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Photovoice and PPGIS as Methods to Create Open Educational Resources for Enriching School Atlas Maps – The Case of Lake Naivasha Region, Kenya

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ABSTRACT

Motivated by questions about how people perceive unfamiliar environments and how encounters with new places influence them, this article presents the results of a geography field trip with geography students from the University of Passau to Lake Naivasha in Kenya. The educational concept underlying this field trip combines the methods of photovoice and participatory mapping to create open data for enriching school atlas maps. Photovoice is a qualitative research method that uses photography as a medium to explore how individuals perceive and interpret places, with a particular focus on their subjective perspectives. In this case study, a map of Lake Naivasha from the Diercke World Atlas served as a starting point. The participating pre-service geography teachers were given three hours to answer geographical questions about Lake Naivasha by taking photographs. Afterwards, the results were critically discussed, and the students shared and compared the photos. For this purpose, the Public Participation Geographic Information System (PPGIS) tool PUBinPLAN was used. As a result, participants assumed the role of experts by investigating the unfamiliar region through their subjective impressions (photos), thereby developing a deeper understanding of the region. The photographs can also be made available as open data for use in school lessons and research to gain valuable insights into the students' spatial perception.

Der Artikel präsentiert Ergebnisse und Erkenntnisse einer konstruktivistischen Arbeitsphase während einer geographischen Exkursion an den Lake Naivasha (Kenia) mit Geographie-Lehramtsstudierenden der Universität Passau. Das zugrundeliegende exkursionsdidaktische Bildungskonzept basiert auf den Methoden der Reflexiven Fotografie (Photovoice) und dem Partizipativen Kartieren. Mittels dieser Zugänge haben die Studierenden den Raum erschlossen und dabei Daten in Form von Fotos und Beschreibungen generiert, die georeferenziert gesammelt und aufbereitet worden sind.
Reflexive Fotografie ist eine qualitative Forschungsmethode, die Fotografie als Medium nutzt, um subjektive Wahrnehmungen, Eindrücke und Interpretationen festzuhalten und zu reflektieren. Die teilnehmenden Lehramtsstudierenden hatten drei Stunden Zeit, um ihren geographischen Fragen nachzugehen. Als Ausgangspunkt für die Exkursion diente ein Kartenblatt des Diercke Weltatlas zum Lake Naivasha, wodurch die Reflexive Fotografie mit einer kritischen Reflexion von Karten verschränkt wurde. Dabei erfolgte eine kritische Diskussion der Ergebnisse, die die Studierenden zuvor digital hinterlegt hatten. Hierzu wurde PUBinPLAN, ein Public-Participation-Geographic- Information-System-(PPGIS-)Tool, verwendet. Die Teilnehmenden übernahmen dabei die Rolle von Expertinnen und Experten, indem sie die Region durch ihre subjektiven Eindrücke (Fotos) analysierten, um so ein vertieftes Verständnis der Region zu entwickeln. Die entstandenen

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Posts lassen sich als Open Data weiternutzen, um die Auseinandersetzung mit der Region Naivasha im Unterricht zu differenzieren.

KEYWORDS

Open Educational Resources (OER), Photovoice, Participatory Mapping, Open Data

Offene Bildungsressourcen, reflexive Fotografie, partizipatives Kartieren, offene Daten

1. Introduction

Current dynamics in the Naivasha region of Kenya are of considerable interest from geographical perspectives. The complexity and controversy of the region's development processes can be analysed using maps. Focusing on rose cultivation and monoculture in greenhouses, the Naivasha/Kenya case study has become a well-established topic in geography education in recent years.

The cultivation of roses in Kenya has developed dynamically over the past few decades. The boom began in the 1990s. Since then, the population of the city of Naivasha, the centre of rose cultivation in Kenya, has grown from around 30,000 to over 300,000 today; and approximately 90,000 jobs have been created in the cut flower industry (Styles 2019, 5). Up to 70 % of the employees are women (ibid.). In 2023, sales amounted to 430.2 tonnes (Kenya Export Promotion and Branding Agency, 2024). Fairtrade flower sales in Germany have also risen significantly in recent years. However, this is only partly due to increased demand. Price and appearance are often the only decisive criteria that influence the purchase of roses (Gemählich 2020, 31). Using the Naivasha region as a case study allows us to map and discuss the perspectives surrounding the rose industry and land use conflicts.

In addition to various teaching materials and exam questions, the topic has also found its way into school textbooks. The corresponding map in the new Diercke World Atlas[3] (Westermann 2023, 161.4) was also at the centre of the discussion. The topics presented in this map make it possible to explore the complexity and controversies surrounding regional development in Naivasha in greater depth. This is particularly successful because, in addition to the large-scale cultivation of cut flowers, the map also covers topics related to energy geography and tourism geography. The map from the Diercke World Atlas, freely accessible geodata such as OpenStreetMap and aerial photographs (Figure 1) were used to prepare the field trip to this region with teacher training students from the

[3] With the new edition of the Diercke World Atlas (2023), the map section has been changed (Map 161.4). While the 2015 edition showed the northeast shore of Lake Naivasha with the Flower Business Park in the centre, the new map focuses on the south shore (Figure 1, map 1).

