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Developing teaching/learning materials on "Sense of Place" with students in an international university cooperation: overall approach and first phase outcomes at Karlsruhe University of Applied Sciences

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Abstract: The 'Cognitive Geomatics' project is a cooperation between the Karlsruhe University of Applied Sciences (Germany), the University of Pretoria (South Africa) and the University of Nairobi (Kenya). It builds on an earlier geo(infor)matics-focussed cooperation between the first two universities, which is expanded to a third country and to be interdisciplinary in nature through participation of lecturers and students from the social sciences and culture media management. The aim is to jointly develop digital teaching and learning resources related to sense of place, which can be used in blended learning at each university. We aim to learn with and from each other, and to create awareness of cultural differences when using geomatics methods. The adopted approach is one of working together with students on the conceptualization, development and completion of the resources. The project has three phases, each led by a different university, and with a different focus on teaching sense of place. In this paper, the results of the first phase led by the German university are shared. Students developed four digital teaching/learning resources for training awareness of space, making use of web mapping technologies and Sustainable Development Goals data. During a project workshop, the students presented the resources to project team members, who provided feedback and proposed ideas for further work together with students.

Keywords: blended learning tools, educational material codesign, thick-client web mapping, SDG indicator data, thematic maps

1. Introduction

The rapid development of information and communication technology together with the processing options in the so-called 'cloud' are leading to proliferation in data (Hashem et al., 2015). Future use and analysis of the location-based aspect of these big data is expected to lead to a boom in geo(infor)matics (Karimi, 2014). Due to the current democratization of data and tools, these methods will more often be used by those who are not geomatics specialists (e.g. Koch, 2021). At the same time, it is becoming increasingly clear that the mere positioning of objects based on geographic coordinates does not do justice to the subjective experiences of space and the world around us. The debate of 'space' versus 'place' is not new (Tuan, 1977), but has recently gained more momentum (see the PLATIAL'X symposia since 2018, https://platialscience.net/). Spatial perception includes our habits of thought and reflections about the relationship between people and the environment. Whereas awareness of space is considered to be a requirement for one's orientation in action space. This 'sense of place', however, differs from one culture to another and is closely linked to locality and authenticity (Schenkel, 1993).

In March 2022 we started a new project on "Cognitive Geomatics – Digital Teaching to Create Awareness of Intercultural Differences in Sense of Place using Germany, South Africa and Kenya as case studies" (https://www.imm.hs-karlsruhe.de/gvisr/project/cognitive-geomatics.

html). It is part of the Baden-Württemberg-STIPENDIUM for University Students – BWS plus, a programme of the Baden-Württemberg Stiftung (https://www.bw-stipendium.de/en/scholarships/bws-plus). Our interest is linked to questions arising from the nature of the interplay between the way we think about and perceive physical space (our mental maps) and the use of high-tech methods for measuring, analyzing and visualizing our environment (in the virtual world), thus contributing to what can be described as cognitive geomatics. Here, the respective cultural differences in teaching and learning matter and require reflection.

2. Background

Cognitive maps have their basis in the mental knowledge store and are information constructs to handle spatial relations and environmental data, which enables us to operate in space and to process geographical data (Kitchin, 1994). Often, also the term mental map is used, but it can refer to just any mental representation or model (Gibbson, 2019). Ethnographic studies of spatial cognition revealed that humans generate maps in the course of conversation, i.e. only temporarily. In cultures which became saturated with maps, a shift from such tools for thought to those for the hand or eye meant that the mental representation of spatial configuration became a by-product of the interaction with and reflection over a map (Heft, 2013). Therefore, the knowledge domain, the geographic domain and the space represented cartographically are related (Celentano & Pittarello, 2012). Here, over time, maps changed from mute displays to digital interactive and proactive tools for meeting the evolving information and social interaction needs of the users (ibid.).

