MOTIVATING ENVIRONMENTAL CITIZEN SCIENTISTS AND OPEN DATA ACQUISITION ON OPENSENSEMAP WITH OPEN BADGES

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ABSTRACT:

Citizen science projects making the public part of scientific research are a growing trend and often have a strong geospatial focus with mapping and observation activities on biodiversity or environmental topics. To keep participants engaged, gamification is often used, adding elements of competition and rewards. Digital badges are a common gamification component that can increase participant motivation. Open Badges, an open standard for digital micro-credentials, can be used in citizen science projects to incentivize participants and showcase their achievements. They can also be adapted to open education, where learners can build a portfolio of evidence to demonstrate their achievements and credentials. Open Badges can enhance the learning experience and increase motivation, leading to improved educational outcomes. The use of Open Badges in citizen science and open education aligns with the spirit of collaboration and transparency in science and technology. In this paper we propose a solution linking the openSenseMap, as an open environmental citizen science platform, to myBadges, an Open Badges infrastructure, to allow an automatic issuing of badges for achievements made. A short study reveals first impressions of the proposed solution, its motivational aspects to contribute and improve open data on the platform, and the potential for future work.

1. INTRODUCTION

1.1 Citizen science

In December 1900, ornithologist Frank Chapman proposed with a new Christmas tradition that would start as the first CS project ever: counting birds instead of killing them. The annual Audubon Christmas Bird Count was born. This would allow for a more accurate understanding of bird populations and their movements. Chapman's idea was met with some resistance, but ultimately proved to be a valuable tool in ornithology (Silvertown, 2009).

In the early days of citizen science, the term was mostly used to describe the procedure where citizens help collecting data that can be used for scientific research and experiments. It then also involved citizens to actively take part in the research project itself. Citizen science is now an accepted expression for the many ways in which members of the public contribute to scientific research. This includes everything from data collection to analysis and interpretation.

Currently the majority of citizen science projects, usually curated by larger citizen science platforms as Zooniverse (Simpson et al., 2014), BürgerSchaffenWissen (David Ziegler et al., 2014) or eu-citizen.science (Wagenknecht et al., 2021), have a geospatial component either through the activities performed and tools used by the citizen scientists or the projects' domains. Citizens often map sightings and observations, measure environmental phenomena, and use a variety of geospatial tools such as mobile apps, positioning technologies, cameras, or sensors. The data acquired, interpreted, or analyzed by the citizens often is presented on maps, usually in a web-based system.

There are many benefits to citizen science. For one, it allows people who may not have access to traditional scientific resources or training opportunities to participate in real-world research projects. Volunteers who participate in citizen science projects also enjoy benefits like increased knowledge of scientific content and processes, engagement with the scientific community, skill development (especially in the geospatial domain), improved attitudes towards science, increased time spent outdoors, and a sense of civic responsibility. Citizen Science also provides scientists with extra help on large or complex projects and helps them gather data from a wider geographical area than they could otherwise achieve.

However, there are negative, ethically questionable effects as well. For instance, one might believe that citizen science is a really inexpensive way to get people to complete labor-intensive tasks for free. But maintaining people, websites, and databases for citizen science may be a huge time and labor drain (Gura, 2013). The fact that no one is aware of the actual data quality being collected is one of the main drawbacks. Gura provided an excellent illustration when she said: "*It could be a retired botany professor reporting on wildflowers or a pure amateur with an untrained eye*".

For long-term citizen science projects, the motivation to contribute changes over time after an intrinsic interest in the beginning. To keep up the level of participation, citizen scientists can be motivated through a variety of strategies: e.g. feedback about the contribution, acknowledgment by scientists or peers, or community-building (Rotman et al., 2014). Another method for the motivation of citizen scientists can be found in gamification (Bowser et al., 2013).

