# The Role of Online Communities in Promoting Physical Activity: A Survey on User Preferences and Perceived Impact

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Abstract: The primary objective of this online survey is to understand differences in user profile, user preferences and perceived impact among the European population. The sample groups were based on the most recent report of the European country with the highest and lowest levels of physical activity (PA). The cross-sectional online survey population of Portugal residents and Finland residents was selected by simple random sampling. Responses were collected from the open-source tool LimeSurvey. IBM Statistical Package for Social Sciences Statistics was used to analyse the acquired data. A total of 538 responses were considered with 48.4% of respondents residing in Portugal, and 51.4% residing in Finland. About 38.5% of the general survey population regularly practice exercise, and 39.7% regularly engage in PA. Regarding the level of online community experience, responses were distributed between medium, moderately low, and very low. Overall, there is a significant relationship between both sample groups when it comes to PA, common emotions using online communities, user perception, preferences and openness. Our survey results provide evidence to support that country of residence is related to user PA and highlight the importance of considering demographic factors to understand general population lifestyle choices.

## 1 INTRODUCTION

The goal of this survey is to understand the potential user perceptions and preferences when using online communities (OC) aiming at promoting physical activity (PA).

Various studies have reported on the potential and importance of PA-driven OC (Duncan et al., 2018; Kalgotra et al., 2021; Parker et al., 2021) and its influence on behaviour change (Manzoor et al., 2016; Resnick et al., 2010). However, these studies are often theory-based (Popp & Woratschek, 2016; Vandelanotte et al., 2019), reflecting incoherence and lack of understanding of user preferences and perceived impact when using OC for PA promotion (Rayward et al., 2021).

Contemplating the undeniable importance of user participation in effective OC (Manzoor et al., 2016; Resnick et al., 2010), there is an increased necessity to fulfil user needs. This is especially relevant in a digital dimension where there is constant supply but no assurance that it meets user demands.

Taking into account the persistent problem of users' long-term engagement (Edney et al., 2017; Kolt et al., 2020), there is likely an opportunity for PA-related OC optimisation. It is projected that the results of this survey will contribute to the creation of a conceptual framework for analysing the driving forces behind sustained participation in OC (Seddon et al., 2008).

## 2 MATERIALS AND METHODS

Our main survey research question is: "What are the OC user preferences and perceived impact of residents of Portugal and Finland?". The following detailed questions were broken down from the main survey research question:

(1) Do users' academic level and employment status influence their experience with OC?

(2) How do users' country of residence compare in terms of user profiles?

(3) Are there variations in user preferences and perceived impact based on country of residence?

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## 2.1 Development of the Online Survey

The research instrument used in this phase of the study is the online survey that was planned, written, tested, and officially published. Our research question and goals are best served by an online survey because it enables the effective collection of data from an adequate sample.

The purpose of the online survey is to identify essential criteria for developing and managing an OC aimed at promoting PA, focusing specifically on content that fosters user participation (Bishop, 2015), strengthens interdependence (Zhang et al., 2020), and enhances long-term user retention (Edney et al., 2017; Kolt et al., 2020). These findings may inform the development of more effective PA-related OC.

The primary objective of this online survey is to understand differences in user profile, user preferences and perceived impact among the European population who have reported the lowest and the highest PA levels (Special Eurobarometer SP525: Sport and Physical Activity—Data Europa EU, n.d.).

Moreover, the secondary objective of this online survey is to recognise what are the user preferences of the European population with the lowest reported PA. Namely, finding what OC content and features this population rather see available in PA-related OC to make them more appealing, reliable and/or trustworthy for regular, long-term engagement.

Finally, the third objective of this online survey is to identify the perceived impact of a population when it comes to PA-related OC. The disseminated survey can be consulted in Table 1 (Appendix A).

## 2.2 Finding the Target Population

The survey was officially tested by the research supervisor and two other members of the scientific community, one month before its official release on December 15th, 2022.

After all questions and respective answers were verified and approved, the survey received the necessary adjustments and was approved for dissemination in Portugal, and Finland.

