

Getting to know the potential of social media in forest education

Radosław Lewoń*, Ewa Pirożnikow

Białystok University of Technology in Hajnówka, Faculty of Forestry, ul. Piłsudskiego 1A, 17–200 Hajnówka, Poland

*Tel. +48 507960651, e-mail: radek.lewon@gmail.com

Abstract. The development of social network sites not only facilitates the acquisition and deepening of knowledge but also provides the possibility of easily contacting foresters, specialists in natural sciences and nature enthusiasts. In addition, for some years already, Internet users have been able to make use of websites operated by institutions and participate in nature-related social network groups.

The purpose of our survey was to evaluate the possibility of using the main fanpage of the State Forests and virtual nature groups in Poland and Great Britain to propagate knowledge about nature and forestry. The aim was to verify the recipient groups and explore the benefits derived by users from informal forest education as well as to determine how they assess the work of foresters or the reliability of the provided content posted on the portals.

The research found that the majority of respondents use portals to gain knowledge and communicate with specialists whilst social networks are a motivating factor encouraging people to take advantage of recreation in forest areas by collecting mushrooms and herbs. Our results clearly point out the advantages and disadvantages of the State Forests' fanpage and other nature-related social groups.

The importance of social networks in education and communicating with the public is steadily increasing. Therefore, social networking websites should be refined and accommodate the constantly-changing needs of society as well as allow members of virtual groups to converse with foresters. The State Forests should support nature-related groups in attracting real enthusiasts. Organisational and substantive support for these groups would allow an increase in ecological awareness and knowledge about forest management directly from the practitioners.

Keywords: social communication, forest education, informal education, ecological awareness

1. Introduction

The development of social network sites enables information to flow rapidly without discriminating against anyone on the grounds of sex, age, place of residence or social status (Wieczorkowska 2004). Internet users can post messages, photos, videos or hypertexts. These features make social media a good tool for disseminating knowledge and popularising science (Jarska 2017). At present, our most popular social networking site is Facebook, which allows people to set up and operate:

- a profile – targeted to individuals. A profile provides information about a person's interests, workplace and their own content. It allows one to follow and communicate with other users or fanpages. In addition, it enables a person to

‘like’ what they see, that is, by clicking the thumb, heart or other emoticon to evaluate the published content or follow a specific fanpage (Tarczydło 2012).

- a fanpage – these are pages that Facebook users can set up. Its function is to represent institutional users, businesses, music groups and so on. The content they provide enables brand promotion and contact with interested persons. When a visitor to the fanpage clicks ‘like’, this initiates the sharing of the content published by the page to the visitor's Facebook news feed (Tarczydło 2012).

- groups – to set up and manage a group, you must have a profile. This is a fanpage that allows the integration of Internet users interested in a particular topic by communicating and publishing specific content relating to it. Access to

Arrived: 2.01.2019 r., reviewed: 24.01.2019 r., accepted: 17.07.2019

a group may be restricted, so that the published content is posted by and visible only to group members (Szewczyk 2011).

The activities of foresters on behalf of forest education are needed to raise the awareness of society about nature conservation and to shape collective responsibility for the effects of negative activities in the natural environment (Młynarski 2009). This aim can be achieved only if the method of delivering such information is attractive and adapted to the recipients. At present, forest education is struggling with problems such as limited access to learning activities, learning programs not adapted to the recipients and inappropriate proportions in the type of information provided (Grzywacz 2011). The participants of the educational activities organised by individual State Forests (SF) units are school-aged (Mrowińska 2018). Adult education is most often targeted to professional groups and closely tied to activities conducted in natural areas (Wierzbicka et al. 2014). It should also be targeted to adults who have diverse interests and be adapted to the new and more popular forms of communication that have emerged as a result of the Internet. This is a new phenomenon, little is known about the recipients or about the effectiveness of education conducted through social media, including through a fanpage.

Foresters have been conducting information and educational activities on the Internet for several years. They are administrators of websites, blogs, e-Ryś portal and so on (Łukowski et al. 2016). In 2009, the Gdańsk Forest Inspectorate started using Facebook social media to communicate with the public and for educational purposes. A year later, the main fanpage of the State Forests was launched, which has the greatest responsibility for communicating with the public to promote State Forests as well as nature and forest education. In 2018, more than 200 SF units had their own Facebook accounts. At present, the number of forest districts with their own fanpages is increasing, which shows the willingness of foresters to share their knowledge about the forest and forest management (Natarski, Stępińska 2018).