1.2 openSenseMap

An example for a long-term citizen science project is the openSenseMap[1], an open geospatial and environmental data

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[1] `https://opensensemap.org`

platform developed by Pfeil et al. in 2015. The openSenseMap is widely used by individuals and organizations around the world for the collection, storage, analysis, and visualization of environmental data. It is closely related to senseBox, a citizen science and education toolkit, and allows users to measure, record, and share data from various environmental sensors (Bartoscheck et al., 2018) and (Wirwahn and Bartoschek, 2015). The platform currently boasts over 11,000 registered devices and has recorded over 11 billion measurements. The openSenseMap is being used for various purposes, including monitoring temperature changes, noise levels, air quality, and water quality in the public, scientific and professional domain. The data collected can be used to create maps that display trends or patterns in environmental conditions and can be useful for scientists and urban planners alike.

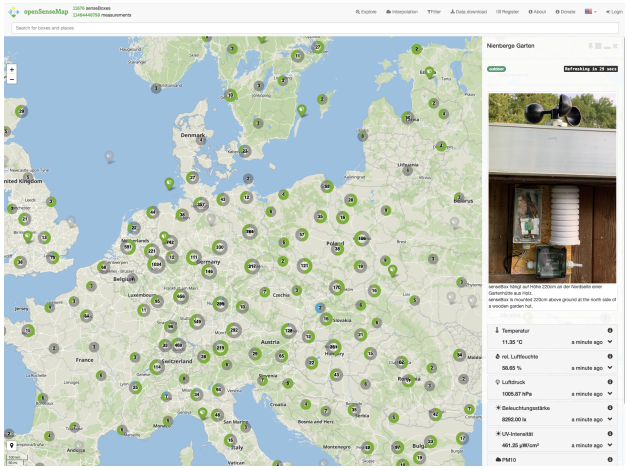

Figure 1. openSenseMap user interface.

openSenseMap can be used with different predefined hardware setups such as senseBox[2], sensor.community[3] and hackair[4]. Besides these hardware setups the open REST API [5] allows users to upload sensor data from any device capable of sending data via http, MQTT or through the TTN Network. Data uploaded to the openSenseMap is published as open data under the PDDL License and can be used by everyone for every use case. Users can explore the data on the website, create simple analyses or download the data in various file formats. A free API allows one to access the data and integrate it to other software solutions such as statistics software (Roosen, 2022) or dashboards. An archive [6] offers all historical data as csv-files per station and sensor.

A study from 2019 asked about motivations using the openSenseMap and being part of a technology-oriented citizen science project. Major motivations were sharing and collecting open environmental data, contribution to a scientific project and interest in technology and environment (Pesch and Bartoschek, 2019), similar to the intrinsic motivations described by Rotman et al. (2014). The citizen scientists visit the openSenseMap 1-2 times a week and most of these users only use basic features such as exploring their own data. An visual analysis though the creation of diagrams and more advanced features were used only by very few users. Besides the citizen scientists the openSenseMap has many more users (visitors), that do not contribute, and were not investigated in this study.

Current statistics of registered devices on the openSenseMap show an online rate of approximately 30% meaning 4200 registered measurement devices uploaded any data in the last 30 days. Reasons why sensor stations do not upload any data are not clear, but might range from hardware failures, like lack of network connection, broken sensors or other parts to lack of motivation to continue to contribute to this project.

1.3 Gamification

Gamification is “the use of game design elements in a non-game context” (Deterding et al., 2011). People can be motivated and engaged in new tasks or goals with the help of gamification. It can also help create a sense of ownership and investment in the outcome of a task or goal (Sailer et al., 2013). Gamification has been used in a variety of fields, including marketing, healthcare, education, and workplace efficiency.

The best gamification components will always depend on the specific goals and objectives of the initiative. However, some commonly used game elements include points, badges, and leaderboards. Kapp (2012) provided a more detailed list of elements like goals, competition, cooperation, time, reward structures, feedback, levels, storytelling, the curve of interest, and aesthetics. Sailer et al. (2013) also put together a core list with typical gamification elements such as Points that can be received for different activities in the gamification environment.
Leaderboards are ranked lists of players based on their achievements. Progress bars can visualize how far the player has come towards a goal. Quests are tasks, users have to complete within a game. Meaningful stories can motivate the player and bring up emotional bonds to certain figures or elements of the game. Lastly, avatars can be customized and represent a player in a game.
These do not cover all possible approaches but provide examples and show how varied these lists can be and how different researchers and scientists may view them.