Upon selection of the appropriate method of consent, we provided participants with a suitable user agreement notice to participate in the online survey in compliance with the RPDG European laws. The user agreement plainly stated the objective of the study, the duration of the overall online survey phase, terms of privacy, data handling procedures, and the possibility to insert contact details, if participants desire to receive updates on the final study results.

The survey was distributed online and disseminated for eight weeks, starting on December 15th, 2022, and ending on February 15th, 2023.

The cross-sectional online survey population of Portugal residents (Group A) and Finland residents (Group B), aged between 18 and 65 years old, was selected by simple random sampling.

As of 2021, the total population of Portugal was 10,343,066 (4 920 220 male; 5,422,846 female), and the total population of Finland was 5,548,241. Henceforth, the sample size was estimated by assuming a mean population of 10,343,066 in Portugal and 5,548,241 in Finland, effect size of 5%, with a confidence level of 95%. The country's population data was found by using the Portuguese statistical database INE (Instituto Nacional de Estatística, 2022), and the Finnish statistical database Tilastokeskus (Statistics Finland, 2022).

The target public for the survey sample gave special emphasis on responses from the population resident in Portugal. To identify online survey participants, we contacted higher education institutions in Portugal and Finland to request online survey participation—both staff, student and alumni participation. Additionally, we contacted universities which have Erasmus partnership with our university filiation to request dissemination of the online survey. We also reached out to the Sports and Health Ministry of both Portugal and Finland.

To reach a wide and varied range of respondents, the survey was shared online, on social media (i.e., personal profiles, academic groups, or groups with other miscellaneous topics). Additionally, we decided to make the survey anonymous to encourage survey participants to provide more truthful and accurate responses.

The estimated sample size for each geographical region was 385 individuals for each region (a total of 770 individuals in the two European countries of Portugal and Finland). This survey sample size was projected using power calculation to ensure a statistically appropriate study enrolment target to obtain meaningful results, representative of the countries' population.

Furthermore, the following inclusion criteria was considered: age groups 18 and over; male and female; resident population of Portugal or Finland; data as of 2021. Individuals with the following criteria were excluded: non-English or non-Portuguese speakers; country of residence is not Portugal or Finland; illiterate individuals.

### 2.3 Data Collection and Analysis Tools

The survey was distributed online and disseminated for eight weeks, starting on December 15th, 2022, and ending on February 15th, 2023.

Responses were exported from the open-source tool LimeSurvey in FormsUA and exported into Microsoft Excel (version 16.56). Duplicates were removed, as well as participants whose responses were incomplete or did not comply with the inclusion and exclusion criteria. The software IBM Statistical Package for Social Sciences (SPSS) Statistics (version 24) was used to analyse the acquired data. Each option was individually coded, and a quantitative analysis method of frequencies for all survey questions. The complete statistical breakdown can be accessed in Appendix B.

## 3 RESULTS

A total of 1512 responses were recorded. 974 out of those 1512 responses were invalidated due to incompletion, therefore only 538 responses were considered. Moreover, 38.3% (N=206) of female participants and 61.7% (N=332) of male participants. When it comes to country of residence, 48.4% (N=261) reside in Portugal, and 51.4% (N=277) reside in Finland.

The survey aimed to understand residents of Portugal and Finland's preferences and perceived impact when using OC aiming at promoting PA. This was accomplished by identifying specific demographic factors such as country of residence, academic level, employment status, user perception, preferences and openness towards OC.

While certain BCT and user engagement strategies and their frequencies have been previously identified in digital platforms (DP), here we aimed to know if the population in our study recognises their presence in the form of perceived impact.

### 3.1 General Survey Population

The majority of the general survey population among both countries of residence belongs to the 25-34 age groups (45.5%), followed by age groups 18-24 (24.9%). This is valuable information because it helps us understand youth's tendencies regarding OC, especially because they are the forthcoming generation of adults (Patton et al., 2018).

It was important to learn more about the age groups of this particular population because not only is it a crucial demographic in our society, but it also makes up a sizeable portion of the working population, often undergoing a transitional phase of life, and found at the forefront of technology adoption.

