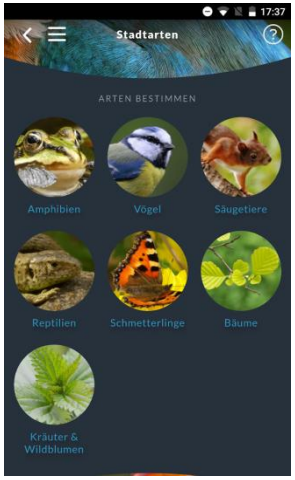
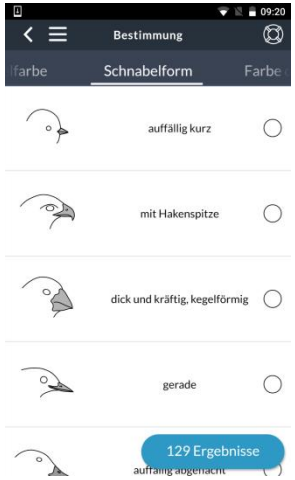
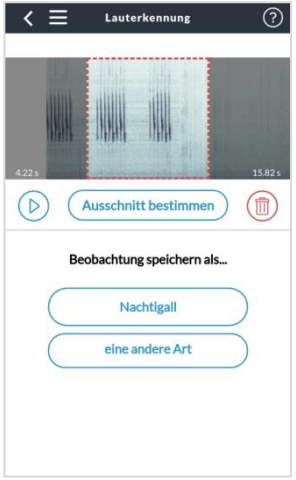
Mobile app and platform development in citizen science

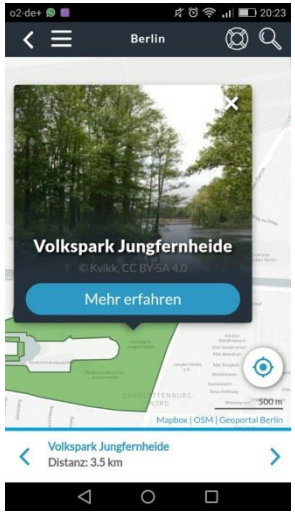
Ulrike Sturm

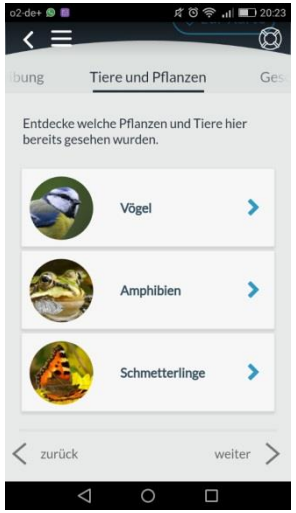
Naturblick











Mobile app and platform development in citizen science

Ulrike Sturm | Museum für Naturkunde Berlin – Leibniz-Institut für Evolutions- und Biodiversitätsforschung