1.3.1 Badges Analog badges have been around for many years in the form of patches given to Boy Scouts and Girl Scouts for completing certain tasks or learning specific skills. But there are several issues that come with analog credentials. This is due to the fact that they are difficult to spread and are often misplaced. For example, a diploma or degree earned from an analog institution can easily be misplaced or destroyed. In addition, sharing this information with others can be difficult since it needs to be physically handed over. Contrast this with a digital credential, which can easily be stored in the cloud and shared with others electronically (Hurley, 2017).
There are numerous settings where badges can be used. For instance, they are an excellent approach to inspire and involve pupils in their schoolwork. They provide learners a sense of accomplishment and motivate them to keep pursuing new objectives. With the use of badges, teachers may monitor student development and recognize their best performers. Badges can help create a sense of competition among students as they work to earn the most prestigious awards possible. This added layer of excitement encourages players to learn more and try harder than they might otherwise do. Gamification badges can be displayed on a player’s profile or avatar to show others what they have accomplished. In addition, badges provide an opportunity for self-expression; players can choose which ones they want to

[2] https://sensebox.de
[3] https://sensor.community/
[4] https://www.hackair.eu/
[5] https://docs.opensensemap.org/
[6] https://archive.opensensemap.org/

display based on their interests and personality traits.
Since there are so many different platforms where you can earn and display badges, it becomes harder to show an overview of the many skills a user has already acquired in his lifetime as they are spread out on many different user accounts. This is a major problem with badges as they become more and more popular.

Digital badges can provide a solution to the challenge of making competencies visible to employers. Digital Badges (e.g. Open Badges) are a visual representation of specific competencies and skills that learners have acquired, providing employers with a clear understanding of a candidate's abilities (Brauer and Siklander). In this way, badges can bridge the gap between the expectations of employers and the qualifications of graduates. Badges can be used to recognize skills that are not typically assessed through traditional forms of assessment, such as critical thinking, problem-solving, and communication skills (Rhodes, 2012).
To ensure that badges accurately reflect the competencies of learners, it is important to develop a shared understanding of what each badge represents. This requires a collaborative effort between educational institutions, professional bodies, and employers to define the competencies that are necessary for success in a given field (Bravenboer and Lester, 2016). This shared understanding will enable badges to become a common language for describing and recognizing competencies.
In addition to badges, ePortfolios and other digital tools can be used to showcase competencies and skills. However, learners may require guidance and support to use these tools effectively. Educational institutions and professional bodies can play a crucial role in providing this guidance, ensuring that learners understand what constitutes evidence of competence and how to present it effectively (Korhonen et al., 2020). Ultimately, the use of digital badges, ePortfolios, and other digital tools can enable learners to demonstrate their competencies and skills to potential employers, increasing their employability and ensuring that employers can make informed decisions about hiring (Brauer and Korhonen, 2021).

ePortfolios are digital collections of evidence of competencies that learners can use to showcase their learning and improve their employability. However, creating ePortfolios can be challenging for learners, who may not be aware of how to document their competencies effectively. Open Badges, which are mini-portfolios that recognise and validate specific competences, can help learners to demonstrate their competencies more effectively. By attaching evidence to Open Badges, learners can communicate their competencies to different audiences and customize their showcase portfolios to suit their needs. The challenge is to store evidence in an environment other than the badges to ensure that it is available in the future. Open Badges can also be used as a criteria-based assessment of competences, replacing the summative assessment of learning in ePortfolios (Brauer and Korhonen, 2021).

1.3.2 Open Badges A digital badge does not necessarily be an open badge. Digital badges are for example used in video games and are not shareable through different platforms. The Open Badge is a digital microcredential that adheres to the Open Badges infrastructure (OBI) developed by the Mozilla foundation. An Open Badge according to the standard called by the OBI needs to be an image enriched with metadata (e.g. issuing organization, description, requirements etc.) (Clements et al., 2020).

Open Badges are a digital way of representing accomplishments or skills that can be earned by individuals and shared on the internet. The Open Badges Infrastructure (Figure 2) is responsible for maintaining and developing Open Badges using open standards such as JSON-LD.

