has wheels and *[(A) sympathetic / (B) panicky]* eyes. Suddenly, a text *[(A) COME WITH ME / (B) FOLLOW ME IMMEDIATELY!]* appears on the surface of the robot. The robot turns around and starts moving. The youngsters stay still. The robot turns back. *[(A) COME, COME, the robot calls and peeps eagerly. / (B) YOU ARE NEEDED, IT IS EMERGENCY NOW! the robot calls with an anxious*

voice moving nervously at the same time.] The youngsters start to follow the robot and arrive at a place called "Youth Stop". The staff at the stop tell the youngsters about their activities, and the youngsters also get to know about different ways for civic participation.

2.3. Data analysis

The audio-recorded group discussions were transcribed and analysed using the affinity diagram method [18]. The open-ended survey questions were analysed with the thematic content analysis method. Descriptive statistics were calculated of the survey scale questions. Analyses of variance were conducted to compare the differences between the three scenarios and the scenario variants.

3. Results

3.1. Overview of scenario evaluations: Civic robots are all right, but they need humans

In general, participants accepted the idea of using robots as means for participation. Shopping centres, youth centres and schools were suggested as potential contexts of use for civic robots. However, the safety of a lone robot was raised as an issue: the robots in the scenarios were all described as fully automated robots with no humans associated with them, and participants felt that such a robot left on its own would soon be broken by someone. Some also pointed out that the situation should have been introduced to the youth in the scenario more directly by the people who had deployed the robot. Moreover, while some participants saw robots as attractive and interesting, many did not express special interest in them. Some felt that the robot was either redundant or that they would prefer to communicate with humans instead, e.g.: *"I'd find it easier to talk to a real human […] who would have more information and be more quick-witted".*

No significant within-scenario differences were found in the numerical evaluations of the scenario variants A and B. Between scenarios, the evaluations of the story had no differences, but there were significant differences in most of the robot-related evaluations: usefulness of the robot ($F=8.31$, $p<.001$), encouragement to participate ($F=5.77$, $p=.004$), attractiveness ($F=5.70$, $p=.004$) and trustworthiness ($F=8.47$, $p<.001$). Scenario 3 was evaluated lower than scenarios 1 and 2 on all these aspects: the robot's approach was considered forceful, and even deceitful in the B variant. Table 2 presents a summary of the positive and negative aspects found in the scenarios. Two central themes across the scenarios were identified: *trust* related to robots' abilities and safety; and *human-likeness* related to robots' emotional expressions and roles.

Table 2. Positive and negative aspects in the three scenarios. Specific findings related to scenario variants are denoted with A and B.

	Positive aspects	**Negative aspects**
Scenario 1 (S1): Robot on a Climate Strike	Robot had extensive knowledge and its climate mission was important. Youth's ideas were listened to and collected. Suggestions from a robot would be interesting to hear. Some empathized with the robot's anxiety (B).	Robot on a climate strike seemed strange, since it was a programmed machine. Some felt the robot's anxiety was disingenuous (B). Dialogue with a human would be easier. Robot does not add value compared to an online survey.

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Scenario 2 (S2): Interview with a Robot	Robot initiated the interaction and seemed easy to approach. Its polite, humorous and non-forceful character was attractive (A). The robot's human-like behaviour was interesting.	Robot's nervousness seemed strange or unnecessary (B). Interview with a robot felt pointless, since a robot cannot truly listen and understand. The robot would fail as an actual interviewer.
Scenario 3 (S3): Follow the Robot	Robot seemed funny, attractive and interesting. Its mission was good and relevant. It could work as an attractor, with proper introduction and interaction. It was persistent in trying to get youth's attention (B).	Robot's approach was inappropriate: forceful (A, B) and deceitful (B). It behaved in a too extreme way. Its intent was unclear, and it did not communicate properly. It tried to appeal to one's sense of duty (A).