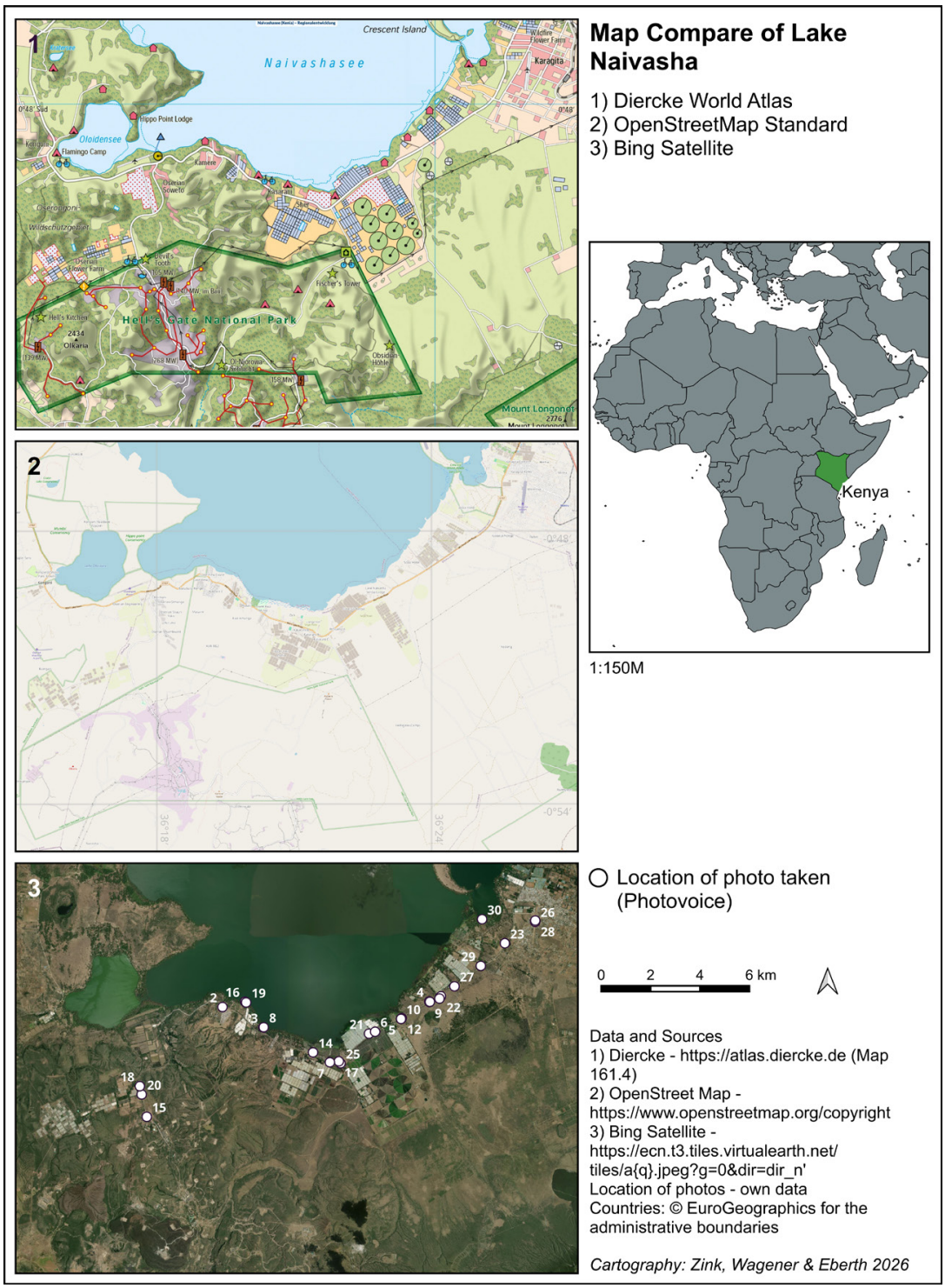

Figure 1: Map Compare of the south shore of Lake Naivasha (Kenya).

University of Passau. Once there, the students explored the region, documented their own impressions through photographs, compared the local situation with the maps, and examined the region's current challenges. While the primary focus was on teacher education and the research question of how students perceive space and place, this article also highlights the potential of creating Volunteered Geographic Information (VGI) and making it available as Open Data and Open Educational Resources (OER).