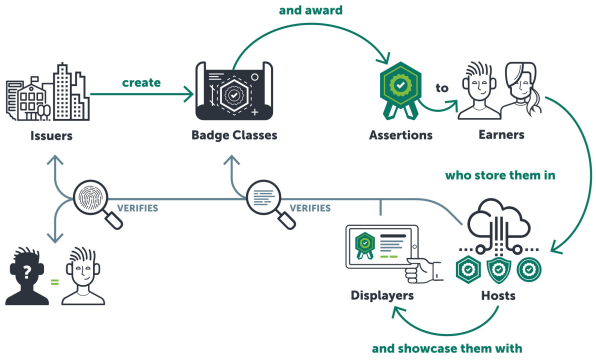

Figure 2. Open Badges Infrastructure. © 1EdTech Consortium Inc. CC BY 4.0.

There are three main parts in the Open Badges infrastructure according to the Open Badges standard [7]: the Badge Issuer, the Badge Earner, and the Badge Displayers.
The Badge Issuer is an individual or organization that creates and awards the badges. The issuer sets the criteria for earning the badge and provides the evidence required to support it. The badge issuer can be an educational institution, a professional organization, a company, or even an individual.
The Badge Earner is the individual who has met the requirements set by the badge issuer and has earned the badge. Badge earners can use their badges to showcase their skills and accomplishments to potential employers, colleagues, or clients.
The Badge Displayer is any person or organization that recognizes and values the badge earned by the badge earner. This could be an employer, a client, or a peer in a professional network. The badge Displayer evaluates the skills or achievements represented by the badge and uses that information to make informed decisions about the badge earner's abilities.
The OBI provides a metadata standard that describes the badge and contains information such as the issuer, the earner, the criteria for earning the badge, and the evidence supporting the badge. This metadata is embedded in the badge image and can also be stored in a central repository called the Badge Backpack.
In summary, Open Badges and infrastructure provide a standardized and flexible way for badge issuers to award badges, Badge Earners to showcase their accomplishments, and badge Displayers to evaluate the skills and achievements of badge earners. The open interfaces ensure a large number of possibilities for the use of Open Badges and allow the connection between different software systems and is therefore a promising element to support the citizen science projects.

This study aims to investigate whether the attainment and reward of Open Badges as one element of gamification can motivate citizen scientists and increase their involvement in citizen science projects. To achieve this goal, a survey was conducted among users of the citizen science project openSenseMap. A first prototypical implementation of integration

[7] https://openbadges.org/

of Open Badges was developed to showcase the potential of an automated issuing of Open Badges to the citizen scientists. This will allow the project administrators to grant specific badges automatically once users take a specified activity, thereby increasing user engagement and participation in the project.

2. RELATED WORK

In 2017 Tinati et al. published a paper regarding the EyeWire[8] project, which is a citizen science project that uses gamification to engage users in the mapping of neurons. The project was founded in 2012 by Seung-lab at MIT and has since engaged over 250,000 players from around the world. The goal of EyeWire is to map as many neurons as possible in order to better understand their function and connectivity. Players are presented with 3D reconstructions of neuronal data, which they then trace using an online interface as players progress, they unlock new levels and earn rewards for their contributions. The design of EyeWire incorporates gamification aspects including leaderboards, scoring, and competitions. Points are awarded for completed tasks. Leaderboards and activity feeds facilitate tracking progress and benchmarking against others. Periodic challenges and tournaments are held to further promote involvement, frequently uniting the players in teams. The use of gamification has shown to be effective in engaging users in complex tasks such as this one (Tinati et al., 2016). In addition to providing a fun and stimulating environment, it encourages collaboration and competition among users. The Eye-Wire community is highly active, with participants often sharing tips and tricks on how to best complete the task at hand. Badges were not used as gamification elements in this project.