3.2. Trust: Can you rely on a robot to do its task well – and what is the task?

Regarding trust, one area of concern was transparency about the robot's purpose. Many were concerned about information security. Participants criticized the robot in S2 for not stating clearly how the collected information would be used, but also pointed out that a robot itself may not be reliable or trustworthy. Many were aware that there is always a person controlling the robot – after all, someone has programmed it. *"When it's a robot, it may not be intelligent in that way, so maybe you believe it but there can be some person behind the robot"*. Participants wanted transparency about the humans behind the robot, which would also improve the experience of encountering the robot. In S1 and S3, robot was discovered by youth independently, and the encounter was described as a surprising (S1) or startling (S3) situation; however, a few participants pointed out that a proper context and introduction would be more appropriate for the purpose.

Deceptive behaviour was disapproved almost unanimously by the participants. In S3, the key difference between the A and B variants was the use of deception. In B, the robot attempted to create a sense of urgency by giving a deceptive message about an emergency. Participants commented that the robot should be honest and suggested that the place the robot tries to attract them toward should be in plain sight. Overall, the participants seemed critical about misleading announcements and attempts at gauging their attention. They appeared to prefer a straightforward approach from robots, but also needed a proper introduction to the robot to understand its context, meaning and purpose.

3.3. Human- or robot-likeness: Which emotional displays and roles are appropriate?

Whether the robot should be human-like or robot-like in terms of emotional expressions divided opinions. The robot's sadness (S1/B) or nervousness (S2/B) were appealing to some participants, who thought such emotions increased the robot's attractiveness: *"It is humane that someone's nervous, and it makes [the robot] considerably more interesting and more likely to attract people when it has such gestures"*. Some described the robot's behaviour as if they would speak of a conscious creature, even using the "he/she" pronoun: *"…he wishes that things would change"*. However, many clearly understood that robots are programmable machines, and stated that emotional expressions felt unnatural for robots. They preferred a robot that did not pretend to have human emotions. In S2/B, the robot's nervous behaviour was considered unnecessary and the purpose behind it obscure. *"Why does the robot have to be like… why can't it just be confident. That would bring more credibility to it."* Also, some saw robots as advanced technology, and thus the depressed and anxious behaviours exhibited by the robots in S1 and S2 felt

weird or pretentious, e.g. *"The robot has been made for this purpose, why would it be afraid?"; "It clearly somehow tries to pretend to be a human, although it is not"*.

The robot's role in S1 and S2 also raised discussion. In S1, it was considered especially strange that a robot would be on "strike", when it was doing what it had been tasked to do, a contradiction of strike. The role of a climate striker was written in the scenario to reflect the timely climate strike movement of youth. However, most participants felt this role was inappropriate for a robot; there was no activity that the robot would be on a strike from, and it had no free will. In S2, some participants perceived the interviewer role as interesting, and said that talking to a robot instead of a human could be less invasive: *"It could be more interesting to [talk to a robot] instead of having a human jump in front of your face […] a robot might not be as pushy as some humans."* Still, many considered this as an unsuitable role for a robot. They felt that the dialogue would seem pre-programmed, and questioned how one can even talk with a robot or why would one do it in the first place: *"It does not care what I say"*; *"It does not actually listen"*. The interaction in S2 was also criticized: students gave short answers, and the robot just accepted them instead of asking for follow-ups. Thus, the robot was perceived as failing at performing in a convincing way in the role that it was given.

4. Discussion

4.1. Trust and transparency

While the use of civic robots – and the robots themselves – raised curiosity and positive sentiments in youth, the findings of our study interestingly reveal how the existence of a robot in a certain situation does not by itself justify engaging with it. Curiosity and novelty effect that have attracted participants in earlier field studies with physical social robots [7,8] would seem to be insufficient reasons to interact with robots for the adolescents in this study. Instead, trust was essential for the youth, indicating that a civic robot must clearly convey its purpose and its connection to other humans. Otherwise, the interaction with the robot will lack meaning, and the opportunity to engage youth will be lost. Overall, the issues raised concerning trust indicate that *a robot's word is not reliable on its own*. The information about its safety and purpose should be made available externally to the robot, preferably by adults or surrounding society, especially on the first robot encounter. A civic robot can be thought as a collaborative robot, as its aim is to enable participation and communication, and thus the youth need to be able to understand how the robot is connected to the social world and society in order to build the trust needed for interacting and sharing ideas.