The study presented is the result of a cooperation between the Deggendorf Institute of Technology

(DIT) and the University of Passau (UP). Geography teacher training students at the UP worked with the PUBinPLAN application developed at the DIT during the geography field trip to Lake Naivasha in Kenya.

2. Case Study and Local Background

In Naivasha, flower farms have increasingly occupied large areas in recent decades, which causes changes along the South Lake Road. In many cases, these farms have restricted access to the lakeshore. Despite some improvements in social and environmental areas in recent years, fundamental problems remain. Lake Naivasha is one of only two freshwater lakes in the Great East African Rift Valley and is of enormous ecological importance as a wetland. Increasing water pollution and declining biodiversity are associated with the flower farms (Böhme et al. 2017, 70f.). The lake's endemic fauna is considered to be endangered (Hornetz & Teucher 2017, 84). The sustainability of water-intensive rose cultivation in a region prone to water scarcity remains a matter of debate.

This also applies to the corresponding land use in a country with a rapidly growing population (Eberth 2019) and a corresponding need for agricultural land for growing food (both food crops and cash crops). It remains a matter of debate whether such land should be used for non-food cash crops rather than food production. Some farms have since been abandoned. One example is the former Twiga Roses farm, which was owned by the Indian company Karuturi Group. The farm occupied large areas of land and was criticised for its working conditions and treatment of workers. This has left huge areas devastated and around 3,000 workers unemployed (Eberth 2020). This aspect is also marked with a corresponding symbol on the new map in the Diercke World Atlas.

From an economic geography perspective, Kenya can be characterized as a highly dynamic country. The Kenya Vision 2030 development programme sets out ambitious goals for the country's industrialisation. To achieve these goals, the expansion of electricity generation is an important prerequisite (Greiner and Klagge 2022). In addition to measures for decentralised power supply, which primarily target private households, large-scale and centralized projects also play an important role, as they enable a massive expansion of power generation capacities (ibid.). Besides investments in wind power, especially in the north of the country, Kenya's geothermal potential is being successfully harnessed on a large scale for power generation along the East African Rift Valley which provides excellent conditions for this form of energy production. The Olkaria geothermal power plants are located in the Lake Naivasha region.

Additionally, Kenya is undoubtedly a major tourist destination (Job 2017). Alongside well-known National Parks and reserves such as Amboseli, Masai Mara, and Samburu, Hell's Gate National Park is something special. Unlike other parks, it is not customary to go on safari in a jeep in Hell's Gate National Park, which is located south of Lake Naivasha. Here, visitors can explore the park on foot. Numerous bike rental stations in the immediate vicinity of the park rent out mountain bikes by the hour or day at reasonable rates.

This tourist highlight also explains why there are many restaurants, lodges, and campsites along the southern shore of Lake Naivasha. This aspect, which is marked on the new Naivasha map, makes it possible to discuss Kenya's importance as a tourist destination as well as variations of sustainable safari tourism, since here it is not only possible to do without a car, but necessary.

3. Field Trip Educational Concept

The concept presented here was developed for a field trip designed for pre-service geography teachers at the University of Passau. It consists of two modules arranged in a chronological order (see Figure 2).

The first module comprises the field trip itself, during which students collect their own geospatial data. As part of the didactic approach, students are assigned the following task directly on site:

a) Familiarise yourself with the map "Lake Naivasha (Kenya) Regional Development" and its legend in the Diercke World Atlas (2023; p. 161, map 4).

b) Identify three geographical aspects shown in the map section that are of particular interest to you. Formulate three corresponding geographical research questions based on these aspects.

Following this, students explore the region by bicycle for two hours, seeking answers to their own questions. Their task is to take photographs using their smartphone cameras with GPS enabled, uploading these images to an interactive web map, categorising them and providing textual descriptions. This activity combines the methods participatory mapping and photovoice. Data collection takes place within a digitally protected sandbox environment, which is only accessible to participants and project coordinators.

The second module involves the processing and publication of the collected data as an Open Educational Resource (OER). During a joint reflection session attended by the field trip leaders, the data were reviewed, supplemented, and prepared for publication. For this purpose, the previously protected interactive website has been made publicly accessible online, while the editing mode is disabled. The result is a static webpage that can be used for informational purposes, and which allows photos and their metadata to be downloaded. This data can then be used to enrich the "Lake Naivasha (Kenya) Regional Development" map in the Diercke World Atlas for use in geography lessons in German secondary schools. Additionally, the collected data can be shared and discussed with local stakeholders.