The game Foldit[9], enables players to assist in scientific research by folding proteins. The efficient functioning of proteins, which are the body's building blocks, is crucial for optimal health. By playing Foldit, users can contribute to scientific research on how proteins work and possibly new medical therapies. Because a group of players (also called "Folders") were successful in understanding the structure of a retroviral protease in less than three weeks, Foldit made headlines in the scientific world in 2011. This enzyme, whose structure scientists have been attempting to decipher for the past ten years, is crucial to how HIV multiplies (Khatib et al., 2011). As a result of this finding, Foldit gained credibility as a tool for research into protein folding. Jennett and Cox conducted a study interview with four Foldit and four Eyewire participants in 2013 to learn more about their motivations for joining the different projects. Like Rotman et al. and Curtis, they discovered that the majority of the participants had prior scientific interest. In essence, they were drawn to the initiative not because they were gamers but because they were science enthusiasts. However, game components did seem to be helpful in maintaining participants' interest in the project. Being a part of a team and interacting with others who share their interests was another factor that encouraged Foldit members to keep playing (Jennett and Cox, 2018). Badges were not introduced in Foldit.

As of today there is only a small number of citizen science projects that have embedded digital Badges into their environment (e.g. CrowdWater[10]). CrowdWater relies on the Spotteron App framework, a private closed source software, used in many different citizen science projects as the data acquisition and community platform. Through the recent implementation of digital badges for the CrowdWater project also other projects using the Spotteron App might integrate Badges in the future (Spotteron, 2021). The citizen science project Biotracker, a gamified mobile application that gathers plant phenology data, already integrated digital badges and found positive effects on motivation (Bowser et al., 2013).

Open Badges have been used by over 1400 institutions, from higher education institutions over K12-Schools to teachers or coaches issuing badges to their individual students (Clements et al., 2020). One example for the whole process of applying and integration Open Badges into an existing use case related to data is the competence model for research data management by Buchem (2022). Research Data Management (RDM) refers to the practices, processes, and infrastructure for managing research data throughout its lifecycle. RDM is becoming increasingly important due to various technical, legal, and organizational challenges faced by organizations and individuals involved in offering, producing, processing, and utilizing research data (Neuroth et al., 2021). Guidelines and recommendations for RDM include the FAIR principles, which aim to make research data Findable, Accessible, Interoperable, and Reusable while maintaining the legal and ethical framework and striving for an open data culture (Wilkinson et al. (2016) as cited in Buchem (2022)). The development of competencies in RDM is crucial for ensuring transparent, sustainable, and future-oriented research (Hörner et al., 2021). There are various approaches to defining competencies in RDM, often based on the research data lifecycle. However, existing models are complex and challenging to implement in didactic contexts, such as developing educational programs. The EU project OBERRED developed a simplified and more practical approach to modeling and recognizing competencies in RDM using Open Badges. The project developed an RDM competency framework with eight competency areas and 22 Open Badges for recognizing individual competencies. The goal was to facilitate the planning of didactic measures in RDM. The approach involved analyzing various RDM frameworks and identifying common competencies and skills. The competency framework was then validated by experts and used to design Open Badges that recognize specific competencies. This approach provides a practical and flexible solution for recognizing competencies in RDM, which can be used in educational programs and other contexts (Buchem, 2022).

3. PROTOTYPE DEVELOPMENT

As there is no existing implementation of Open Badges within an active citizen science project the effect of Open Badges on long-term contribution, motivation and data quality has not been investigated. To allow further development in this research area we propose a first prototype for an automatic open badge issuing system integration in the openSenseMap infrastructure and myBadges as OBI.

3.1 Implementation

MyBadges[11] is a free, open source platform (implementing the OBI) that enables the creation, issuing, receiving, exploring,

[8] https://eyewire.org
[9] https://fold.it
[10] https://crowdwater.ch/en/crowdwaterapp-en/#Badges
[11] https://mybadges.org