Lynch (1960), as well as Gould & White (1993), asked people to freely draw map sketches on what dwelled in their minds. These mental maps, expressed as graphical articulations of conceptual space (Götz & Holmén, 2018), offered insights into spatial conditions linked to the perception of the current situation or to people's desires. Mental representations of space are strongly linked to one's lifestyle, existence and self-awareness, this individually formed or as socio-cognitive constructs generalized of diverse mental representations (Zelianskaia et al., 2020). Cultural differences arise through the grouping of individuals and their collective actions (Heft, 2013). As studies have shown, our thinking is influenced by historical and cultural context and the resources being available in an environment (Zhang et al., 2022). Zhang et al. found a significant positive correlation between geospatial thinking and sense of place. This sense of place is more than just a specific location, its inherent characteristics and geographic context. It also includes the complex connections people have with the place, in other words the perception of the environment (Zhang et al., 2022). It is important to note, that 'place' per se is dimensionless and can apply to any spatial scale (Shamai, 1991). Here, place-specific culture and experience matter (Williams, 2014), leading to variations in feelings, attitudes and behaviour towards a place. Therefore, location, a spatial property (Montello, 2001), is not sufficient for creating a sense of place (Shamai, 1991). Cognition of space and place both express human-environment relations (Montello, 2001). Thus, cognitive map development stimulating spatial thinking (cp. Castellar & Juliasz, 2018) is therefore considered fundamental in teaching (Kitchin, 1994). The aim of our project is to develop teaching/learning materials that can facilitate and support teaching different geospatial aspects of sense of place across educational and cultural settings.

Not allowing for the usual classroom environments, the COVID-19 pandemic led to emergency online learning (Finley et al., 2022). As the changes were neither carefully planned nor carried out voluntarily, and as the teaching staff did not have adequate resources (like support personnel) or time to develop adaptation strategies, emergency remote teaching (ERT) seems to be the better term for this significant but likely only temporary shift of instructional delivery (Iglesias-Pradas et al., 2021). It describes the phenomenon well, when teachers and students were suddenly forced to switch from traditional classroom teaching to full-time teaching online (Ringer & Kreitz-Sandberg, 2022). According to Iglesias-Pradas et al. (2021) the pandemic led to a wake-up call in higher education to integrate digital technologies into educational processes. However, the exceptional experiences also revealed that students encountered difficulties with regard to learning from each other during ERT (Ringer & Kreitz-Sandberg, 2022). As compared to a fully virtual learning approach, students reported significantly higher satisfaction scores for blended learning (Finley et al., 2022).

The web-based opportunities supported by information and communication technology (ICT) with their evolving interaction spaces required new strategies for an effective teaching and learning (Balram & Dragićević, 2008). Blended learning (BL) covers all technically supported learning environments except those of pure online learning and classroom instruction only, with commonly about 30 to 80% of the content being delivered online (Müller & Mildenberger, 2021). Here, the question of the optimum balance, i.e. the 'right blend' arises (Hockly, 2018), this for in particular supporting interaction, context, and remedial education which are considered limiting factors of the pure e-learning approach (Vo et al., 2017).

In BL settings, the mix of discourse in the classroom and visual media tools in the electronic environment fosters knowledge construction and reinforcement (Balram & Dragićević, 2008) and motivates critical thinking skills

(Tayebinik & Puteh, 2012). Here, the computer-based interactive learning environments "may have positive effects on knowledge gain, skill acquisition and student perception" (Müller & Mildenberger, 2021, p. 2). As compared to traditional face-to-face classroom learning, Vo et al. (2017) found that in higher education BL is significantly associated with greater learning performance of the STEM-disciplined students. The authors attribute it to the particular importance of discourse learning (involving brainstorming, deliberating, validation of perspectives/solutions) in the non-STEM disciplines. While in a similar study, Müller & Mildenberger (2021) concluded that there is no fundamentally superior teaching format across the disciplines. Instead, it is contextual with the effectiveness largely depending on implementation. Hockly (2018) adds that cultural considerations should be taken into consideration when implementing BL.