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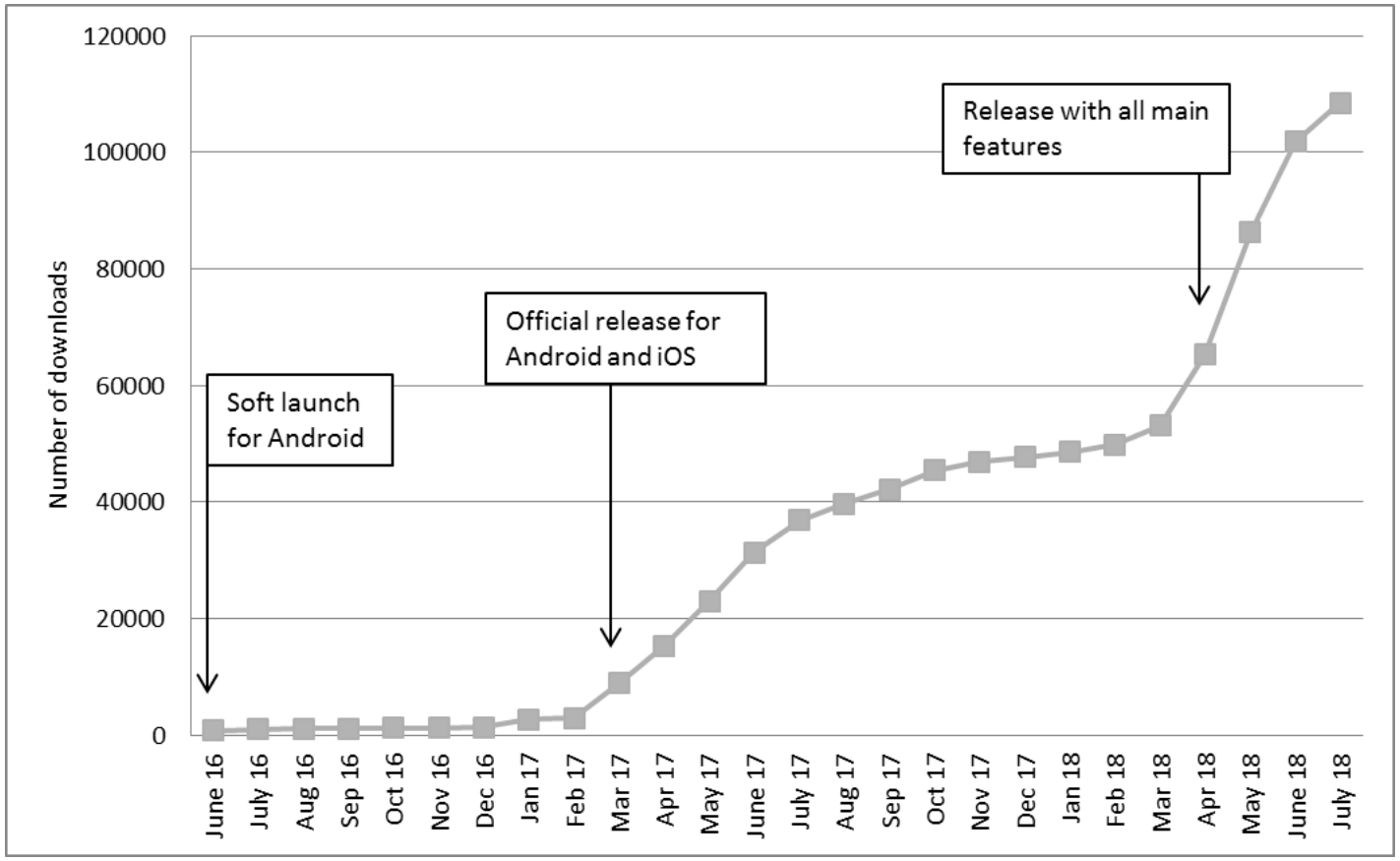
Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit
aufgrund eines Beschlusses des Deutschen Bundestages