Unlike the main SF fanpage, many of the websites of forest inspectorates and other SF units on Facebook are operated by foresters ‘at the margins’ of their main professional activities, and the administrators of these pages are not remunerated for their work. Owing to the limited time an administrator has to work on the content of a fanpage, a frequent problem is the number and regularity of published posts. The low activity of some fanpages and the increase in the number of new forest district fanpages on Facebook may be due to the short-term enthusiasm. One should think about reducing the number of fanpages in favour of improving the quality of the content being published. When a forester only has ideas but no concept of managing a full-fledged fanpage, it may be better for his projects to be implemented in cooperation with a popular fanpage of a given SF unit.

At present, the main SF profile is followed by more than 77,000 people (as of 2019). The most interesting posts go

‘viral’, making it possible to reach a larger number of recipients (Ciechanowicz 2011). Internet users can comment on SF posts, which could be the beginning of a dialogue. The weakness of this option is the discussions that are not based on facts but whose purpose is to express opinions full of aggression about the current practices of forest management.

Along with the development of civilisation, an awareness of nature conservation and the interest in various aspects of nature and forest management have been increasing. The fast flow of information facilitates communication and sharing content, which encourages users to take advantage of the option of establishing virtual groups on Facebook. Their members are scientists, foresters, people working in a variety of nature organisations and amateurs interested in a given field. This form of participation facilitates a broader scope of communication as opposed to having a fanpage. Each Internet user belonging to a virtual community has the option of sharing their own content. These are not only photos and videos but also scientific articles, burning questions, food recipes or information about upcoming events (Lewoń, Pietrzak-Zawadka 2018). The main purpose of user participation in a virtual group is the desire to acquire new knowledge, have contact with specialists and is the opportunity to exchange views on various aspects of the forest and forestry. Community members' posts, despite being ‘liked’ or shared, are often visible to people in the group.

Some social groups delete hate speech and introduce regulations that are accepted by users. Despite the fact that virtual communities usually do not have people overseeing content or the sufficient involvement of administrators, users try to make everyone follow the rules. This phenomenon is particularly visible in Poland, where groups often have tens of thousands of users. British groups on Facebook attract a larger number of specialists and focus on narrower topics (Lewoń, Pietrzak-Zawadka 2018). Often, such groups have several dozen or several hundred people. Examples of British nature groups include ‘Roses (Rosa) of Britain and Ireland’, ‘Dandelions (Taraxacum) of Britain and Ireland’, ‘Euphrasia (Eyebrights) of Britain and Ireland’, ‘Hawkweeds (Hieracium) of Britain and Ireland’ and ‘British Plant Galls’.

Social networking sites have become an excellent tool for promoting knowledge about the forest amongst many social groups. The various forms of activities in the operation of fanpages or virtual groups on subjects relating to nature provide other opportunities to disseminate and promote both science and good practices in tourism and forest recreation. The aim of the research was to determine the extent to which social media are used to disseminate knowledge about the forest, to study recipient groups, as well as changes in attitudes resulting from participation in informal education. Aside from the results of the research conducted, the article also includes the observations and thoughts of the authors on the functioning of the main



fanpage of State Forests and the virtual nature groups in Poland and the United Kingdom.

2. Methodology

The survey questionnaire was used as the research tool for the study. The questionnaire contained questions on demographics as well as questions about the perception of social media as a source of knowledge about the forest and forest management, as well as the possibility of public communication with foresters and specialists in the natural sciences. It also raised issues regarding basic knowledge about the forest and the functioning of selected social media. The questionnaire also asked respondents to assess the reliability of the content made available by users of virtual groups and administrators of the main SF fanpage. The questionnaires targeted to the SF's main fanpage and Polish virtual nature groups asked about the perception of forest management, foresters' work and their responsibilities. The respondents could reply in one of three proposed ways: yes, no or I have no opinion. An open question was also included asking respondents to indicate the most important sources of knowledge about the forest and forest management.