and sharing of badges online. Badge earners can store and share their badges across different platforms and organizations. It also provides tools for badge earners to manage their badges, such as organizing and displaying them on a personal profile page. MyBadges allows the full manual management of badges, e.g. a course instructor may award a badge for participation in a course. On the other hand the myBadges API allows the automatic issuing of badges from other software solutions. Badges created on myBadges follow the Open Badges standard and can also be imported to other badges backpacks. On mybadges organizations can sign up to become an issuer and can verify their credentials before creating new badges using a graphical interface. The BadgeClass is created once all necessary data has been entered, and anyone who satisfies the badge's requirements may claim it. Organizations can revoke badges using the same interface. MyBadges offers all the features from the Open Badges Infrastructure and is based on Badgr. Badgr was developed by Concentric Sky, starting in 2015 to serve as an open source reference implementation of the Open Badges Specification. It provides functionality to issue portable, verifiable Open Badges as well as to allow users to manage badges they have been awarded by any issuer that uses this open data standard. Since 2015, Badgr has grown to be used by hundreds of educational institutions and other people and organizations worldwide. The newest version of the Badgr server is not open source anymore although the backend-infrastructure, a fork of the original Badgr server [12], for myBadges is still open source and actively maintained.
The technical implementation of gamification in citizen science projects is a complex process that requires careful consideration and attention to detail, e.g. platform compatibility, coding principles, and security measures. In order to enable an automatic awarding of badges via myBadges to a user of the openSenseMap, a link between the two open interfaces was created (Figure 3).

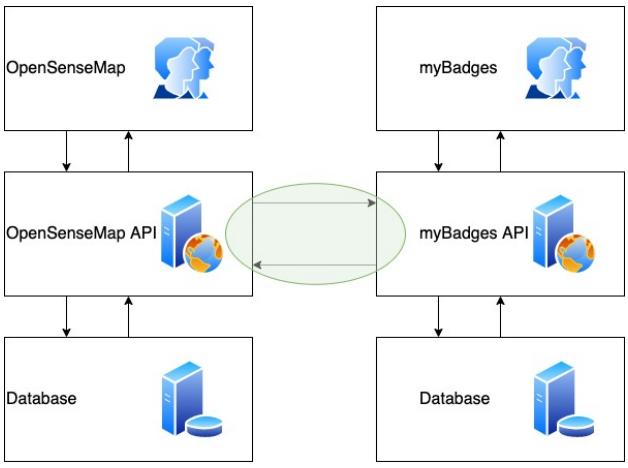

Figure 3. myBadges and openSenseMap.

The gamification process was planned using Marczewski's framework, and similar projects were assessed before implementation began. To connect openSenseMap and myBadges coding principles such as clean code, user privacy, and avoiding redundant data were followed to ensure optimal performance. Developers can easily add, remove, or update badges on the openSenseMap thanks to the preexisting interface of myBadges, which reduces the amount of time needed for badge management tasks.

[12] https://github.com/myBadges-org/badgr-server

The process of granting badges to users is as follows: when a user performs an action for which a badge should be awarded, the openSenseMap Application Programming Interface (API) checks if the user already owns the badge. A connection between the myBadges and openSenseMap APIs was established using admin credentials and a secret key for security reasons. If the user does not own the badge, it is granted through the myBadges API and a notification appears in the frontend of the openSenseMap (Figure 4).

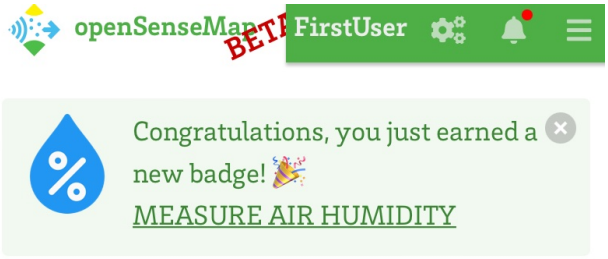

Figure 4. openSenseMap badge notification.

On the openSenseMap, users have the option to mark their accounts as "public," allowing anyone to see an overview of their account. This feature includes displaying the user's username and all the badges they have earned (Figure 5). By clicking on a badge, viewers can be redirected to the Open Badge platform to see more detailed information about the specific badge. It is also possible to see which badges have not yet been earned as they are greyed out, while the earned badges are displayed in color. This feature is an excellent addition to the openSenseMap platform's gamification aspect, providing transparency in the badge system and motivating users to earn more badges. By showcasing their achievements, users can build a sense of community and inspire others to engage more actively in citizen science projects.

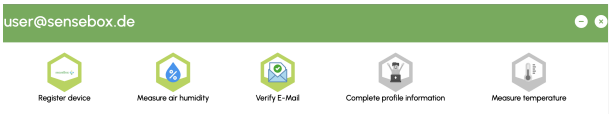

Figure 5. openSenseMap Badge Summary.