Naturblick



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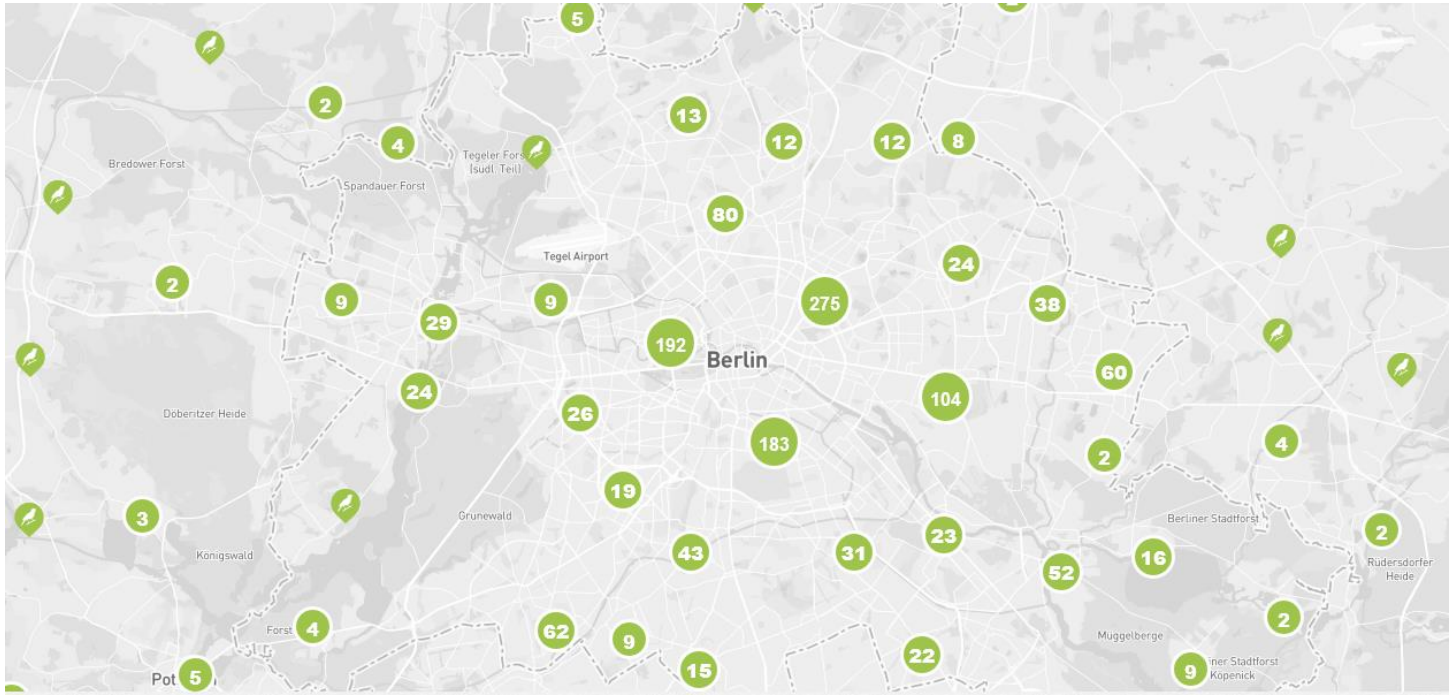
Forschungsfall Nachtigall

FORSCHUNGSFALL NACHTIGALL

›Participants record nightingale songs with “Naturblick”. The recordings are analysed in regard to song dialects and habitat preferences.

- ›2.449 recordings were made by 1100 participants in 2018
- ›1766 recordings were verified nightingale recordings

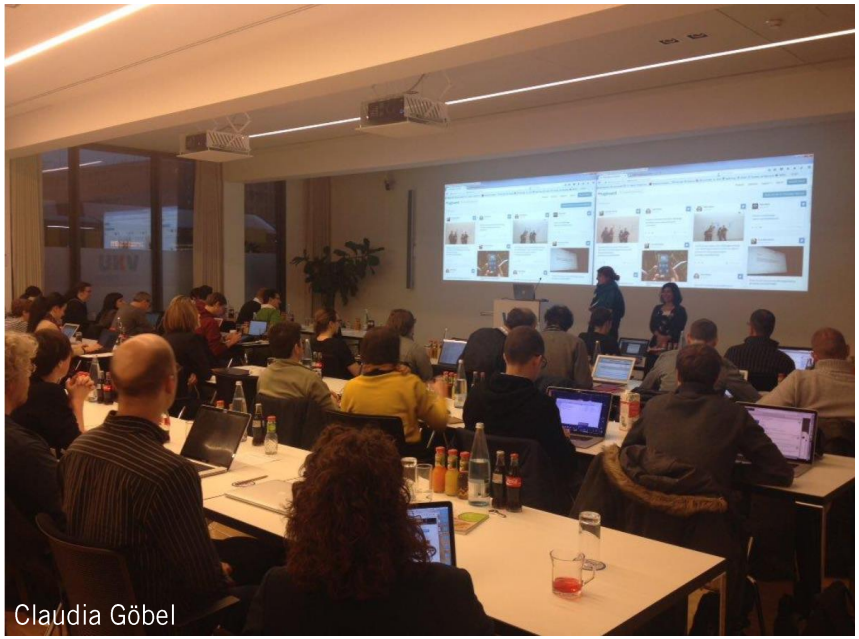


https://forschungsfallnachtigall.de/kart e (8.8.2018)