As education is a social practice (Finley et al., 2022) and learning a social activity (Ringer & Kreitz-Sandberg, 2022), perceived social presence may involve higher motivation levels (Ribosa & Duran, 2022). Consistent social interactions facilitate successful learning (Finley et al., 2022). One of the benefits of synchronous instruction, and thus of BL over online-learning, is that it provides sense of community (Tayebinik & Puteh, 2012, Lapitan et al., 2021). Note also, not every digital native is also a digital learner (Iglesias-Pradas et al., 2021). As shown by Obermeier et al. (2022), students feeling socially isolated and with lower digital readiness are more susceptible to stress and lower levels of enjoyment. The above provides useful guidance for planning and designing teaching/learning materials. It also supports our preference for blended learning, particularly after our own personal teaching experiences during the COVID-19 pandemic.

According to Ribosa & Duran (2022, p. 1) "the creation of digital materials by students is one of the least frequent uses of media in education". A learning-by-teaching approach can cover knowledge-telling as well as knowledge-building, where students learn by presenting and by explaining, and thus contribute to the learning of fellow students as content creators (ibid). Their study, based on a meta-analysis, encourages to particularly ask students for creating audio-visual and interactive visual teaching materials. But also, the instructors can learn from students' work. In this regard, Burton (2013) complained the missing shift from science being taught as a rigid body of knowledge to a way of knowing, which can be assessed by the students' cognitive change, their intellectual growth or knowledge building. Tomej et al. (2022) conclude, that collaborative redesign with, not for others is of highest importance when transitioning higher education to successful blended teaching and learning. To this end, the students are taking centre stage in the development of the blended learning tools in our project.

3. BWS plus project "Cognitive Geomatics"

With a first BWS plus project on "Geomatics & Participation" (2015 - 2018, extended to 2020, https://www.imm.hs-karlsruhe.de/gvisr/project/geomatics-and-participation.html) a cooperation between Karlsruhe University of Applied Sciences (HKA, Germany) and the University of Pretoria (UP, South Africa) was established (Schaab et al., 2018). Currently the network is expanded to the University of Nairobi (UoN, Kenya), another university with a strong geo(infor)matics education. We are also widening the thematic discourse to be of a more interdisciplinary nature by including exchange with students in the Social Sciences and in Culture Media Management. The new challenge is the joint development of digital teaching and learning resources (for BL) together with students. Our approach aims to learn with and from each other, which will, despite physical distances, lead to a portfolio of teaching and learning resources that can be used jointly at the three university sites. This is with the goal to, amongst others, create awareness of cultural differences when using geomatics methods.

Learning with and from each other in the development of digital teaching materials will provide building blocks for BL at the three universities. The approach is based on working together with students on the conceptualization, development and completion of the materials with the involvement of both target groups – lecturers and students. We chose to follow a phased approach, where the three universities take turns with leading, each being responsible for a different sub-topic (Fig. 1).

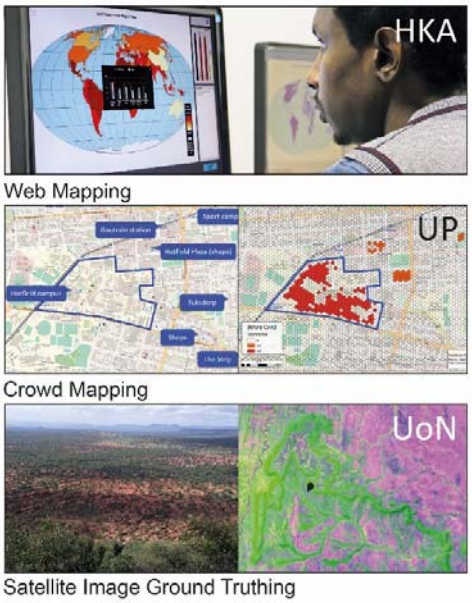

Fig. 1: Topics covered in the three-phased approach within the Cognitive Geomatics project

The theme of the first phase, "Sense of Place – Web Mapping", focuses on mental maps at different spatial scales

versus the visualization of spatial statistical data for different cartographic scales via web mapping technologies (cp. Celentano & Pittarello, 2012). After that, UP takes the lead with a thematic focus on "Sense of Place – Crowd Mapping". The activity space of people will be illuminated, on the one hand through their own imagination but also visualized by using available geodata and thus in a wider spatial context (cp. Montello, 2001). By developing easy-to-use crowd mapping tools, the participation and involvement also of larger groups of people, this at specific locations and online, will become possible. The last theme "Sense of Place – Satellite Image Ground Truthing" revolves around multispectral satellite sensors which scan the environment in different spatial and spectral resolutions. Understanding the interaction (reflection – object dimension – pixel resolution) is required for a meaningful interpretation of satellite images and/or digital image classification. Juxtaposition of ground truth, such as photos from the extremely diverse peri-urban zone, and image composites of different sensors can contribute towards training mental images and thus sense of place (cp. Edwards, 1991).