In S2, the purpose of talking to a robot was not to merely to talk to a machine but to convey ideas through it. When the person interacting with a robot knows that what they say will be heard by a human, they are not "speaking to a void" or merely "pretending interaction with a robot". The knowledge of where the information goes and what it is used for helps to construct purposeful interaction. In line with [15], this also indicates that we should not design robots for tasks that are better suited for humans, but rather focus on identifying tasks that offer something different and leverage abilities that are unique to robots – arguably a more culturally sustainable and ethically sound approach.

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4.2. Appropriate roles for a civic robot

The roles assigned to the robots in scenarios S1 and S2 were considered somewhat inappropriate by the youth. The rejection of the climate striker role relates to a broader finding in our research: *the credibility of a robot*. It appears to be important for youth that the robot is authentic in its behaviour as a robot. Our findings indicate that youth may reject robots exhibiting social activities such as striking or interviewing that are not suitable for them by virtue of being robots. Instead, youth may prefer robots that carry out social activities that can be considered natural for them as programmed machines. The scenarios S1 and S2 were written with the intention of making the robots relatable to youth, but as the robot was depicted as doing something that humans would normally do, the activity seemed absurd to our participants. Future research into the rationale that bases these interpretations would improve understanding regarding the appropriate roles and behaviours for civic robots. A robot should not try to fit into the exact same role as a human but be presented in a role more suitable to a programmed machine, as suggested also by Integrative Social Robotics [15].

The role of the robot in S3 appeared the most feasible of all three: it served as an attractor to get youth's attention and guide them to a certain location. This task was not criticized as problematic as such, only the forceful approach that it took in the story. This suggests that the attractor role was considered more natural and fitting for a robot, bearing in mind also that the appearance of the robot in S3 was described as the most robot-like. While the robots in S1 and S2 were criticized because the activity of talking to a robot that cannot process what is being said felt absurd, the robot in S3 did not offer any means to communicate with it, which also received criticism. We can surmise from the findings that interacting with a robot could be interesting for youth, but the interaction must be designed to avoid the experience of futility of talking to a robot when it is in fact not "listening". Youth often experience that their opinions and suggestions do not have impact in the adult world and on political decisions [1,2,5] – interaction with a civic robot should not replicate this experience.

Our research points to the subtle role of humans' interpretations about what is appropriate for robots. Since robots are not human, which social activities and emotional expressions are appropriate for them? There is absurdity in the climate striker robot; it was cast in a role that is not suitable for programmed machines. The robot is not in a position to be on a strike because of its lack of own will to do so, which is a prerequisite for the activity in question. There is also something weird about talking to a robot: its inability to really listen renders the task of responding to its questions obsolete, unless the human has a guarantee that there is some other endpoint that receives the message.

4.3. Is it appropriate to attempt to persuade by evoking emotional responses?

The robots in our B scenario variants expressed emotions with negative valence (depression, anxiety, fear) to attempt to evoke empathic responses. These emotional expressions divided opinions to some degree but were mostly deemed as unnecessary for a robot. The appropriateness of a robot's emotions ties into its intended purpose and role: participants especially wondered about the purpose behind the emotions, which indicates that they were considered redundant, as robots are machines and do not naturally have emotional reactions. The pretended emotions, depression in S1 and anxiety in S2, both expressed by humanoid robots, were not seen as authentic by most of the youth. While emotional expressions in robots were not rejected across the board, the results indicate

that they need a certain justification so that they do not feel strange, awkward, or redundant. Especially the physical signs of nervousness and fear in a robot were considered strange and excessive.