BÜRGER FORSCHUNG Wissenschaft für alle!
GEFÖRDERT VOM Bundesministerium für Bildung und Forschung

Defining principles for mobile apps and platforms development in citizen science

1. Workshop
13th- 14th December 2016 in Berlin



Workshop Report

2. Workshop
25th-27th April 2017 in Gothenburg

Workshop Report

43 recommendations

Research Ideas and Outcomes 4: e23394
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OPEN ACCESS

Workshop Report

Defining principles for mobile apps and platforms development in citizen science

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Reviewable v2

1. Sharing of outcomes and interoperability

1. Platforms, portals and apps should have an API to share as much data as possible, and open API standards should be followed where possible.
2. There should be transparency about what data are collected and where data is stored.
3. **The licenses of data, source code and other resources should allow for re-use. Pay attention to the differing restrictions of different open licenses.**
4. If sharing data and other resources with other countries, pay attention to national and international differences in licensing.
5. When writing the code, take into account the different levels of technical ability and keep reusability in mind (i.e. new projects can reuse the app or platform, and it should not be too hard to adapt the code for their purposes), especially coding conventions should be followed to ease take up.
6. It is preferable to open source the code base, but there are contextual situations where some limited closeness is necessary (e.g. long-term monitoring projects that require aggregation over time, and therefore consistency of the code base).
7. If sharing code, think about sustainability and discoverability. Examples are Github or the Astrophysics Source Code Library (ASCL) for source code in astrophysics.
8. Re-use also refers to the design (e.g. icons, and interaction), therefore, design should be based on existing standards if applicable (e.g. ISO/FDIS 9241-11 Ergonomics of human interaction). Design should be innovative but familiar. But be aware existing standards are in some instances not free to use and need additional investment of resources.
9. Existing fit-for-purpose platforms/project-portals/apps (and the communities using them) should be taken into account for re-use. We recommend that existing tools are built on and developed to the next level.
10. New developments should be well documented, if possible also in English (including the scope of use, any assumptions made, known limitations, and implications when using a particular solution).
11. If possible, use modular development of apps and platforms.
12. Consider multi-lingual translations of project documentation depending on the scale of the project.
13. If possible, use open standards for data and metadata, and use distribution services that make these accessible. Examples include ALA - BioCollect, SciStarter, PPSR-CORE - CitSci.org, The US Federal Crowdsourcing and Citizen Science Catalog, Dublin Core, GBIF - IPT, Project Open Data Metadata Schema - POD v1.1, CKAN API, DCAT, Schema.org, OGC, CobWeb, ADIwg, ISO 19115/19110, Inspire) until a recommendation is made available by CSA-ECSA-ACSA (foreseen by October 2017).
14. Each observation site/data point should have a universally unique identifier (UUID coming from an existing standard).
15. Implement interoperable quality assurance procedures (especially including validation processes).