The development of digital teaching resources will happen for the entire duration of the project. Due to a delayed start, the work on the web mapping-based BL-tools had already started as a semester project at HKA, while a presence workshop (two days) with the active participation of the two partner universities was anticipated to serve as the actual project kick-off. Here, the stage reached so far was presented and critically reflected. To ensure that we reached an advanced stage by the end of the subsequent semester, by deploying student assistants, regular virtual feedback sessions with the partner universities (project management and selected students as assistants) were planned. The aim was to ensure that the materials developed could be used at all three universities taking cognizant of the cultural contexts.

Half a year into the project, UP took the lead with the initial plan to follow a similar approach (workshop, semester project and active support through participants of all three partner universities). For September 2023, a large, joint summer school, hosted at HKA over seven days, is planned for 24 participants from the three participating universities. The summer school will also facilitate the integration of the new project partner from Kenya into the network: apart from the active testing of the teaching building blocks developed by then, which will lead to ideas for further enhancements as well as further sample data sets, the third workshop on the last theme will also take place at the same time. Thus, we hope to inspire and motivate the new project partner, UoN, for their leadership in the second part of the project and after concluding the actual project highlight, the summer school. While UoN on their return will further develop their theme based on methods tried and tested for the other two modules, the remaining project runtime will also be used to prepare the final versions and to make all teaching materials available to the three participating universities with sample data from Germany, South Africa and / or Kenya.

4. Tool development at HKA: "Sense of Place – Web Mapping"

The work on BL tools started as a semester project at HKA in the winter semester 2021/22, i.e. ahead of the official start of the project. The plan had been to ask students to intensify their experience in open source client-side web mapping technologies (contrary to proprietary server-side or cloud-based technologies), using amongst others HTML5, JavaScript, and cartographic libraries (cp. Roth et al., 2014), but this time aiming at interactive dynamic thematic maps built from statistical data linked to SDG indicators (Kraak et al., 2018). At the same time, students were to engage with the concept of blended learning for developing tools which support the mutual cross-fertilisation of spatial imaginations (i.e. mental maps due to subjective perception) and supposedly objective map representations. Here, the idea was to address sense of place arising from awareness of space via fostering map reading/interpretation skills and promoting human agency (cp. Kitchin, 1996) through reflective discourse.

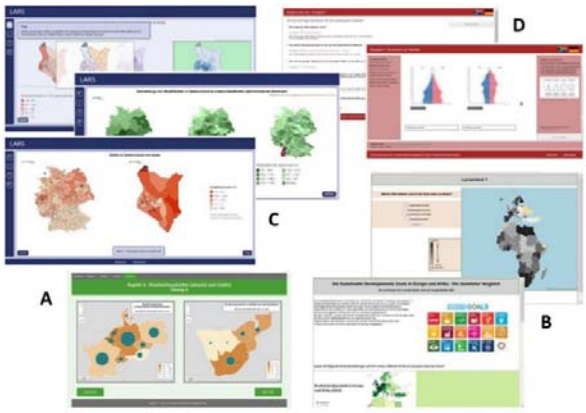

Fig. 2: Collage of screenshots taken of four blended learning tools developed by HKA students in winter semester 2021/22 to train awareness of space