The structure of the educational concept is based on Eberth et al. (2025) and has been adapted for the field trip and the examination with the map in the Diercke World Atlas. The combination

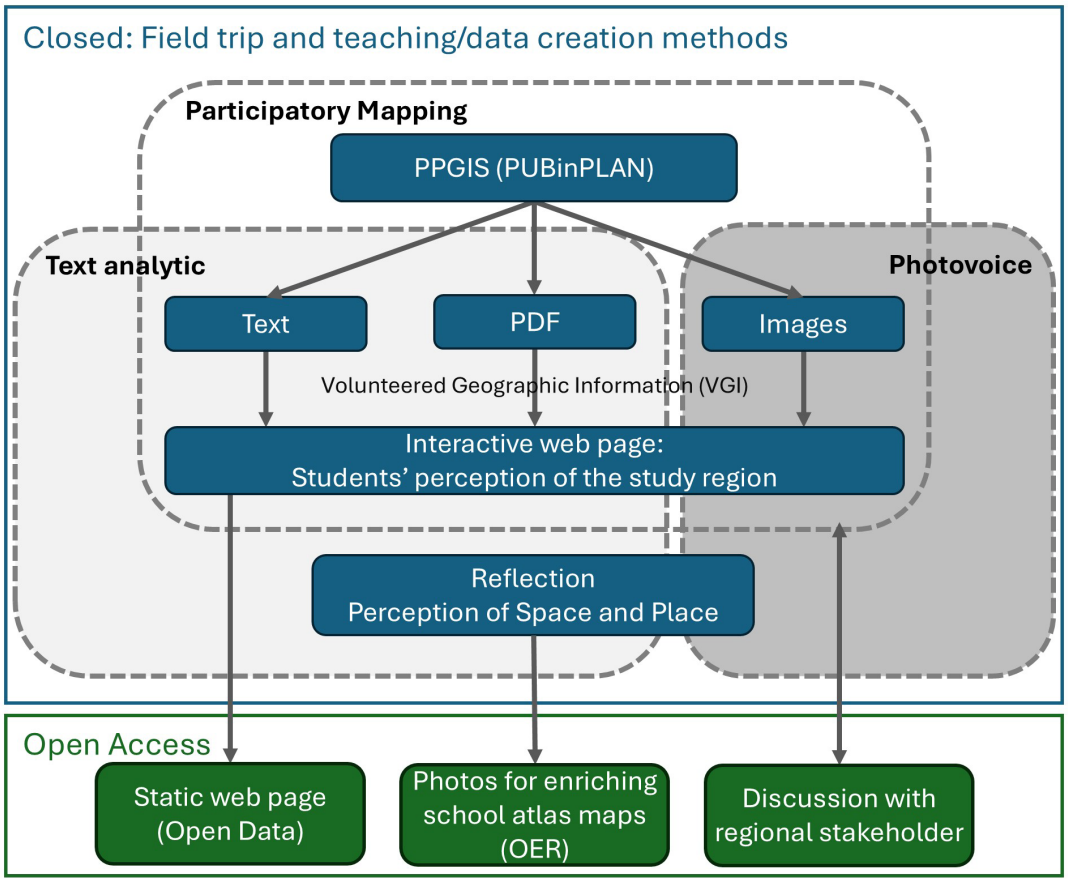

Figure 2: Concept of creating Open Data to enrich school atlas maps.

of participatory mapping and photovoice has already been established within the context of citizen science (Denwood et al. 2022; Soma et al., 2022). In addition to the inherently participatory nature of both methods, such projects often aim to make the collected data open access. Consequently, Creative Commons (CC) licensing is widely used in this regard.

4. Methods

In this case study, the methods Participatory Mapping (4.1) and Photovoice (4.2) were applied to capture participatory perspectives on spatial and social conditions. PPGIS facilitated the integration of local knowledge through map-based engagement, while Photovoice employed visual narratives to document the participants' subjective experiences. The following section briefly outlines both approaches and discusses their application within the research context.

4.1 Participatory Mapping

According to Malakar & Roy (2024), geospatial citizenship refers to the active and responsible engagement of individuals in understanding, utilising, and contributing to the geospatial environment. In this context, participatory mapping is an approach in which maps are created collaboratively with people who live in or are affected by a particular area. Although there are various terms used in the literature for digital platforms that adopt this approach – i.g. Geospatial Digital Participatory Platform (DPP) or Public Participatory Geographic Information System (PPGIS) which are discussed in terms of their strengths and weaknesses as well as the factors for success (Atzmanstorfer et al. 2025; Kahila-Tani 2019; Ramirez Aranda et al. 2023) – what all platforms have in common is that they offer users the opportunity to enter their own geodata on a map. These platforms are popular in regional and spatial planning, with widespread application, but also in education and school teaching and a focus on children (Ergler & Freeman 2020; Mansournia et al. 2024).