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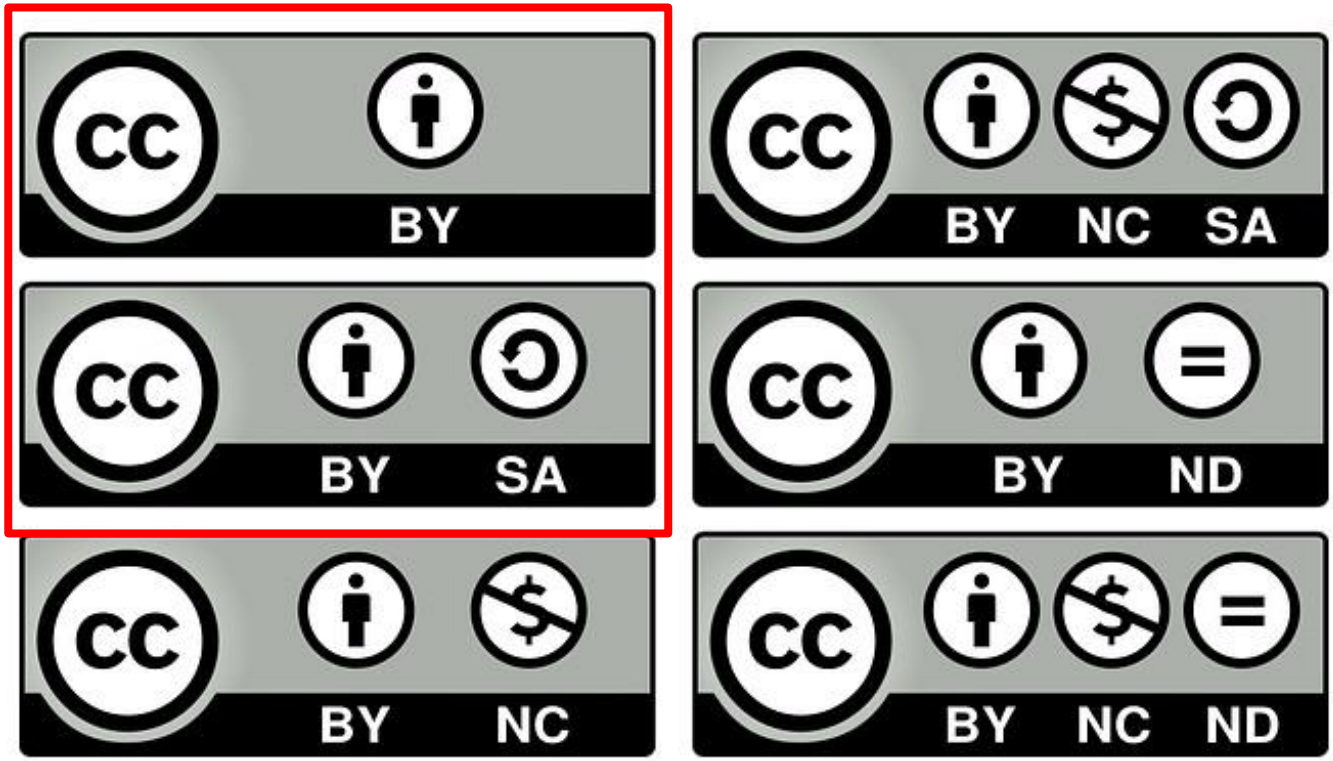