Youth raised the emotional expressions of the robot both as a potentially interesting and as a potentially unnecessary "fake" element. It is possible that some of the youth identified with the robot's emotions such as climate anxiety in S1 and thus reacted positively; Paiva and colleagues [12] state that to evoke an empathic response, a social agent needs to have characteristics that a human can identify with. This may indicate that there is no clear right or wrong, appropriate or inappropriate when it comes to emotional expressions in robots, and that further empirical studies would reveal how these aspects are experienced by youth in real situations. Our scenario-based study nevertheless allowed us to identify issues to consider in order to avoid inadvertently employing unethical means of persuasion such as deception or coercion [19]. What youth seemed to strongly agree on was that a robot must not deceive with displays of emotion, and that a robot's emotional behaviour should be implemented without over-emphasis that may cross a line of appropriateness.

4.4. Limitations

As an initial exploration into youth's perceptions of persuasive civic robots, our study has several limitations. Only textual descriptions of scenarios were evaluated, and there were no visualizations or actual interaction with the robots. To encourage discussion, the scenario descriptions purposefully left a lot of room for imagination in terms of how the robots would appear and behave, and hence participants likely had different interpretations e.g. related to the anthropomorphic appearance of a robot. In group discussions, social dynamics with other students may have had an impact on how freely opinions were voiced; because of this, we also collected data with questionnaire forms.

5. Conclusions

The overall idea of a social robot as a persuader in civic participation was quite well accepted by the youth in our study. However, the *credibility* of the robot emerged as a central issue to consider in civic robot design and future research: the youth's main criticism of the robots in the scenarios was related to their "pretentious" nature in terms of emotional expressions, purpose, and ability to perform a task that was supposedly assigned to them. Most of the youth in our study saw emotional expressions as unnecessary for robots, although they may elicit positive experiences and curiosity. We can surmise that the design of a civic robot should veer away from pretended human-likeness and aim for an experience that feels as a natural expression of a robot's nature as a programmable machine. Still, empathetic emotional expressions in a robot, coupled with a non-human appearance, could enhance its persuasive potential. However, this would also raise potential ethical issues, especially regarding deception.

Another important consideration for civic robots is the robot's proper positioning in the social, physical, and societal context [20]. The robot's connection to the society must be explicitly explained or displayed – the connection must be visible, attainable, or presumable in the given situation. Otherwise, a robot aiming to capture a person's attention might be viewed negatively, as someone who tries to invade one's personal space and steal one's valuable time. The youth in our study seemed especially concerned

about how they can trust a robot to be truly built for the task it claims to be performing. This indicates that most youth viewed social robots without intrinsic agency, as machines. A proper introduction of the robot, aided by humans, would build understanding and trust, and follow the ethical principle of revealing designer's intent in persuasion [19].

An issue beyond the current investigation relates to the kinds of feelings that arise when people encounter robots in real situations. Designing for positive experiences [21] for youth also relates to social robots' adoption to society [22]. Care should be placed on the ethical, responsible design of civic robots that attempt to persuade youth to participate. Experiences that relate to fear, awkwardness or forcefulness should be avoided, and interaction with a robot should be optional rather than obligatory.

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References

[1] Pietilä I, Varsaluoma J, Väänänen K. Understanding the digital and non-digital participation by the gaming youth. INTERACT 2019. Lect. Notes Comput. Sci., vol. 11747 LNCS, Springer Verlag; 2019, p. 453–71.

[2] Meriläinen N, Pietilä I, Varsaluoma J. Digital services and youth participation in processes of social change: World Café workshops in Finland. Proc. 2018 ECPR Gen. Conf. Univ. Hambg., Hamburg, Germany: 2018, p. 1–30.

[3] Stolle D, Hooghe M. Shifting inequalities: Patterns of exclusion and inclusion in emerging forms of political participation. Eur Soc 2011;13:119–42.

[4] Freelon D, Wells C, Bennett WL. Participation in the youth civic web: assessing user activity levels in web sites presenting two civic styles. J Inf Technol Polit 2013;10:293–309.

[5] Rexhepi A, Filiposka S, Trajkovik V. Youth e-participation as a pillar of sustainable societies. J Clean Prod 2018;174:114–22.