Gender predominance of our survey respondents comprised a high male percentage (61.71%). This may be explained by the fact that men spend more time (Goswami & Dutta, 2016; Sun et al., 2020)—thus being more likely and available to respond to an online survey.

Moreover, it was quite encouraging to find that our respondents consisted mostly of participants with an academic level of a bachelor's degree (34.1%), followed up by high school (28%), which matches general population statistics data for the previously identified most influent age groups in this survey population (OECD, 2022). Also, finding that most of our survey respondents consist of full-time workers (45.3%) provided additional certification that our data is not tied to a specific niche and consists of an important and large segment of the population composed by demographic balance.

Exercise-wise, a little over one-third of the general survey population responded that they regularly (38.5%) practice any form of PA in a sports context or sport-related setting (such as swimming, training in a fitness centre or a sports club, or running in the park), followed by sometimes (25.4%). Likewise, the general survey population responded that they regularly (39.7%) engage in any sort of PA (such as walking or cycling from one place to another, gardening, etc), followed by sometimes (30.6%). This might indicate that there is a balance between a more and less athletic survey population, with varying levels of experience, emphasising the importance to continue investigating any potential underlying causes for these various responses.

However, one must keep in mind that respondents might have a hard time distinguishing the exercise question from the PA one. Previous research (Lynch & Soukup, 2016) has found that in real-world context there is global nomenclature misperception among terminologies such as physical education, health and physical education, physical literacy and health literacy.

Regarding respondents' level of OC experience using social media or apps for PA, the data was quite balanced, with about three-fourths of responses scattered between medium (27.5%), moderately low (26.3%), and very low (24.9%). Knowing there is a balanced distribution of OC user experience, indicating that some respondents use OC more often, while others do not OC at all or only do so occasionally is quite relevant because it can help

understand how to better tailor OC content and features. That is, providing a more personalized experience by including more guidance and instructions on how to use the DP, increasing basic support, and assuring users that they are being presented with reliable, trustworthy information.

About users' most common emotion when using social media, 56.2% of respondents reported feeling indifferent, followed by positive (31.7%) and negative (9.8%). This is helpful information because, with deeper understanding, OC might be able to improve user experience, retain users in the DP and receive higher levels of positive word-of-mouth and representation of its users, thus increasing its reach.

## 3.2 Influence of Academic Level and Employment Status

In the real-life context of the population resident in Portugal, 57% are enrolled in a bachelor's program and 33% are enrolled in a master's program (OECD, 2022). These numbers correspond to the high percentage of survey respondents enrolled in tertiary programmes, with 42% master's and 24% bachelor's students. The same can be noted with the Finnish respondents, where 69% of residents of Finland are enrolled in a bachelor's and 25% in a master's programme (OECD, 2022), also corresponding to 44% of survey respondents enrolled as bachelor's and 20% as master's students.

Statistical tests found that there is a significant relationship between the academic level of survey respondents and exercise level, common emotion using OC, and user preferences. This might be indicative of several factors. When it comes to exercise level, the academic level may indicate higher time management constraints, more consciousness of health concerns, increased awareness of the benefits of PA, or a superior socioeconomic status that allows for accessibility to exercise facilities (Juvinyà-Canal et al., 2020; Kwak et al., 2009; Syväoja et al., 2013).

Moreover, the relationship between academic level and variables such as common emotion using OC and user preferences could be associated with divergence in user expectations due to digital literacy—hence a more analytical approach to using OC (J. T. E. Richardson et al., 2003). Likewise, the level of exposure to DP could shape the perception of quality, technical knowledge, or information needs (Cardoso et al., 2013; Selwyn, 2008).

Statistical tests also encountered a significant relationship between the employment status of survey respondents and level of OC experience, common emotion using OC, user perception, user preferences, and user openness. This could mean a few things. When it comes to the level of OC experience, employment status may indicate advanced access to technology due to work-related technology use, or time constraints (Lunau et al., 2014; Macassa et al., 2016; Popham & Mitchell, 2007). Employment status may also play a role concerning common emotion using OC, user perception, user preferences and user openness because of digital literacy, which could determine user expectations using DP, therefore influencing how people perceive quality, technical proficiency, as well as information needs, and health demands (S. Y. Lee et al., 2015; Pulakka et al., 2018).