Currently, a large number of software tools for participatory mapping is available (Burnett 2023; Schmuderer et al. 2019). For the case study presented, PUBinPLAN was used. PUBinPLAN is based on the concepts of PPGIS (Zink et al. 2016; Küspert & Zink, 2017) and aims to foster transparency, inclusivity, and citizen involvement in spatial planning initiatives. Each project on the platform addresses a specific theme and geographic area, allowing participants to contribute georeferenced data – such as comments, photographs, and documents – via an interactive map interface. These geographically localised contributions can be liked, shared, and recommended, akin to social media interactions. All submissions undergo a structured moderation process to ensure adherence to platform standards. Because of its project-based design, PUBinPLAN can be used for various topics and user groups, including educational contexts in schools (Zink 2025) and universities (Eberth et al. 2025). The platform enhances the Photovoice method by enabling georeferenced photo contributions and facilitating peer comparison and discussion.

4.2 Photovoice

Photovoice uses photography as a medium to explore how individuals perceive and interpret places with the focus on the subjective perspective. The qualitative research method has now become established in both empirical social research (Rose 2016, 315; Eberth 2018) and geography teaching (Eberth et al. 2026; Eberth 2021) as a means of depicting subjective perceptions. "Photovoice is a method developed in particular by Carolyn Wang and Mary Anne Buries [...] and comes in part from a specific tradition of the Brazilian activist Paulo Freire. The point of action research is not just to study something, but to engage research participants and researches [and learners alike; author's note] in a process of social learning, analysis and empowerment, in the hope of eventually changing the social situation itself" (Rose 2016, 315).

Using Photovoice, learners take photographs of self-selected subjects with a specific guiding question in mind and then comment on the images, elaborating on the meaning of the subject.

5. Results from the Case Study Naivasha

In response to the local challenges described and the questions and tasks provided, the students took 30 photographs within the area covered by the map in the Diercke World Atlas. They had three hours to take photographs and used bicycles to explore the study area. The photographs were assigned to various categories: agriculture, tourism, energy

geography, infrastructure, and sustainability. Each image posted on PUBinPLAN includes a title, a description, and metadata specifying the location and time of capture.

A selection of these images and their associated metadata for four different categories is exemplarily presented in Figure 3. Entry 6 focuses on agriculture and outlines the advantages and disadvantages of Fairtrade



Number: 6 Titel: Cultivation of roses
Category: **Agriculture** Date: 19 February 2025, 12:05 p.m.
Coordinates: 36.37527569012699757 -0.82710621320484001 (EPSG 4326)
Description: *Cultivation of Fairtrade roses*
Advantages:
- *Higher wages for employees compared to normal rose plantations (as Fairtrade enables higher wages)*
- *Higher safety measures*
- *More moderate working hours*
- *Meals provided by the employer*

Disadvantages:
- *Break times (only one break per day)*
- *Only minimum Fairtrade requirements are met*
- *No equal pay for women and men (...)* (translated with DeepL.com (free version))

Number: 21 Titel: Staff transportation
Category: **Infrastructure** Date: 19 February 2025, 2:46 p.m.
Coordinates:36.37303812854599983 -0.82779705052245001 (EPSG 4326)
Description: *busses parking next to the flower farms without drivers waiting for the staff in order to transport them home from rose plantations* (original)





Number: 24 Titel: Water Pump
Category: **Energy Geography** Date: 19 February 2025, 2:46 p.m.
Coordinates: 36.39909401860099791 -0.81439201778707004 (EPSG 4326)
Description: *water pump with estimated 100 meters depth -> assumed clean water for students (wish to be also powered by solar panels but too expansive)* (original)

Number: 30 Titel: Safari tourism at Lake Naivasha
Category: **Tourism** Date: 19 February 2025, 2:46 p.m.
Coordinates: 36.41423129283099769 -0.78593261330828001 (EPSG 4326)
Description: *When visiting the Crescent Island wildlife reserve, we turned off Moi South Lake Road just before the city centre onto a dirt road leading to the island. Our goal was to visit the island. However, the road to the island marked on our maps no longer existed. Crescent Island was only formed by the rise in water levels. This rise in Lake Naivasha is due to unusually heavy rainfall in the Aberdare Mountains caused by climate change. Before that, it was a peninsula with a marked road. Through conversations with two locals, including a local guide, we learned about the background of the sanctuary. Originally, there were far fewer large animal species in the area. (...) (*translated with DeepL.com (free version))



Figure 3: Examples of photos taken and their meta information.

certification as experienced by the participants on site. What is particularly noteworthy is that the post emphasises shortcomings related to working conditions – an issue that receives limited attention in European debates on Fairtrade. Fairtrade certification in the flower industry differs from certification schemes in sectors such as tea, cocoa, and coffee, where market access for small-scale farmers and the payment of minimum prices that are as constant as possible are important measures. Fairtrade-certified flowers, on the other hand, are usually traded and sold at the same conditions and prices as conventional flowers. Consequently, producers do not receive a price premium for their flowers. Instead, 10 % of the trading price can be used by a committee of workers for social and environmental issues (Gemählich 2020, 33).

