Social media in learning on nature: case Finnish amateur mycologists

Minna Santaoja

Abstract

Purpose – *Eco-social crises such as the loss of biodiversity call for transformative learning. This study analyzes the prospects of social media in learning about nature.*

Design/methodology/approach – *The study is placed in the intersection of science and technology studies, futures studies, environmental social sciences, and environmental humanities. The study draws on a qualitative case study of a mycologists' Facebook group. The empirical material was collected through digital ethnography.*

Findings – *Social media provides opportunities for learning about nature for many people. However, specialized naturalist social media groups are increasingly geared towards citizen science. The development may fragment the online naturalist cultures and narrow the scope for learning.*

Research limitations/implications – *Insights from a single case study cannot be broadly generalized. However, the case highlights significant features to consider in promoting collective learning in social media in the future.*

Originality/value – *Much of the previous research has focused on social media uses in the formal education of youth. This study addresses social media in informal and collective learning, specifically about nature.*

Keywords Social learning, Informal learning, Social media, Nature, Amateur naturalism, Mushroomers, Citizen science, Facebook, Biodiversity, Taxonomy

Paper type Research paper

1. Introduction

Amidst the global ecological crises of biodiversity loss and climate change, there is a broad call for nature education and reconnecting with nature. Common knowledge on species has deteriorated to the point that it has been called 'extinction of experience' (Soga and Gaston, 2016). The phenomenon is connected to a simultaneous loss of taxonomic expertise (Lester *et al.*, 2014) that impacts the possibilities to monitor biodiversity and, ultimately, conservation. In this situation, formal and informal modes of lifelong learning are increasingly important in providing education for change (Lander and Stever, 2018). Social media offers unprecedented possibilities for connecting, interacting, and learning (Lewis *et al.*, 2010), and it is fundamentally changing how knowledge is created and distributed (Chugh and Ruhi, 2018; Conway, 2011). Therefore, understanding the possibilities of social media in learning about nature is an important issue.

Relationship with nature is increasingly mediated: digital technologies influence how we perceive and engage with nature (Verma *et al.*, 2015). Technologies may generate interest in natural phenomena, exemplified by the popularity of nature-themed social media groups. There are, however, concerns about using social media in learning about nature. Social media may have a de-skilling effect as people learn to rely on internet resources instead of making an effort to learn to identify species themselves (Arts *et al.*, 2015). Furthermore, there are concerns that digital representations of nature may become substitutes for

physical nature. Technological development tends to focus narrowly on the affordances of the technology itself, paying less attention to the social, political, and cultural worlds where the technology is situated (Ellis *et al*., 2007). The popularity of naturalist social media has alerted the promoters of biodiversity data science. Citizens are perceived as potential data producers, and the main concern is how to motivate them (Silvertown, 2009). It is unclear whether harnessing social media for citizen science supports collective learning on nature, or who benefits from the data.

The use of social media in learning has been examined in both formal and non-formal educational contexts (Greenhow and Lewin, 2016). Most research addresses the learning of young people, from primary to higher education, but social media is also important in self-directed adult education. Learning is becoming more interest-driven and the boundaries of formal and informal learning become blurred. Social media is changing the traditional institutional relationships in education and also the roles of the teacher and learner, especially in peer-to-peer learning (Greenhow and Lewin, 2016). Learning in social media is collective, and social interaction is a crucial aspect of the process (Lander and Stever, 2018). The social learning environment may impact the identity, sense of agency, and sense of connectedness of an individual learner. Social media may provide role models, support and encouragement, guidance, and collaboration on the learning path (Lander and Stever, 2018; Chugh and Ruhi, 2018). Also, the group itself may develop a collective identity that holds the group together.

In general, increased participation, interaction, engagement, and information sharing are mentioned as benefits of social media (Chugh and Ruhi, 2018). Access to learning material is often free or low cost, and social media allows for different learning styles and paces. One benefit is connectivity and finding like-minded people beyond spatial and temporal constraints (Balkin and Sonnevend, 2016). Learning in social media can be considered democratic due to accessibility and flattening expert hierarchies. With the development of social media, however, accessibility is not measured only by available mobile devices or internet connections. It becomes also about the ability to keep up with changes and mastering the nuances of social media interaction. Not all learners engage equally, and there are severe concerns regarding privacy and discrimination. In sum, while there are concerns about how social media is disrupting education, social media is also championed, sometimes uncritically, for changing the playing field of learning. It may be questioned whether social media supports the development of shared goals and experiences that would form a genuine learning community (Lewis *et al*., 2010).