The surveys were conducted electronically using Google Forms at the end of January and beginning of February 2018. Three separate surveys were prepared on issues relating to informal education on Facebook. Most of the questions in the surveys raised the same issues, although relating to different topics. In addition to the surveys, correspondence interviews were conducted with people interested in the topics addressed by the virtual nature groups.

The first survey concerned the main fanpage of State Forests. The survey could not be published on the site itself, as this would break the rules set by its administrators. In order to reach the widest possible number of respondents, the survey was distributed amongst nature groups on Facebook: 'Dzika Kuchnia i Apteka' [*The Wild Kitchen and Apothecary*],

'Dzika Polska' [*Wild Poland*], 'Praca dla Przyrodników' [*Work for Naturalists*], 'Niezwykła Przyroda Kseroterm' [*The Extraordinary Nature of Xerothermic Habitats*], 'Ptaki' [*Birds*], 'Miłośnicy lasu, grzybów i natury' [*Lovers of the forest, mushrooms and nature*], 'Pozytywnie świrmięci miłośnicy przyrody – konkursy z nagrodami' [*Positively crazy nature lovers – competitions with prizes*], 'Zbieramy Ziola Suwałki' [*Collecting the herbs of Suwałki*] and on the fanpages of 'Koło Naukowe Leśników ZWL PB w Hajnówce' [*The Scientific Circle of Foresters ZWL PB in Hajnówka*], 'Leśnictwo – Filia Uniwersytetu Łódzkiego w Tomaszowie Mazowieckim' [*Forestry – Branch of the University of Łódź in Tomaszów Mazowiecki*], 'Czy na Felinie wieje?' [*Is it blowing in Felin?*] and 'Suwałski Park Krajobrazowy' [*Suwałski Landscape Park*]. The link to the survey was also shared by users.

The second survey was directed to members of nature groups 'Poszukiwacze roślin' [*Plant searchers*] and 'Grzyby, grzybiarze, grzybobranie :)' [*Mushrooms, mushroom gatherers, mushroom picking :)*]. The choice of the groups was subjective because they stood out from other nature groups not only because of the high involvement of their members but also because of the involvement of the group administrators in overseeing the site. Only members of the surveyed groups had access to the survey.

The third survey in English was addressed to several virtual nature groups in the United Kingdom. By asking the question 'How did you find out about the survey?', we were able to verify the respondents, which increased the reliability of the conducted study. Virtual British groups, compared to Polish ones, are characterised by a smaller number of users. In order to receive a similar number of completed questionnaires, the study included a larger number of British groups. The survey was made available to groups whose administrators substantively administered the posts: 'Bryophytes Of Britain and Ireland', 'British Butterflies', 'Moths and Dragonflies', 'British Mycological Society (BMS)', 'Hawkweeds (Hieracium) of Britain and Ireland' and 'Ferns, lichens and mosses'.

Table 1. The age structure of users of the State Forests fanpage and virtual nature groups

Group of users	Age group [years]						
	>18	18–24	25–34	35–44	45–54	55–65	<65
	number of persons (share) [%]						
State Forests fanpage	2 (0.9)	87 (41.4)	58 (27.6)	26 (12.4)	21 (10.0)	11 (5.3)	5 (2.4)
Polish nature groups	1 (0.6)	23 (13.5)	45 (26.3)	38 (22.2)	36 (21.1)	24 (14.0)	4 (2.3)
British nature groups	1 (0.6)	7 (4.5)	20 (12.8)	36 (23.1)	33 (21.2)	34 (21.8)	25 (16.0)

3. Results

The questions were answered by 210 followers of the main SF fanpage, 171 members of Polish virtual nature groups and 156 members of British virtual nature groups. Women constituted 70% of respondents from the Polish groups, 77% from the British groups and 58% of those following the main SF profile. The age structure of the respondents in the individual group surveys showed significant differences in the number of young users (aged under 18 and 18–24 years), older persons (aged 55–65 years) and those older than 65 years (Table 1).

More than 70% of the British nature group respondents had completed higher education. Amongst the users of Polish groups and the main SF fanpage, more than 50% were graduates of higher education and nearly 40% declared that they graduated from secondary school.