Entry 21 addresses the transport infrastructure along South Lake Road. The accompanying photograph shows the buses which are used to transport workers home after their shifts. This company-provided transport system reflects the highly centralised organisation of production processes, yet it remains invisible on the map. The example illustrates how photographs can reveal everyday infrastructures and organisational arrangements that conventional

maps do not capture.

A similar observation can be made for Entry 24, which was assigned to the theme of energy geography. While the map only depicts the geothermal power plants and the major electricity transmission lines, the photograph and the students' comments highlight local-scale challenges. Although it is located only a short distance from facilities that generate substantial amounts of geothermal electricity, the water pump shown in the photo has no access to renewable energy. Such observations can stimulate critical reflection on power relations, unequal access to basic infrastructure, and the contrast between top-down development projects and local, bottom-up perspectives.

Entry 30 further demonstrates that maps do not always represent current conditions. The contrast between the map and the photograph is illustrated by a post entitled Safari tourism at Lake Naivasha, which states: "However, the road to the island marked on our maps no longer existed. Crescent Island was only formed by the rise in water levels. This rise in Lake Naivasha is due to unusually heavy rainfall in the Aberdare Mountains caused by climate change. Before that, it was a peninsula with a marked road" (see Figure 3). Here it becomes obvious that the photographs not only enrich the maps by providing additional information, but also help to verify, correct, and update the cartographic representations. Due to climate change, the lakeside changed significantly in the last years. Taken together, the entries show how photographs can complement static atlas maps and help geography students develop a deeper understanding of the Lake Naivasha region and reflexive cartography. Challenges related to tourism and energy, which are often described in abstract terms, become more tangible through the map on the one hand and, more importantly, through the geographically precise images on the other hand.

Consequently, the integration of photographs into classroom instruction contributes to the development of a critical understanding of maps. Atlas maps represent only a snapshot in time, whereas the environment is subject to dynamic change. Although photographs are also momentary, they can stimulate comparison and reflection (Eberth et al. 2025). A similar effect can be achieved by shifting from a bird's-eye view – such as satellite imagery provided by Google Maps or Microsoft Bing – to a ground-level perspective. Our approach partially mirrors functionalities found in Google Maps or Bing Maps, where user-generated images can be displayed. However, while those images also contain spatial and temporal metadata, they often lack descriptive context and a clearly defined purpose or task orientation. By categorising the images into thematic areas, the resulting educational material gains a focused content structure and can be purposefully integrated into teaching.

Both the photographs and the accompanying web page, including the interactive map, are made accessible via PUBinPLAN (https://pubinplan.th-deg.de/ex-kenia) after the field trip, following a critical reflection and review by the instructors. Reflection played a central role throughout the whole process and has taken place on at least three levels: At the level of disciplinary reflection (Level 1), students commented on each other's posts regarding geography concepts and theories and subsequently discussed their observations in a plenary session. They then engaged in a second level of reflection by critically reflecting on their personal perspectives, the emotions they experienced while conducting the fieldwork, and the ways in which their perspectives changed during the project. Post-colonial perspectives also featured prominently in these discussions (Level 2). Students recognised that it is impossible to completely set aside the European lens through which they perceive and interpret the local context. Consequently, one of the key conclusions of the discussions was that engaging with a wide range of local stakeholders during the exercise was essential for broadening and challenging their own perspectives. Finally, at the third level, students adopted a meta-reflective perspective on the exercise (Level 3). They critically considered which insights the exercise had made possible, as well as the limitations of the knowledge gained and the perspectives that remained inaccessible. This critical review process is also the reason why the project initially takes place in a protected digital environment and is only released afterward.

In summary, a curated set of annotated photographs for the Lake Naivasha region is supposed to be developed as OER. These 30 images could be used as freely accessible teaching and learning materials to complement and enhance the map in the Diercke World Atlas. The collected data thus contribute to both Open Education and Open Science and will be also

published at the University of Passau's OER-Hub which is an infrastructure provided by the local community of practice, which is working in Education for Sustainable Development and OER, coordinated by the project "moreBNE – Making Open Resources in Teacher Training" funded by the Federal Ministry of Research, Technology, and Space (BMFTR; https://www.uni-passau.de/morebne).

6. Discussion

From a postcolonial perspective, the potential and limitations of the approach must be critically examined, particularly regarding how it has been implemented to date. Although the project has broadened the range of perspectives on the mapped area and encouraged reflection on individual spatial perceptions, these are primarily the perspectives of white students from Germany. The perspectives of local people were not explicitly and continuously integrated, as they were not involved in the design of the exercise. Moreover, the digital tool itself was developed in Europe. Although students engaged with local people during the fieldwork, these interactions were initiated by the students and primarily took the form of interviews. This was only done to a limited extent by some students who had asked local people about their geographical interests.