The trouble with social media research is that the social media landscape is changing fast, and results published just a few years ago may be outdated. For instance, while previous research has studied Facebook as the primary social media of the youth, the teenage use of Facebook is in decline. Young people are using social media such as Snapchat and TikTok, and the user base of Facebook is aging (Heath, 2021). The platforms and applications limit the affordances for learning and participation. Besides discussing learning in social media in broad terms, detailed case studies are needed to examine the particularities of the different social media platforms. Here, my focus is on Facebook.

Facebook is trying hard to keep its users and attract the younger generations. One means for this is developing Facebook groups (Hutchinson, 2021). The groups were introduced in 2010 to allow for close-knit communities around shared interests. More recently, Facebook introduced "badges" that allow group moderators to award especially active or helpful members or highlight posts of high relevance. The badges aim to make the users more engaged. The group function has also allowed naturalist groups to form on Facebook. For example in the Finnish Facebook there are numerous groups on birds, butterflies, nature photography, hiking, etc. I will focus on one such group, namely the Finnish Mycological Society's group.

Traditionally, mushrooming has been culturally transmitted to the next generation, and foraging guidebooks have been an important source of information. However, the learning strategies are shifting as new information sources such as online groups have become increasingly popular in spreading the naturalist traditions (Kaaronen, 2020). I will analyze the development of the Finnish mushroomers' Facebook group and discuss how learning on mushrooms becomes organized through the group.

2. Finnish mushroomers' Facebook group

The Facebook group of the Finnish Mycological Society (www.facebook.com/groups/suomensieniseura) was established in 2010, and it became rapidly popular. In August 2014, the group had over 4000 members; in April 2015, it had 10 000 members, and in October 2021, almost 40 000. For comparison, a preceding internet discussion forum had 1500 subscribers. Thus, Facebook as a platform has facilitated wider access to the mushrooming community and plays an integral part in the popularity of amateur mycology (Lehtonen, 2016). More than a third of adult Finns report picking mushrooms, but most do so independently, without a society membership.

The Finnish Mycological Society was founded in Helsinki in 1948. The Society aims to study Finnish mushrooms in every way, promote mushrooming culture, disseminate fungal knowledge, increase the collection and use of mushrooms, and promote conservation. Anyone interested in mushrooms is welcome to join the Society. Membership of the Facebook group is not bound to the membership of the Society. The Facebook group is public: the contents can be browsed by anyone. The group is defined as a discussion platform to share mushroom knowledge among its members. Upon joining the group, one has to accept the group rules.

A typical post to the group is an image of a mushroom with a request for help in identification. During the busiest mushroom season, there can be hundreds of posts daily. With the growth of the group, a need for rules emerged to facilitate interaction. The group rules define what kind of content is welcomed in the group and emphasize that mushrooms should not be eaten based on Facebook identification alone. In implementing the rules, group moderators are in a gatekeeper role, setting the stage for learning.

3. Materials and methods

This paper presents a case study of learning in social media, specifically, learning about nature in Facebook groups. While the case is not representative of learning in other Facebook groups, the analysis provides insights that can be applied in other contexts. Typical to case studies, the paper draws on diverse empirical material (Yin, 2018). Most of the material was collected through digital ethnography, or netnography (Kozinets, 2010). Netnography means applying an ethnographic approach on the internet: becoming familiar with the studied community and describing and analyzing it in its terms. I have been a member of the Finnish Mycological Society's Facebook group since 2012.