Internet users with an education in the natural sciences constituted 63.3% of the main SF fanpage followers, 37.8% of the Polish virtual nature group members and 36.2% of the British nature group members.

The respondents considered that the most reliable information is published by Polish virtual nature groups (73%), slightly less by the main SF fanpage (68%), whilst only more than half (55%) of the users of British virtual groups positively assessed the credibility of information published on those sites.

Motivation is important in developing knowledge, so Internet users were asked if the SF/nature group fanpage (depending on the survey) motivated users to undertake various activities: sports in forests, herbal medicine and collecting forest edibles. Being in the forest allows one to observe the phenomena occurring in nature, the management activities of foresters as well as the flora and fauna. Being active in the forest may arouse emotions that motivate a person to search for answers to burning questions. The 94% of the users of virtual nature groups gave the most affirmative answers, whilst 64% followers of the main SF fanpage and only 49% of the users of British virtual groups gave the most affirmative answers.

The survey asked respondents about the opportunity to acquire knowledge through social media (Table 2). This usually involves identifying species from photographs, reading popular science articles or conducting discussions on key issues relating to nature conservation and forest management. Most likely, the extent to which knowledge is gained about domestic species via social media was determined by the number of posts published by users or administrators enabling species of plants, animals and mushrooms to be identified based on photographs. Repeating photos of common species makes it easy to remember their names. Attitudes about social media and the forest may also affect the possibility of acquiring knowledge. British users probably take the media more seriously than Polish users. British sites are characterised by greater control over shared content and the official language is more often used. This may be due to the lower access people in Britain have to the forest than in Poland and the greater proportion of mature and older people in the survey. Internet users following the main SF fanpage rated the possibility of gaining knowledge slightly less positively than the users of British groups. The reason for this may be the lower number of published posts and the significant proportion of followers that have an education in a field of nature. A positive response was most often given by persons aged 35–44 and 45–54 years in the Polish groups and 45–54 and 55–65 years in the British groups, whilst on the fanpage, it was most often given by those aged 18–24 and 24–25 years.

The ability of society to communicate with natural science specialists and foresters enables professional knowledge to be transferred about nature, including forestry. Respondents believed that their presence in both the virtual nature groups and on the main SF fanpage facilitated their contact with educated naturalists and foresters. The significant number of responses provided by virtual nature groups affirming that contact with experts is facilitated may be due to the different rules of operating a fanpage (Table 3).

Answers to the open question on the most important sources of knowledge about the forest and forest management were very similar amongst the users of the main SF fanpage

Table 2. Assessment of the possibility of acquiring natural science in the State Forests fanpage and on the websites of virtual nature groups

Group of users	To what extent, thanks to (the fanpage LP/ nature group), have you met national species of forest flora and fauna and their life requirements?				
	very good	good	medium	bad	I have no opinion
			[%]		
State Forests fanpage	10	34	39	5	12
Polish nature groups	10	48	28	1	13
British nature groups	11	37	38	11	3

Table 3. Assessment of contact opportunities with natural science specialists or foresters of natural science by users of the State Forests fanpage and virtual nature groups

Group of users	Do you consider your presence in the group / fanpage as an opportunity to contact specialists in natural sciences or foresters?				
	definitely yes	rather yes	rather no	definitely no	I don't know
	[%]				
State Forests fanpage	24	48	13	4	11
Polish nature groups	52	31	9	0	8
British nature groups	42	49	7	0	2

and virtual nature groups. In both the studied groups, the main SF fanpage and the virtual nature groups were cited most often (>30% of responses). The press and television amounted to almost 10% of the responses. A few answers repeated (approximately 2–5%), citing books, studies, friends, the Żubry online fanpage, Baligród Forest Inspectorate fanpage, eRysia Forest, Forester's Blog, Forest Data Bank and news on the general State Forests website, as well as social media. This demonstrates the willingness of users to acquire extensive knowledge from various sources. When interpreting the results, the number of students participating in the survey relating to the main SF fanpage (42.3% of responses) and Polish nature groups (10.5%) should be taken into account.