2. Communication and Design

1. Respect your participants by designing in a way that appreciates their time and lowers the barriers for entry. Think about ease of use, user friendliness, accessibility, and context.
2. Participants need to be able to communicate amongst themselves (e.g. in forums).
3. The design of apps and platforms for citizen scientists can be centered on a target group, or be developed to meet the needs of both communities in a co-creation process.
4. **Define your target group (the ones you try to reach), and design for their needs to attract and support them.**
5. Be as inclusive as possible. However, have in mind that the ideal target group size is project specific. In some cases, it is appropriate to narrow the target group in order to enhance recruitment and retention, or to maintain a higher quality of data.
6. Think about the participant's journey: "take care"/ consider participants throughout the processes of your project, think about their motivation.
7. Plan and understand the required level of engagement for the project: is it fine to have many on-off participants, or does the nature of the project require deeper long-term engagement?
8. Check your assumptions about the participants, e.g. do the people you want to reach have e-mail? Internet? Smartphones? Are they comfortable with technology? Do they have Wi-Fi connectivity or data in the field?
9. Consider the context in which participants are using the app or the website during the design phase. For example, consider the weather (will the participants be using mittens?) and the natural environment (is it wet?).
10. Take different levels of physical ability into account when designing the interface.
11. Take other aspects of inclusivity and accessibility into account. In particular design for people with visual difficulties.
12. Balance designing for citizens with designing for scientists, keeping in mind who the central users of the app or platform will be.
13. **Whenever possible, citizen scientists should be the co-creators of apps, contributing to the structure and design from the very start of development (i.e. not limited to testing).**
14. Design to prevent bias both in the participants demographic composition, as well as in the data collection, coverage, consistency.
15. Communicate constantly with the participants and react to feedback and ideas.
16. Design for communication: start by deciding on the right "tool" (app, platform, website, non- digital tools, or a mix).
17. Communication should be as direct as possible, and both sides should profit. Develop meaningful thanks/giveback within the app itself.
18. Unstructured learning and communication should be recognized as valuable. Allow unstructured space for informal learning and reflection among citizen scientists.

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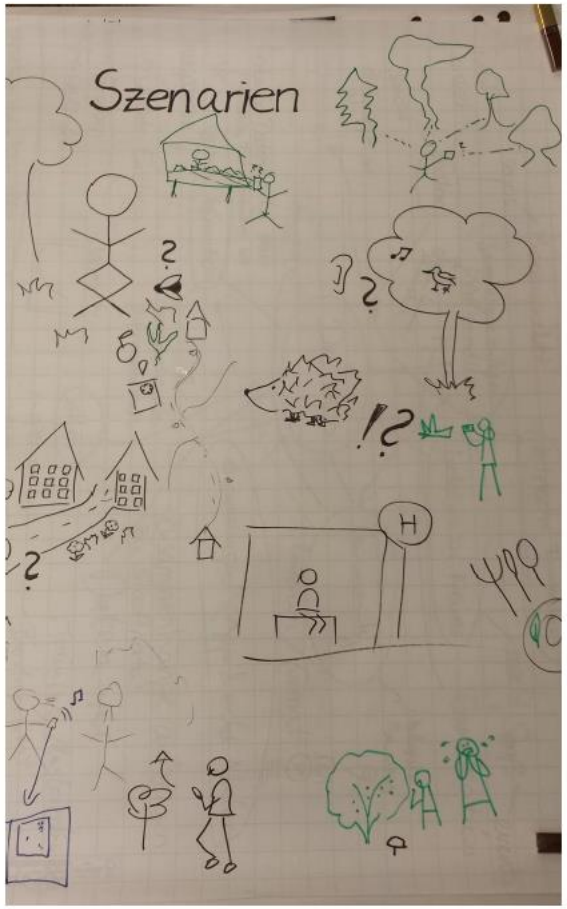