For the first implementation 5 different badges were created. The badges aim to provide a first implementation showing potential uses cases. In general created badges can be divided into 2 different categories: Badges for creating a user account or complete profile information are smaller achievements which can be achievement in a short period of time, while badges for long term use of openSenseMap such as 1 million uploaded measurements need long term usage.

3.2 Survey

Following a review of the literature on gamification, citizen science, and Open Badges, a hypothesis was formulated that Open Badges, if implemented in a user-friendly manner, can increase involvement in citizen science projects. To test this hypothesis, a web-based survey was developed. The survey included Likert scales and closed-ended questions to collect data on demographics, motivation, frequency of use of openSenseMap, and connections between video games and badges. Due to the cost of the review, no open questions were raised. Responses on the Likert scale ranged from "completely agree" to "absolutely disagree" on a five-point scale. The survey was set up in German

because it was promoted on the social media accounts of senseBox and openSenseMap, which post only in German.
The survey's initial section collected demographic data, followed by questions about participants' motivations for using openSenseMap and how frequently they used it. The users were given multiple choice predetermined categories as potential answers to evaluate their motivation for taking part. Finally, video game behaviors and experiences with badges in other contexts were questioned.
It is important to note that the user group that participated in the survey is already interested in citizen science because they follow the social media profiles of openSenseMap and senseBox. Therefore, the conclusion on whether gamification can motivate people to start participating in citizen science could not be drawn. This topic could be an interesting area for future research.

3.3 Results

The results of our survey (n=22) support the idea that badges can increase users' interest and engagement in citizen science platforms. A large majority of respondents said that badges would improve their interest in the openSenseMap platform. Specifically, 27% of respondents stated that badges definitely boosted their interest, and another 36% stated that it made the platform more intriguing. Only one participant claimed that badges had no substantial effect on his level of interest.
In addition, when asked if badges would make the openSenseMap platform more engaging, a majority of respondents (50%) totally agreed with the statement, while only two individuals disagreed. This suggests that badges may be an effective way to increase user engagement and motivate ongoing participation in citizen science initiatives.
Furthermore, our survey results suggest that younger individuals may be more receptive to gamification aspects than older individuals. The mean consensus among various age groups indicated that the 21-25 age group and the 31-35 age group were the most receptive to the idea of badges making the openSenseMap platform more engaging. Although the sample size was small and not representative, the findings suggest that gamification elements such as badges may be particularly effective in engaging younger individuals in citizen science initiatives.
Overall, incorporating gamification elements such as badges into citizen science platforms may be an effective way to increase user engagement and encourage ongoing participation. Our survey results suggest that badges can increase user interest and engagement in the openSenseMap platform, particularly among younger individuals. However, further research is needed to confirm these findings and explore other gamification strategies that may be effective in increasing user engagement in citizen science initiatives.

4. CONCLUSIONS AND FUTURE WORK

The implementation of openBadges to the openSenseMap and the short survey show the potential for citizen science projects. Although the survey had few responses most users were attracted by the badges. Further development needs to be done to unlock the full potential and a follow up study in a larger scope might show the effects for motivation and data quality.

openSenseMap data is used in many different scientific use cases and studies across multiple disciplines e.g. Garzon et al. (2022) or Richter (2021) . Data quality is often discussed in citizen science projects and is multifaceted and often disputed, with no 'one-size-fits' all approach (Balázs et al., 2021). Lack of metadata and incomplete data is one of the major problems of the openSenseMap dataset. Users can add pictures of their mounted measurement device (e.g. senseBox) a description including how/where it was mounted. Introducing badges for completing metadata about their sensor stations or keeping a sensor station alive for a longer period of time could help to improve these two aspects. As of today only a few devices registered on the openSenseMap feature an image or metadata about the installation site or the used housing. A Badge for this task could help to remind users to submit this data and keep it up to date, improve data quality and allow better post-processing of data.

An introduction of (Open) Badges was already porposed for the OpenStreetMap project too. Badges can show the community the effort of single users for specific tasks e.g. mapping nodes. In the proposal, badges could not only reward positive user actions, one could also think about negative badges for bad actions ("badges of shame") such as for creating N duplicate Nodes. (OpenStreetMap-Wiki, 2020)

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