The survey also asked for an assessment of (1) the management activities of the State Forests National Forest Holding, (2) the work of a forester. More than three-fourths 3/4 of respondents to the fanpage survey positively (very good/good) rated the work of foresters. The best opinions were expressed mainly from three age groups (18–24, 25–24 and 35–44 years). Members of Polish nature groups favourably rated the work of foresters in more than 50% of the responses, of which the majority (almost 70%) of young respondents answered 'very good' (aged 18–24 and 25–34 years). Followers of the main SF fanpage and Polish virtual nature group members rated the activities of the State Forests National Forest Holding with almost two times fewer 'very good' and 'good' responses than on the work of foresters. The SF's economic activities were positively assessed by users following the SF fanpage in various age groups (below 18, 18–24, 25–34 and 35–44 years), whilst the age group of 18–24 years prevailed amongst the members of Polish virtual nature groups.

4. Discussion

Published didactic materials on nature and forest education, thanks to the involvement of teachers and the State Forests, are mainly addressed to school-aged persons (Chrzanowski

2004; Wierzbicka et al. 2014). Studies have shown that although virtual nature groups and the main SF fanpage on Facebook are not strictly involved in forest education, the scope of their topics develops interests in nature and provides information about various aspects of forest management. Activity on community portals is a real opportunity to reach a large audience not professionally connected with forest management. SF units should shape awareness about environmental protection on two levels, that is, by organising educational activities and promoting knowledge through the mass media (Hłobił 2010). The need for education and contact with nature enthusiasts resulted in the creation of virtual groups joining together people interested in a given field.

The survey results refute the myth that older people do not use social networking sites. The research results in the United States, Great Britain and Finland show a systematic increase in the number of people using the Internet in the 55–64 and older than 64 years age groups. In Poland, the number of network users in the age groups of 50–59 years and older than 59 years increased significantly in 2010–2011, whilst decreasing in other age groups (Bąk, Hołda 2013). In virtual nature groups, a significant proportion of respondents were represented by older adults. This is most evident in Great Britain, where respondents older than 64 years constituted 16%, whilst the number from the SF fanpage and Polish virtual nature groups was just more than 2%. This is probably due to the difference in the level of technological development between the countries studied.

The main motive for the use of websites by older people is the ability to communicate, often inter-generationally, allowing them to share their experiences. Such activity also prevents social isolation, because older people, because of illness, may have difficulty leaving the house to establish direct contacts with others (Bąk, Hołda 2013). Having a significant amount of free time enables older adults to develop their interests and contacts, and virtual thematic groups can be a source of support for them.



Activity on social networking sites operated by the SF or virtual nature groups enables people to have contact with specialists in the natural and forest sciences. The significant share of people with an education in the natural sciences may be confirmation of the substantive nature of the content provided, because its absence would result in a decrease in the interest of Internet users. The ability to communicate, exchange views or conduct discussions is undoubtedly needed in the search for answers to users' questions and even in refuting myths. The strength of virtual groups is their ability to share one's own posts, which often contain interesting information and unique forms of presenting issues. Owing to the fact that the SF fanpage does not allow user's posts to be published, it is able to control the quality of the shared content. In contrast to the functioning of virtual groups, adding comments by Internet users on a fanpage allows one to reach more people, because such activity is displayed in the 'news stream of their friends'. This is related to the privacy status of the nature groups, which are usually closed (users' activity is visible only to group members).

Acquiring new knowledge about the forest or forest management is easier when the recipients consider the source to be reliable. Trust in shared content is very important for the main SF fanpage. Any mistake or inaccuracy can be quickly spread, which threatens not only to damage the reputation of foresters but, above all, also to reduce the degree of trust in published content. In the case of virtual groups, information is quickly verified by members, and responsibility [for the content] falls not on the SF but on its members.

Foresters should be more involved in the activities of virtual groups, not necessarily representing the SF, but in their role as naturalists. This is especially important in contact with people having low levels of trust in current forest management. It would allow members to get to know the forester as an enthusiast of nature and not as a representative of the SF, which would facilitate communication and knowledge transfer. Research has shown that people have a better opinion of foresters as a professional group than as representatives of the State Forests National Forest Holding. This is confirmed by the fact that society has limited confidence in institutions responsible for environmental management (Tuszyńska 2014). Users often pay more attention to the greater social importance of the forest than to its productive functions in their correspondence or comments. This conflicts with the opinion about the intensive exploitation of forests, which may indicate a lack of understanding about forest management activities (Referowska-Chodak 2017) and also the different expectations of forest management. Attention should be paid to society's expectations in forest education and communication activities with the public, and they should be respected.