Nevertheless, the methodological approach chosen here offers, in principle, a very good opportunity for cooperation with the local society, for example. The exercise could be modified slightly so that residents can transparently express their perspectives on current needs and regional development projects. Prepared as open data, this could also provide an opportunity for a broader participation process, involving residents in specific processes of spatial planning.

The case study presented used a map of Lake Naivasha from the Diercke World Atlas as a starting point. The study region was defined according to this map section. However, the methodology presented is not limited to this area, but can in principle be applied to other regions, other scales and other topics. To teach spatial understanding, it can also be helpful to integrate additional map representations or satellite images, as exemplified in Figure 1 with the Bing Satellite service. This allows other open data sets to be integrated and analysed. The results indicate that the combination of Photovoice and PPGIS enables an intensive and open exploration of (foreign) regions in short time. Participants take on the role of experts, and their photographs place subjective impressions at the centre of the process. These contributions provide researchers with valuable insights into spatial perception. On the other hand, both atlas maps and school geography lessons benefit from this additional resource.

7. Conclusion

This case study demonstrates the potential of combining Photovoice and PPGIS to create OER that complement existing school atlas maps. By collecting and reflecting on their own georeferenced photographs of the Lake Naivasha region, students were able to explore it from their own perspectives and critically engage with the spatial representations provided by the atlas map. In summary, three results can be highlighted:

First, the project highlights the importance of critically reflecting on which perspectives are represented in participatory mapping processes. While this approach allows learners to play an active role in producing knowledge, the new perspectives are predominantly those of German teacher training students. Future projects should therefore aim to involve local stakeholders more systematically in the creation and interpretation of geospatial data to truly enrich learning materials with local perspectives. Therefore, future field research projects are planned to be developed and conducted in cooperation with local organisations, thereby enabling the co-production of knowledge that benefits all participants involved.

Second, the results suggest that combining Photovoice and PPGIS is valuable for geography education, especially for developing a critical understanding of maps, spatial perceptions and regional development processes. Transforming learners from passive map users into active contributors of geospatial knowledge can foster reflexive and participatory geographical learning.

Thirdly, by making the results available as OER, geography teachers can integrate the materials into their lessons, enabling them both to critically examine existing school atlas maps (e.g. Diercke World Atlas) and to explore the topic and the region in depth with their pupils.

References

Atzmanstorfer, K., Bartling, M., Haltofová, B., Zurita-Arthos, L., Grubinger-Preiner, J., & Eitzinger, A. (2025). Critical Success Factors of Participatory Community Planning with Geospatial Digital Participatory Platforms. ISPRS Int. J. Geo-Inf. 2025, 14, 153. https://doi.org/10.3390/ijgi14040153.

Böhme, B., Becker, M., Diekkrüger, B., & Förch, G. (2017). Zur Bedeutung von Feuchtgebieten. In: Eberth, A., & Kaiser, A. (Ed.). Ostafrika. Geographie, Geschichte, Wirtschaft, Politik. Darmstadt, p. 68–72.

Burnett, C. M. (Ed.) (2023). Evaluating Participatory Mapping Software. Springer International Publishing. https://doi.org/10.1007/978-3-031-19594-5.

Denwood, T., Huck, J. J., & Lindley, S. (2022). Participatory Mapping: A Systematic Review and Open Science Framework for Future Research. Annals of the American Association of Geographers, 112(8), p. 2324–2343. https://doi.org/10.1080/24694452.2022.2065964.

Eberth, A. (2018). Raumwahrnehmungen reflektieren und visualisieren. Erforschung sozialer Räume mittels reflexiver Fotografie. In: Wintzer, J. (Ed.). Sozialraum erforschen. Qualitative Methoden in der Geographie. Springer, Berlin, p. 279-295. https://doi.org/10.1007/978-3-662-56277-2_18.

Eberth, A. (2019). Kenias Bevölkerung ist jung. Jugendliche als Akteure einer erstarkenden Zivilgesellschaft in Ostafrika. Praxis Geographie 49, 2019 H. 5, p. 30–36.

Eberth, A. (2020). Racist Roses? – Ein kritischer Kommentar aus postkolonialer Perspektive zur Rosenzucht in Kenia. OpenSpaces – Zeitschrift für Didaktiken der Geographie, H. 2/2020, p. 42–50.

Eberth, A. (2021). Teaching about Space and Place – Everyday Geographies of Young People living in the Slums of Nairobi, Kenya. In: Fargher, M., Mitchell, D., & Till, E. (Ed.). Recontextualising Geography in Education. International Perspectives on Geographical Education, p. 146-165.

Eberth, A., Wagener, J., Schürzinger, S., & Haase, C. (2026). Bilder befragen. In: Schuler, S., Hoffmann, K. W., & Eberth, A. (Ed.). Denken lernen mit Geographie. Diercke Methoden 1, p. 78-98.