## 3.3 Influence of Country of Residence

Levels of experience using OC scores in the residents of Portugal and Finland were equally spread among medium, moderately low and very low (30.69% to 21.84%). This is possibly representative of the general population's digital literacy—which is not expected to be high. According to Eurostat (2022), individuals with basic overall digital skills make up 26.76% of the population in Portugal, and 31.04% in Finland. Similarly, individuals with low overall digital skills make up 12.64% of the population in Portugal, and 12.58% in Finland (Eurostat, 2022).

Undoubtedly, the majority of residents of Portugal and Finland's self-reported common emotion using OC is *indifferent*, with a score of 50.19% and 62.09% respectively. Although respondents may genuinely feel indifferent about the topic at hand, they might also self-report indifference in scale surveys for other reasons (Vetschera & Kainz, 2013), such as an incorrect grasp of the topic or available responses, or a desire to hide one's genuine thoughts or sentiments.

However, residents of Portugal appear to self-report more positive results (40.23%) than residents of Finland (23.83%), and residents of Finland appear to self-report more negative ones (12.64%) than residents of Portugal (6.90%). This coincides with the grouped scores of the subsequent survey questions.

There is a significant relationship between residents of Portugal and Finland when it comes to PA level, common emotion using OC, user perception, user preferences and user openness.

Among users' perception of OC, residents of Portugal mostly believe that current OC is easy to use and hold motivational value (mean score of 2.64 or higher), whilst residents of Finland believe that current OC are easy to use and hold motivational value (mean score of 2.74 or higher). This suggests that ease of use (i.e., UX design, responsivity, etc) is

not problematic in the usage of PA-related OC and that current OC provide satisfactory features for user navigation.

Likewise, respondents believe that OC hold motivational value, which suggests the value of PA-related OC is acknowledged—confirming previous studies (Elloumi et al., 2018; Resnick et al., 2010). On the other hand, indicators such as providing trustworthy information, advocating accountability, connecting with its users, and endorsing connection among users received a lower score than average, suggesting these variables are scarce among OC.

Among users' preferences of OC, residents of Portugal mostly believe that OC should provide trustworthy information, be easy to use, hold motivational value, advocate accountability, connect with its users and endorse connection (mean score of 3.05 or higher), whilst residents of Finland believe that OC should provide trustworthy information, be easy to use, hold motivational value, and advocate accountability (mean score of 3.12 or higher).

Comparing, and contrasting results between users' perception and users' preferences of OC suggest that indeed indicators previously mentioned (i.e., providing trustworthy information, advocating accountability, connecting with its users, and endorsing connection among users) should be further considered and developed by OC.

Among users' openness towards OC, residents of Portugal believe that they are likely to start using, continue using or recommend using social media or apps for PA to others (mean score of 2.91 or higher), whilst residents of Finland believe that they are likely to start using, continue using or recommend using social media or apps for PA to others (mean score of 2.69 or higher). Besides, users' openness to OC further enhances the value that both populations attribute to DP when it comes to PA (Goodyear et al., 2023; Smith Anderson-Bill et al., 2011).

## 3.4 Variations in User Preferences and Perceived Impact

Considering the statistical analysis of this survey, there is a substantial correlation between residents of Finland and Portugal in terms of user perception and user preferences.

Country of residence may affect how users perceive OC due to factors such as access to technology, economic factors, regulatory environment, cultural differences, and language accessibility. Based on the global innovation index that evaluates innovative capacities based on the cultural characteristics of different countries, Finland is positioned as an innovation leader, whereas Portugal is considered a low-innovative country (Moonen, 2017). This is relevant because the level of innovation of a country is directly connected to its openness and broad-minded nature (Hofstede & Bond, 1984; H. S. Lee et al., 2022).

This is especially relevant because the relationship between every single variable in the user perception group (i.e., advocate accountability, connect with its users, endorse connection between users, hold motivational value, are easy to use, and provide trustworthy information) was found to be statistically significant.