New technologies have enabled not only communication but also the opportunity to share one's own views, photo-

graphs or videos. Adding accounts of one's own travels in valuable natural areas, walks in the woods, meadows and even urban greenery, or the preparation of dishes using wild plants, motivate – as research has shown – a person to search for knowledge about nature and to go out into the field. The user takes the initiative to conduct various activities in the forest, for example, whilst doing sports, he or she may take pictures of mostly unknown plants, mushrooms, animals or elements of forest management. He or she then publishes this on the site of virtual social groups, where he or she receives positive feedback and information on specific species. Internet users are very happy to help in identifying plants, mushrooms, insects or birds, which motivates other users. The described phenomenon not only allows theoretical and practical knowledge to be linked but also becomes a new form of recreation (Lewoń, Pietrzak-Zawadka 2018). British virtual nature groups had the least impact on user motivation. The reason for this may be that the knowledge presented is too specialised and the administrators' attention to maintaining order at the expense of freely sharing content may be too limiting. The aims of forest education cannot be fully realised if the participant does not experience nature directly in the field (Pigan 2009). Contact with the forest often enables observation of individual elements of forest management (stacked logs, fencing around saplings and crops, pheromone traps), the work of foresters or its effects (logging, forest renewal, educational paths), which affects the image of SF employees and breaks down stereotypes resulting from the lack of contact with foresters (Krokowska-Paluszak et al. 2017).

Owing to the fact that the respondents indicated the ability to acquire knowledge about nature in their answers, the direction in which this tool should be developed needs to be considered. The best results were obtained from the Polish virtual nature group members, because they have the greatest motivation to learn about nature. The content made available by users is often reviewed and commented on, thanks to which knowledge keeps being repeated (Lewoń, Pietrzak-Zawadka 2018). The appearance of various forms of communication and interesting descriptions allows one to acquire knowledge about common plant species. The research of Staniszewski et al. (2016) draws attention to the fact that current knowledge about the importance and use of forest resources is unsatisfactory. Activity in social media not only motivates people to use the gifts of nature but also promotes good practices leading to the protection of the native natural environment, for example, to refrain from picking unknown plants (Pietrzak-Zawadka, Lewoń 2018).

Informal education takes place, amongst others, thanks to social media that disseminate [information about] the professional literature. In the case of virtual nature groups, scientific articles, atlases and guidebooks are often recommended or



published, which contributes to the dissemination of reliable content. A big advantage of these groups are the posts of users that draw attention to myths and factual errors appearing in popular news sites on the web or in atlases, books and other literature. An example of this might be a description of a species in a plant atlas that does not correspond to the photograph. This makes it easier to remember concepts and unravel popular misinformation, such as that ticks fall from trees.

Followers of the main SF fanpage are more knowledgeable about forest management than members of virtual nature groups. The reason may be the greater number of published content on sustainable forest management and the significant number of followers who were educated in the natural sciences. Therefore, it is worth considering not only the attractiveness of the posted content that is directed to people having no relationship to forests but also the possibility of having forest educators work with the administrators of such virtual groups. Users' organisation of gatherings is proof of the openness of virtual group members to dialogue with foresters and their willingness to develop knowledge on various aspects of the forest and forestry.

With the current state of knowledge, it is difficult to determine the effectiveness of education through social media. Its effects are significantly influenced by the place, time and frequency of educational activities, and the adaptation of the form and content by the teacher to the recipients (Referowska-Chodak 2017). In addition, the process of shaping attitudes promoting nature conservation should be gradual and include six stages, from persuading the target group to spend time in natural areas, followed by experiences and observations of nature, to stages of developing an understanding of the relationships in nature and shaping a sense of responsibility for nature (Pikus et al. 2018).