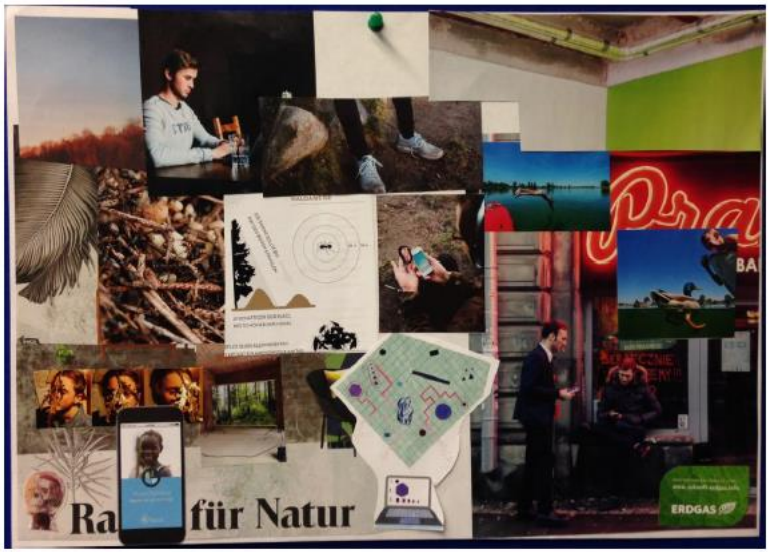

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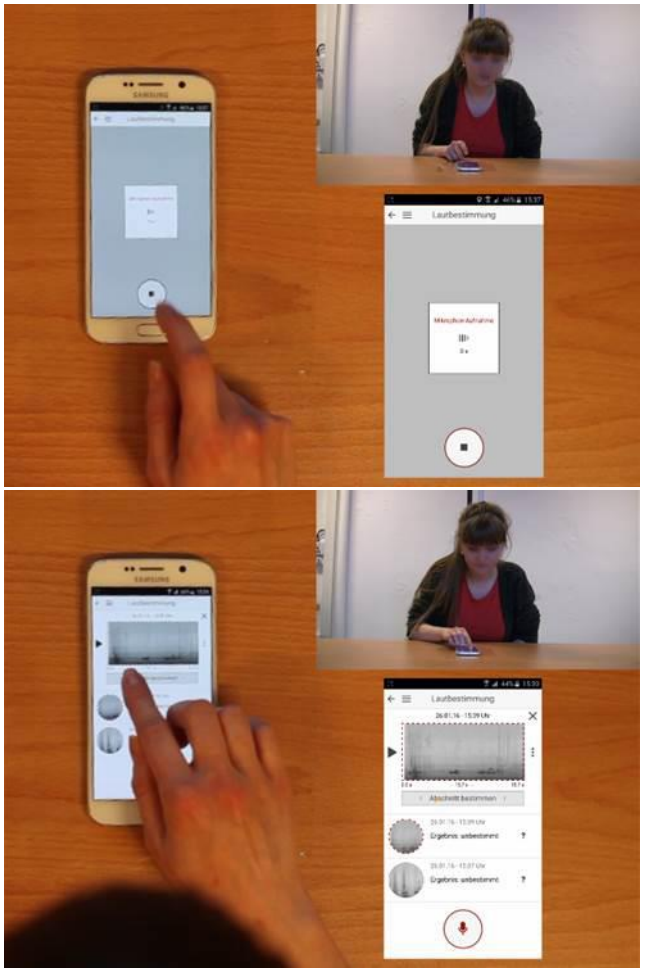

3. Ethical aspects

1. If you are planning a long-term project, you need to assess the need for a long-term sustainability strategy (that includes tech support communication, an appropriate resources over the life of the project) and put it into place if needed. Otherwise, do not even start!
2. Plan the lifetime of the project and the legacy of the project: does it have a natural ending point? (not just the end of funding, but an end to the research goal). Communicate that ending point throughout. If the project can continue beyond the end of funding, plan for longevity and sustainability, commit to on-going support or a hand-over. Data should be stored long-term and must therefore be planned for from the beginning.
3. Remove your app (from app stores or other online repositories) when it is no longer useful (and if you can't analyze or store the collected data).
4. Fully respect privacy of personal data. Take only as much personal data as required according to the objectives of the project, and delete personal data as soon as possible if they are not needed anymore in relation to project objectives.
5. Provide participants ways to decide about the privacy of their data.
6. Ensure that secure data transmission and storage are in place.
7. Particularly with regard to personal data, encryption is recommended, and only a minimum of App Rights Requests should be made on mobile devices.
8. Consider data privacy and intellectual property rights (IPR) that apply for your country or region, including also those at international level.
9. **Give transparent and easy to access information about the app and project. People should not need to download the app to find out what it does and how it relates to them.**
10. Include details about data protection, ethical use of data, and contact information within the app, and on the website or platform.