I have analyzed the group contents from the beginning using qualitative content analysis (Graneheim et al., 2017). The analysis may be characterized as historical document analysis, focusing on changes over time in the studied phenomenon. Historical and future analyses share the temporal dimension, and a researcher interested in the futures must work with the past (Männikkö, 2017). In foresight thinking, the past and the present are inseparably intertwined (Heinonen et al., 2017). The future is realized through causal processes and decision points that can be identified in historical analysis. However, analogies between the past and the future should be drawn with caution, as continuity cannot always be assumed and changes may occur rapidly (Männikkö, 2017). Empirically examining the recent past allows anticipating future possibilities and alternatives. I categorized the Facebook group contents according to emerging themes. What caught my

interest was a change in the purpose and interaction in the group over time. Close reading of the text and image content allowed to identify different learner positions within the group. The change is also found in the group rules, available as PDF documents in the group files. The first version of the rules is from February 2015 and the latest from August 2019; there are altogether ten versions of the rules. Analyzing changes in both the group rules and the contents over time and comparing the findings allowed me to construct a temporal narrative of learning in the group. In addition to the rules and group contents, the research material includes news articles concerning the group, the web pages of the Mycological Society, and the Mushroom Atlas.

The mushroomers' Facebook group is public, but the members perceive it as a semi-private sphere. Therefore, using the contents for research requires ethical consideration. I describe the group contents on a general level and do not provide quotes that could identify the members. Even though my analysis is somewhat critical, the underlying purpose is in line with the aims of the group: to understand how social media can be used to facilitate learning and connections to nature.

4. Evolution of the group rules: Taming the wild bunch

Foraging cultures have traditionally evolved simple precautionary heuristics to deal with uncertainties and poisonous species (Kaaronen, 2020). One such heuristic related to identifying mushrooms is to altogether avoid white mushrooms due to similarity to *Amanita virosa*, a lethally poisonous mushroom. Another common heuristic is only picking mushrooms one recognizes for certain and not identifying mushrooms based on only one cue. With experience, foragers develop intuitive pattern recognition that engages all senses and allows identification with little ecological information. However, this knowledge is hard to transfer to a less experienced forager, and even more so through social media. The heuristics may be only applicable in familiar environments (Kaaronen, 2020).

In 2014, the Finnish Mycological Society's Facebook group had over 4000 members, and interaction in the group was busy. Earlier, mycologists were reluctant to identify mushrooms from images. The situation changed with digital technologies. In August 2014, however, a news article claimed "people are guessing mushroom species" based on photos on Facebook. An interviewed researcher considered this highly irresponsible due to the possibility of misidentifying poisonous species. A representative from the Mycological Society disagreed, saying that the group aimed to improve people's knowledge of mushrooms, teaching them to avoid mixing poisonous species with edible ones. This discussion, in part, inspired the first written rules for the group in 2015.

The first version of the rules was one page in length. The rules emphasized the purpose of the Mycological society: to study Finnish fungi and support mushrooming, mushroom knowledge, and economy. The rules were:

■ using mushrooms as drugs is against the law, and the topic shall not be discussed,

■ the group does not offer an official identification service of mushrooms, so one should never decide to eat a mushroom based on image identification,

■ especially during autumn there is a flood of mushroom pictures so multiple posts on the same species should be avoided,

■ posts unrelated to mushrooms will be removed,

■ respect the moderators and other group members, and

■ read earlier replies before commenting.

With increasing interest in ecological lifestyles, celebrities praising mushrooms, and new books being published, mushroom foraging has experienced a renaissance.

For some mushroomers, aiming at self-sufficiency is an important motivator (Hyvärinen, 2020). Immaterial reasons are important for many: physical exercise and being in nature are perceived to support well-being. Meaningful relations are formed with both human and nonhuman others. The unpredictability of finding mushrooms allows the joy of discovery (Lehtonen, 2016).

Despite the emphasis on citizen science in the rules, a rich mushrooming culture flourished in the group in the first years, with mushroom-related humor. The shape of many mushrooms inspires sexually colored jokes. Group members posted images of all kinds of mushroom-themed items, from cups to aprons to stools. It was common to wish season's greetings to peers, often with a funny mushroom picture. Culinary mushrooming was prominent in the beginning, and cooking recipes were shared.