[6] Ham J, Midden CJH. A persuasive robot to stimulate energy conservation: the influence of positive and negative social feedback and task similarity on energy-consumption behavior. Int J Soc Robot 2014;6:163–71.

[7] Kaipainen K, Ahtinen A, Hiltunen A. "Nice surprise, more present than a machine" - Experiences evoked by a social robot for guidance and edutainment at a city service point. Proc. 22nd Int. Acad. Mindtrek Conf. (Mindtrek '18), New York, NY, USA: ACM; 2018, p. 163–71.

[8] Beheshtian N, Kaipainen K, Kähkönen K, Ahtinen A. Color game: A collaborative social robotic game for icebreaking. Proc. 23rd Int. Conf. Acad. Mindtrek (AcademicMindtrek '20), New York, NY, USA: ACM; 2020, p. 10–9.

[9] Belpaeme T, Kennedy J, Ramachandran A, Scassellati B, Tanaka F. Social robots for education: A review. Sci Robot 2018;3:5954.

[10] Chidambaram V, Chiang YH, Mutlu B. Designing persuasive robots: How robots might persuade people using vocal and nonverbal cues. HRI'12 - Proc. 7th Annu. ACM/IEEE Int. Conf. Human-Robot Interact., New York, New York, USA: ACM Press; 2012, p. 293–300.

[11] Ham J, Spahn A. Shall I show you some other shirts too? The psychology and ethics of persuasive robots. In: Trappl R, editor. A Constr. Man. Robot. Ethical Syst. Cogn. Technol., vol. 40, Springer Verlag; 2015, p. 63–81.

[12] Paiva A, Leite I, Boukricha H, Wachsmuth I. Empathy in virtual agents and robots: A survey. ACM Trans Interact Intell Syst 2017;7.

[13] Lin P. Social groups, social media, and civic participation of high school youth: Concepts and methods for design implications. CHI '09 Ext. Abstr. Hum. Factors Comput. Syst. (CHI EA '09), New York, New York, USA: ACM Press; 2009, p. 3137–40.

[14] Pavlova O, Prichislenko A, Kazin P, Hagen S. Using social media for nurturing civic entrepreneurial spirit and motivation among the students. ACM Int Conf Proceeding Ser 2016;22-23-Nove:194–201.

[15] Seibt J, Flensborg Damholdt M, Vestergaard C. Five principles of integrative social robotics. Front Artif Intell Appl 2018;311:28–42.
[16] Carroll JM. Five reasons for scenario-based design. Interact Comput 2000;13:43–60.
[17] Väänänen-Vainio-Mattila K, Suhonen K, Laaksonen J, Kildal J, Ahmaniemi T, Tahiroğlu K. User experience and usage scenarios of audio-tactile interaction with virtual objects in a physical environment. Proc. 6th Int. Conf. Des. Pleasurable Prod. Interfaces, DPPI 2013, New York, New York, USA: Association for Computing Machinery; 2013, p. 67–76.
[18] Holtzblatt K, Beyer H. Contextual Design: Defining Customer-Centered Systems. Amsterdam: Elsevier; 1997.
[19] Kight R, Gram-Hansen SB. Do ethics matter in persuasive technology? Persuas. Technol. Dev. Persuas. Behav. Chang. Support Syst. Persuas. 2019, vol. 11433 LNCS, Springer Verlag; 2019, p. 143–55.
[20] Deng E, Mutlu B, Mataric MJ. Embodiment in Socially Interactive Robots. Found Trends Robot 2019;7:251–356.
[21] Alenljung B, Lindblom J, Andreasson R, Ziemke T. User experience in social human-robot interaction. Int J Ambient Comput Intell 2017;8:12–31.
[22] Weiss A, Mirnig N, Bruckenberger U, Strasser E, Tscheligi M, Kühnlenz (Gonsior) B, et al. The Interactive Urban Robot: User-centered development and final field trial of a direction requesting robot. Paladyn, J Behav Robot 2015;6.