British groups on Facebook differ from the Polish ones. This is probably due to having restricted access to forests and much lower forest cover in the country. The Internet seems to be a 'substitute' for actual contact with nature. Compared to the Polish groups, the British have a high proportion of users who are in the older age groups, pertain to a narrower topic, and greater involvement of administrators in overseeing the sites. At present, it is difficult to assess whether this is an advantage, because the narrow topics and limitations on being able to conduct conversations freely may be the reason for the low activity of the participants. This would explain respondents' answers regarding the possibility of contact with specialists in the natural sciences, but also the slightly lower motivation for direct contact with nature in comparison with Polish Internet users.

The significant potential of Polish virtual nature groups is mainly limited by problems arising from the lack of substantive and organisational administrators (Pietrzak-Zawad-

ka, Lewoń 2018). The desire to unite Internet users for the purpose of joint informal education should be noted by the SF and other institutions working in nature and forest education in order to create the possibility of developing local groups to attract local supporters of nature. Assistance in organising events targeted to Internet users and administering substantive content would allow, amongst others, people to understand the current issues of forest management, meet local foresters, improve the image of SF, shape collective responsibility for nature at the local and even national level as well as expand knowledge about local flora and fauna. However, care should be taken so that the administration of such nature groups does not limit the virtual community, because it is the freedom of dialogue that is the main reason for the effectiveness of the informal education provided in social media (Lewoń, Pietrzak-Zawadka 2018).

5. Summary

Social networking sites are increasingly important in the education of and communication with the public. Although the main SF fanpage and nature groups on Facebook are not educational platforms, they are an unused platform for forest education. By developing interests in nature, they contribute to expanding the groups interested in educational events organised by forest inspectorates.

The social media sites operated by foresters should be improved and open to the ever-changing needs of society. SF and other organisations working in nature and forest education should support nature groups in attracting enthusiasts. Organisational and substantive support of nature groups would allow awareness of nature conservation to be raised and knowledge to be gained about forest management from practitioners. Such activities would have a significant impact on gaining public trust for the activities of foresters.

The presented research is only a contribution to learning about the potential of social media in terms of disseminating knowledge about nature. Studies should be oriented towards understanding the detailed characteristics of users, determining their needs in the field of forest education as well as the presence and role of foresters and naturalists in social media groups.

Conflict of interest

The authors declare the lack of potential conflicts of interest.

Acknowledgements and source of funding

The research was financed from the authors' own resources.