In 2017, the Facebook group had already 30 000 members, which meant increasing diversity among their motivations for mushrooming, and provided a fertile ground for disputes. The quarrels on how scientific the group should be had continued for years, but they culminated in frequent posts on the use of mushrooms as drugs. Some group members started to call the moderators at their homes, and the bickering became especially heated during late weekend hours. In September 2017, the Facebook group was closed for a few days.

According to one of the group moderators, many people thought of the group as a free identification service, not bothering to learn the basics of mushrooming. This seems to confirm the de-skilling effect of digital technology (Arts *et al.*, 2015). Some members got upset when, upon identification, they were not given permission to eat the mushroom they had found. Images of the same species were posted repeatedly, which aggravated other members to question whether beginners should be allowed in the group at all. The moderator reminded of the purpose of the group – to support responsible mushroom foraging – and highlighted its positive aspects: Facebook had raised the status of mushrooming, inspired more people to pick mushrooms, and provided data on rare species. In other words, it had facilitated learning on mushrooms for a much larger number of people that would have ever been reached through the traditional activities of the naturalist societies, such as outings and study circles.

The group was reopened with stricter moderation practices and redefined rules. The number of volunteer moderators increased from eight to eleven. The first rule became that one must behave according to law and good manners. It was emphasized not to provoke disagreement. Amendments to the rules encouraged the members to advance collective learning by adding species names to their pictures when the mushroom was identified. All the funny business that flourished earlier in the group was discouraged. It was highlighted that there are other groups focused on mushrooms as food. In 2016 and 2017, the rules were actively developed, with seven new versions, and they grew to two and a half pages in length. The aim of structuring the group was to facilitate learning, but it may have taken place at the expense of sociability among the group members (Korkala, 2019), hence excluding some naturalists. For many mushroom foragers, edible mushrooms are the gateway to the activity, but content on edible species is limited in the group, which may discourage beginners. The moderators thought strict rules were the only way to make the large group work, especially during the busiest season. Even urgent inquiries related to suspected mushroom poisonings would be buried if more diverse content was allowed.

5. Gearing the group for citizen science

In 2016, the Finnish Mycological Society committed to a Mushroom Atlas project to map the dispersion of fungi in Finland. There were a lot of skilled amateur mycologists around Finland, but a systematic collection of species data was difficult as there was no place to save it. The Atlas project was partly inspired by the popularity of the Facebook group.

The project organizers noted that the group had provided new data on previously little-known species. Yet, Facebook did not form an actual database. Only a small part of the data was "properly" recorded in scattered databases of environmental authorities. The Facebook group members seemed enthusiastic to participate in the Atlas. Consequently, the Facebook group was increasingly geared towards citizen science. Most group members are amateur mycologists, but over half of the 18 moderators are professional scientists. Thus the group's agenda is geared primarily towards the interests of the professionals.

The Finnish mushroom Atlas was a 5-year project coordinated by the Finnish Natural History Museum. The project aimed to develop a database for recording mushroom data, create a new culture of recording, and inspire and train amateur mycologists. The project benefited from the simultaneous development of the Finnish Biodiversity Information Facility (FinBIF, laji.fi) for recording all data on Finnish biodiversity. In the group rules, members were advised to report their findings also in FinBIF.

In the latest four-page edition of the group rules from August 2019, the rule "moderators do as they best see fit" was promoted to number one. The group moderators were actively preventing conflicts and keeping the group spirit positive. In essence, the rules were same as the first ones from 2015, but they grew in length and detail, and their order and tone changed. While the group was initially a peer group for rich mushrooming culture, the moderators now strictly regulated behavior and contents. Yet, while the rules seem to limit freedom of expression and prioritize amateurs with scientific interest, they may be necessary for the group to exist in the first place.

As part of the Atlas project, mushroom camps, field trips, and microscopy courses were organized to train amateur mycologists in identification skills. The amateurs were not reimbursed for costs in participating in the camps. If we think the main benefactors of the mushroom data are professional scientists with paid careers, the emphasis on citizen science looks like a problematic manifestation of neoliberal science, where citizens are treated as data providers and even funders for science (Vohland *et al.*, 2019). However, some participants in the Atlas reported how participation in citizen science had enriched their mushrooming. In the Atlas camps, they realized it was more fun to go foraging with other like-minded people. Besides learning to identify new species of "annoying little brown mushrooms," participants thought the Atlas also broadened, e.g. their culinary mushrooming. The citizen science approach also elongates the mushrooming season. During winter, the Facebook group fills with images of mushrooms growing on tree trunks, with the members looking to name them.