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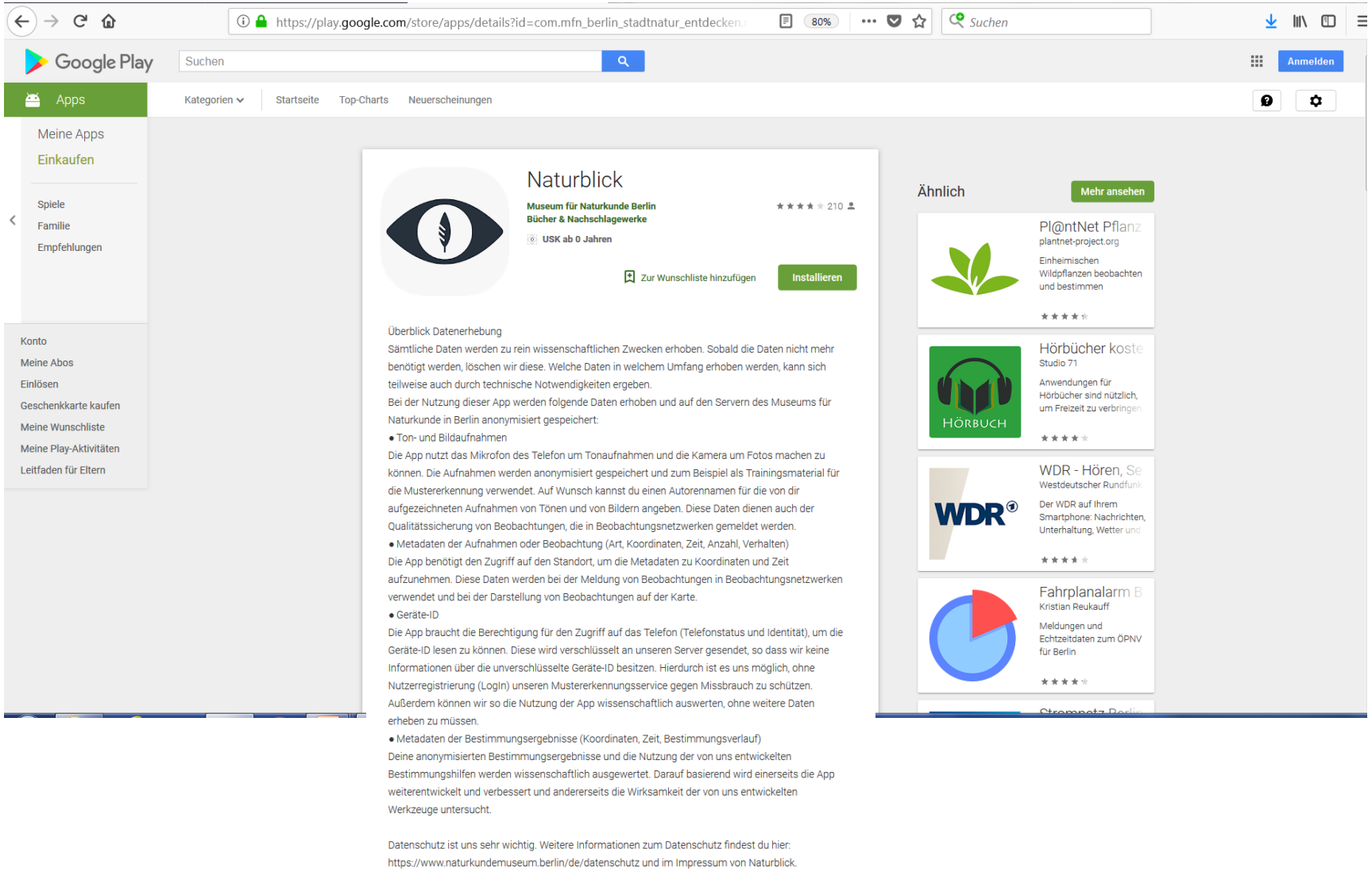

These recommendations are only that, recommendations.