Eberth, A; Wagener, J; Zink, R. (2025): Digital Participation Platforms as Tools for Critically Reflexive Mapping in Geography Education: Insights from a Project with Teacher Training Students. KN - Journal of Cartography and Geographic Information. DOI: https://doi.org/10.1007/s42489-025-00201-4.

Ergler, Ch. R., & Freeman, C. (2020). Children, Maps, and Mapping. International Encyclopedia of Human Geography (Second Edition), Elsevier, p. 155-165. https://doi.org/10.1016/B978-0-08-102295-5.10522-0.

Gemählich, A. (2020). Alle Macht den Supermärkten? Fairtrade als Kontrollinstrument im globalen Schnittblumenhandel. Geographische Rundschau 72, 2020 H. 1/2, p. 30–36.

Greiner, C., & Klagge, B. (2021). Elektrifizierung und Großprojekte der Stromerzeugung in Kenia. In: Becker, S., Klagge, B., & Naumann, M. (Ed.). Energiegeographie. Stuttgart, p. 287–300.

Hoffmann, K. W., & Eberth, A. (2024). Regionalentwicklung am Naivashasee in Kenia. Praxis Geographie, H. 3/2024, p. 42–51.

Hornetz, B., & Teucher, M. (2017). Agrarwirtschaften Ostafrikas. In: Eberth, A., & Kaiser, A. (Ed.): Ostafrika. WBG-Länderkunden. Wissenschaftliche Buchgesellschaft, p. 74–96.

Job, H. (2017). Kenia als touristische Destination. In: Eberth, A., & Kaiser, A. (Ed.): Ostafrika. WBG-Länderkunden. Wissenschaftliche Buchgesellschaft, p. 126-142.

Kenya Export Promotion and Branding Agency (2024). Horticulture Sector in Kenya. https://makeitkenya.go.ke/about-keproba/news-room/latest-news/horticulture-sector-in-kenya, October 28, 2026.

Kahila-Tani, M., Kytta, M., & Geertman, S. (2019). Does mapping improve public participation? Exploring the pros and cons of using public participation GIS in urban planning practices. Landsc. Urban Plan, 186, p. 45–55. https://doi.org/10.1016/j.landurbplan.2019.02.019.

Küspert S., & Zink R. (2017). Concept of a Digital Communication Platform to Increase the Citizens' Interest in Spatial Planning. Journal of Digital Landscape Architecture (JoDLA), p. 136-143. https://doi.org/10.14627/537629014.

Mansournia, S., Sijtsma, F. J., Freeman, C., Ergler, C., Naqshbandi, R., Pirzadeh, A., Niekerk, F., & Ch, O. V. (2024). From fun to function: PPGIS unlocks the power of play in cities. Applied Geography, 166, 103246. https://doi.org/10.1016/j.apgeog.2024.103246.

Malakar, K. D., & Roy, S. (2024). Introduction to Geospatial Citizenship. In: Mapping Geospatial Citizenship. SpringerBriefs in GIS. Springer. https://doi.org/10.1007/978-3-031-63107-8_1.

Ramirez Aranda, N., De Waegemaeker, J., & Van De Weghe, N. (2023). The evolution of public participation GIS (PPGIS) barriers in spatial planning practice. Applied Geography, 155, 102940. https://doi.org/10.1016/j.apgeog.2023.102940.

Rose, G. (2016). Visual Methodologies. An Introduction to Researching with Visual Materials. Sage, London.

Schmuderer, S.; Zink, R.; Gamerith, W. (2019): Citizen Participation via Digital Maps: A Comparison of Current Applications. GI Forum - Journal of Geographic Information Science 7 (2), 34–46. https://doi.org/10.1553/giscience2019_02_s34.

Soma, T., Li, B., & Shulman, T. (2022). A Citizen Science and Photovoice Approach to Food Asset Mapping and Food System Planning. Journal of Planning Education and Research. 44(3), p. 1503-1515. https://doi.org/10.1177/0739456X221088985.

Styles, M. A. (2019). Roses from Kenya. Labor, Environment and the Global Trade in Cut Flowers. Washington DC.

Westermann (2023). Diercke Weltatlas. Braunschweig. Westermann.

Zink, R. (2025): Digitale Partizipationsprojekte im Klassenzimmer, in: Eberth, A., & Scheffer, J. (Ed.). Geographische Bildung im Zeitalter der Digitalität. Passauer Kontaktstudium Geographie. Passau.

Zink, R., Küspert, S., Haselberger, J., Marquardt, A., & Schröck, S. (2016). Interaktives GIS-Framework für partizipative Raumplanungsverfahren. In: Strobl, J., Zagel, B., Griesebner, G., & Blaschke, T. (Ed.). AGIT 2-2016 – Journal für Angewandte Geoinformatik: Beiträge zum 28. AGIT-Symposium Salzburg, p. 488–497. https://doi.org/10.14627/537622065