While the Facebook group seems to exemplify the de-skilling effect of technologies, for some people it has been a way to strengthen their connection to nature. The traditional heuristics may be difficult to transfer via social media, but a master-apprentice learning system is also visible in the Facebook group. Experienced mycologists sometimes "quiz" the group members by asking them to identify a difficult species. The future of the practice depends on the benevolence of the experienced amateurs, as they may be pulled from the Facebook group to more scientific and official recording channels.

6. Future of learning about nature in social media?

"The diversity of life needs to be fostered by a diversity of relations with and ways of knowing biodiversity" (Turnhout *et al.*, 2013, p. 592). But how should this diversity be dealt with in social media? Is the direction towards increased fragmentation and further specialized interest groups? In the case of the Finnish mushroomers' Facebook group, it seems not all forms of mushrooming culture can live peacefully in the same social media space. Once the group becomes large enough, it is necessary to establish rules of conduct to facilitate interaction. The Facebook group fulfills the aim of the Mycological Society: to promote mushrooming culture and disseminate mushroom knowledge. With regard to whose and what kind of knowledge is desired, the group is sending mixed messages. While

it is emphasized how anyone can participate in citizen science, not everyone's observations are equally valued. Emphasis on science constructs a hierarchy among the group members. The hierarchy is underlined with the Facebook badges feature, pointing out the most active group members, but it also facilitates learning by marking progress and identification skills.

The development of pattern recognition algorithms might make automatic species identification from users' images possible. This would be beneficial for science but less so for learning. Automatic identification of mushrooms would undoubtedly lead to further de-skilling, as there would be no need to learn the species. Still, naturalist social media inevitably moves between virtual and physical nature. For there to be a mushroom image to identify, somebody has to go out and take it. Mushroom foraging may allow seeing the forest from the trees beyond scientific economies (Hyvärinen, 2020).

Facebook as a platform imposes limits on learning. Privacy concerns and problematic discussion culture may make people leave the application. On the 4th of October 2021, there was a global crash of Facebook services. It acted as a reminder of the dependency of all the users, groups, and contents on the continuity of the commercial service. For the moment, Facebook is investing in developing the group features to engage its users. Facebook seems to encourage creating "elite" groups within groups, and in their vision, these exclusive groups could have an admission fee (Hutchinson, 2021). Monetizing the membership could allow for employment in curating the group contents, further facilitating their use in learning. To get young people involved, learning might have to be structured to provide them with college credits (Merenlender *et al.*, 2016). Organizing group contents according to curricula, providing feedback to students, etc., would require resources. Making parts of the Facebook group contents available against fee only would, however, work against the public education idea.

The Finnish mycologists' group has existed on Facebook for over ten years. Many members have been in the group since beginning, and it is an important place to connect with peers. The group itself has an established identity, and it would be a loss for the mushrooming cultures if it were discontinued. While the accessibility and connectivity of social media provide opportunities for self-directed and collaborative learning, learning on nature in social media is in many ways fragile.

7. Implications for research and practice

This paper highlights the importance of informal learning in social media. To validate the findings, similar case studies are called for examining a variety of naturalists groups. Also, other social media beyond Facebook should be studied concerning how they allow for connecting with nature and like-minded peers. The study could be complemented by interviewing naturalists on their experiences of using social media for learning. A qualitative approach may be combined with a quantitative user and content analysis.

For naturalists aiming to use social media for collaborative learning on nature, the case highlights the developments of a growing group over time. Similar problems in interaction are likely to occur in other groups, and these may be anticipated by proactively developing the group discussion culture and group rules in a participatory process. Practitioners should look for ways to be less dependent on commercial social media in archiving the cumulated knowledge of nature. The case also calls for inclusiveness in the naturalist social media while participating in valuable citizen science and fostering diverse naturecultures.

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Corresponding author

Minna Santaoja can be contacted at: minna.santaoja@utu.fi