References

- Bąk A., Hołda M. 2013. Seniorzy w sieci. Między stereotypem a prawdą, w: Człowiek Zalogowany. Od mowy nienawiści do integracji w sieci (red. M. Wysocka-Pleczyk). Kraków, Biblioteka Jagiellońska, 131–138. ISBN 978-83-934926-4-0.
- Chrzanowski T. 2004. Edukacja leśna społeczeństwa w Lasach Państwowych – wybór modelu powszechnego. *Biblioteczka Leśniczego* 196: 3–16.
- Ciechanowicz W. 2011. Lasy Państwowe na Facebooku na przykładzie Nadleśnictwa Gdańsk. *Studia i Materiały Centrum Edukacji Przyrodniczo-Leśnej w Rogowie* 13.1(26): 188–190.
- Grzywacz A. 2011. Podstawy programowe w szkołach podstawowych w zakresie wiedzy o lesie a treści kształcenia w edukacji leśnej realizowanej przez nadleśnictwa Lasów Państwowych. *Studia i Materiały Centrum Edukacji Przyrodniczo-Leśnej w Rogowie* 13.1(26): 120–125.
- Hłobił A. 2010. Teoria i praktyka edukacji ekologicznej na rzecz zrównoważonego rozwoju. *Problemy Ekorozwoju / Problems of Sustainable Development* 5(2): 87–94.
- Jarska L.M. 2017. Pracownik naukowy w mediach społecznościowych – od popularyzacji nauki do kreowania wizerunku. *Toruńskie Studia Bibliologiczne* 9.2(17): 201–238. DOI 10.12775/TSB.2016.027.
- Krokowska-Paluszak M., Opalińska P., Łukowski A., Błasiak A., Wierzbicka A., Skorupski M., Sagan J., Gruchała A., Tomusiak A. 2017. Las i rola współczesnego leśnika widziane oczami społeczeństwa. *Studia i Materiały Centrum Edukacji Przyrodniczo-Leśnej w Rogowie* 19.1(50): 105–113.
- Lewoń R., Pietrzak-Zawadka J. 2018. Possibilities of using social network as a source of knowledge about nature and forest. *World Scientific News* 93: 113–120.
- Łukowski A., Opalińska P., Wierzbicka A. 2016. Aktywność nadleśnictw w mediach społecznościowych na przykładzie portalu Facebook. *Studia i Materiały Centrum Edukacji Przyrodniczo-Leśnej w Rogowie* 18.2(47): 209–216.
- Młynarski W. 2009. Edukacja przyrodniczo-leśna w Nadleśnictwie Rudnik. *Leśne Prace Badawcze* 70(3): 293–296. DOI 10.2478/v10111-009-0027-9.
- Mrowińska, I. 2018. Raport z działalności edukacyjnej Lasów Państwowych 2017. Centrum Informacyjne Lasów Państwowych w Warszawie. ISSN 2451-2222.
- Naturski W., Stępińska M. 2018. Współczesne treści i metody edukacji leśnej, w: Współczesne problemy komunikacji społecznej i edukacji w leśnictwie (red. W. Gil, J. Szewczykiewicz). Zimowa Szkoła Leśna. Instytut Badawczy Leśnictwa, Sękocin Stary: 77–88. ISBN 978-83-62830-70-1.
- Pietrzak-Zawadka J., Lewoń R. 2018. Media społecznościowe i ich znaczenie w edukacji przyrodniczej. *Studia i Materiały Centrum Edukacji Przyrodniczo-Leśnej w Rogowie* 20.1(55): 86–92.
- Pigan M. 2009. Rola Lasów Państwowych w propagowaniu turystyki przyrodniczo-leśnej. *Studia i Materiały Centrum Edukacji Przyrodniczo-Leśnej w Rogowie* 11.4(23): 14–20.
- Pikus A., Piasecka A., Głuch G., Sawicki A. 2018. Efektywność zajęć w obiektach edukacji leśnej – tematyka oraz sposoby realizacji, w: Współczesne problemy komunikacji społecznej i edukacji w leśnictwie (red. W. Gil, J. Szewczykiewicz). Zimowa Szkoła Leśna. Instytut Badawczy Leśnictwa, Sękocin Stary, 43–71. ISBN 978-83-62830-70-1.
- Referowska-Chodak E. 2017. Efektywność edukacji leśnej społeczeństwa. *Studia i Materiały Centrum Edukacji Przyrodniczo-Leśnej w Rogowie* 19.1(50): 51–65.
- Staniszewski P., Nowacka W.L., Gasek A. 2016. Potrzeby i wyzwania edukacji w zakresie niedrzewnego użytkowania lasu. *Studia i Materiały Centrum Edukacji Przyrodniczo-Leśnej w Rogowie* 18.2(47): 155–161.
- Szewczyk A. 2011. Popularność funkcji serwisów społecznościowych. *Zeszyty Naukowe. Studia Informatica / Uniwersytet Szczeciński* 28: 381–395.
- Tarczydło B. 2012. Budowanie wizerunku marki organizacji przy wykorzystaniu Facebooka. *Zeszyty Naukowe. Studia Informatica / Uniwersytet Szczeciński* 30: 121–134.
- Tuszyńska L. 2014. Edukacja i świadomość ekologiczna polskiego społeczeństwa. *Edukacja ustawiczna dorosłych* 3(86): 54–61.
- Wieczorkowska G. 2004. Zalety i wady edukacji internetowej. Model dydaktyczny: COME. Centrum Otwartej i Multimedialnej Edukacji UW. www.come.uw.edu.pl [5.05.2019 r.]
- Wierzbicka A., Flies M., Jagiello-Słonimska K. 2014. Oczekiwania osób dorosłych wobec edukacji leśnej. *Studia i Materiały Centrum Edukacji Przyrodniczo-Leśnej w Rogowie* 16.1(38): 200–205.

Authors' contribution

R.L. – concept, literature review, methodology, statistical analysis, writing the manuscript; E.P. – concept, substantive corrections.