Regarding user preferences, country of residence may have an impact on how users feel OC should promote accountability, engage with its users, and support connections between users. The motives for this are like those previously mentioned, such as access to technology, economic factors, laws and regulations, cultural disparities, and communication accessibility requirements.

Finally, the country of residence presented a statistically significant relationship with user openness to start, continue and recommend media or apps for PA. This may be an additional indicator of the quality of life and happiness level differences among these populations—considering Finland is among the happiest countries in the EU, and Portugal is among the unhappiest (Eurostat, 2022). When individuals are more satisfied with their lives, the more generous and altruistic they are with others (Park et al., 2017).

In both populations combined, all variable pairs presented statistically significant relationships with each other. This suggests that overall, user perception of the current OC is most likely unmatched by their preferences. In other words, this may hint at a lack of overall satisfaction in OC features. This result is interesting because it might explain why most users self-reported indifference as the common emotion towards OC. Indifference, although objectively not considered a negative nor positive emotion, provides no motivational value for increasing influence in digital interventions for PA.

Consequently, and according to the social support theory, by being in contact with others, users can obtain empathy, and help, thus highly benefiting from the social support of others to sustain their physical and mental well-being (Wang & Gruenewald, 2019). Indifference towards an OC may withhold these health benefits, and exposure to new information, and lead to a weaker sense of identity and a lesser sense of belonging to the OC (LaCoursiere, 2001; Wright, 2016).

# 4 LIMITATIONS AND FUTURE DIRECTIONS

It is crucial for one to recognise that these findings correspond to the specific elements of this study. Likewise, to assess how broadly applicable these conclusions are, additional analysis may be useful.

First, even though we aimed to focus our research on individuals resident of Portugal and Finland, we were unable to isolate these subjects of study from the general population between every single variable in the survey.

One of the biggest limitations of this study was undoubtedly the lack of collaboration between national entities. Connects and word-of-mouth are some of the most important factors in providing access and resources to reach out to a greater audience. However, after many attempts to contact higher education entities, national health and sports governmental systems, there was no response. Without access to credible sources that could bridge the gap between this and its audience, we were unable to reach out to enough survey participants from both target groups and genders.

Moreover, although used interchangeably by population, the terminology social media and social messaging system are not the same This difficulty in differentiating concepts may have been a limitation in the way survey questions were approached by respondents. Although we inquired survey participants about specific social media apps for PA, we decided not to use that as an analysis variable because of the scarcity of responses and the difficulty of respondents to differentiate between the terminology “online communities” and “social media apps” – assuming OC and digital messaging apps consist of the same.

Finally, although validated as reliable variables to find statistical significance between populations, the questions in the categorized groups of user perception, user preferences, and user openness were based on the author’s previous investigation and information on the subject rather than on validated models. The reason for this is that at present, there are no validated models examining specific variables on user insight and discernment regarding OC usage.

# 5 CONCLUSION

In this study, we endeavoured to find corrections between residents of Portugal and Finland’s responses, especially when it comes to statistical significance in divergent responses and means. The ability to compare these two populations and draw possible correlations is the most relevant part of the survey.

The survey was designed to elucidate the general research objectives and fill specific restrictive gaps (Arksey & O’Malley, 2005; Levac et al., 2010) identified in the earliest phases of this research. Those are the recognition of specific OC qualities that could help overcome the recurrently stated difficulty of extending long-term engagement (Edney et al., 2017; Manzoor et al., 2016; Tague et al., 2014).

Moreover, the survey was conducted to support the discussion part of this research, to comprehend how users perceive OC as a potential catalyst for PA and what kind of relationship the audience has with OC in general.

Although specific group subjects could enhance research validity because of their apparent homogeneity, they would also limit the generalization of the research population. For that reason, we decided to investigate different groups in the survey to provide a diversified online survey analysis and research discussion. That is, considering the differences in academic level, and employment status among both residence groups could provide a diversified perspective, thus enriching this study.

All things considered, there is evidence which supports that further investment by OC would be advantageous. Moreover, for optimal meeting of user preferences, greater OC development attention should be concentrated on advocating accountability, connecting and endorsing connections between users, increasing motivational value and ease of use, and ensuring that the provided information is trustworthy.

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