4.1. Course work setup

Within the Bachelor programme on Geo-Information Management ('environment' track), the 7th semester includes one last module, the second of two project modules, before the students start their Bachelor thesis. Teaching load covers two contact sessions (à 90 min) per week, condensed into the first half of the semester, resulting in two meetings per week, each three hours long. The course was split into three parts. During part 1, the students had to individually engage with the SDGs and their indicators and search and evaluate existing SDG

maps (e.g. Kraak et al., 2020; Pirlea et al., 2020). Part 2 (achieved in groups of two or three) covered the tasks of i) looking for statistical data on SDG indicators of their choice but for different scales and two countries (Germany vs. Kenya or South Africa: Destatis, 2019; KAM, 2020; StatsSA, n.d.) and ii) working through a web mapping tutorial teaching JavaScript in combination with Leaflet and D3. The tutorial had been developed as part of a Bachelor thesis (Guttmann, 2017) with a strong focus on the cartographic representation methods commonly used on thematic maps. Part 3 finally demanded from the students, by again working in the groups as defined for part 2, to develop a digital teaching/learning resource on the topic of "Training awareness of space using web mapping technologies – the example of the SDGs". The project work was to be rounded off with documentation describing the approach, formulating justifications and discussing the results, all of this in the context of literature.

4.2. Hints to the students

The module started with a short introduction to the BWS plus project proposal, thus introducing sense of place as well as cognitive geomatics, the SDGs and their indicators, and an overview of web mapping and the topic e-learning. Hints were provided to ensure that groups worked independently, to motivate the students to surprise the lecturer with their creativity, and to base the work on the profound knowledge which they had already gathered during the previous six semesters. Of particular interest was the desire to learn from the students about what would be attractive or exciting to them, i.e. to learn about the students' point of view. In a first step, the various groups worked on a concept each for a teaching/learning resource elaborating on content and learning objective(s) (including the user group) and the choice of techniques and media, but with web mapping content to be developed as described above being a must and a focus on browser-based map design decisions as well as the user interface and experience (UI/UX) (cp. Roth et al., 2014; Muehlenhaus, 2014). Next was then the realization of the teaching/ learning resource per group, for which special attention had to be paid to cartographic quality regarding the degree of generalization for the reference units, a correct map projection, and the proper use of cartographic methods and design rules. The students were invited to vividly share and present their ideas with the lecturer and to be open to

	Tool A	**Tool B**	**Tool C**	**Tool D**
Awareness of space aspect to be trained	How do **cartographic principles/ methods influence our perception** about the spatial occurrence of a phenomenon?	**Questioning preconceived notions of space**, using a selected theme and maps for illustration	Training the independent, indirect **recognition of spatial structures** by using maps	Training **statistical understanding for spatial perception** based on maps
SDG data used, countries covered and no. of scales applied	Use of SDG 3 data (Good Health and Well-being: 4 topics/ exercises) for DE and ZA (3 scales)	Use of SDG 5 data (Gender Equality: 3 topics to engage with) for DE and ZA (3 scales)	Not being restricted to a particular SDG (7 exercises with solutions); for DE and KE (5/4 scales)	Use of SDG indicators 1.2.1 (proportion below poverty line) and 4.2.2 (rate of early childhood education) for DE and ZA (4 scales)
Splitting of work among students	Concept – web design – programming (Leaflet)	A unit per student	Overall design – more difficult programming tasks	Not of advantage for overall result (relying on progress)
Short description of content	Interactive maps (colour schemes, no. of classes, mouse over) → learning aim and solution (i.e. with explanations)	Intro with maps cp. Europe and Africa; Unit 1: a silent map (topic?); Unit 2: info and question; Unit 3: map comparison; Summary: infographics, further food for thought	A higher number of map types (D3) and ways of interaction (drag & drop, colouring-in, pop-ups, on-screen digitizing)	A convincing web page layout / structure, but not a single interactive map → workarounds instead
Blending	Suggestion to use Senfcall for feedback, buttons for voting and survey – but not set-up/ realized	Linkage to ILIAS (learning management system) for tests and forum	Stand-alone tool → reflections (SDGs)? / blended learning?	6 units planned, nice ideas; MC tests (repeatable), a presence phase (notes to be taken)
Additionally noted	Several cartographic shortcomings	Only choropleth maps (with pop-ups), not a congruent design, incomplete	Doing without ex. 2 would make tool more consistent	Additional instruction material for students (PDF: blended learning, the exercises, time estimates, maps)

Tab. 1: Comparing the four blended learning tools developed by HKA students in winter semester 2021/22 by highlighting differences and assessing the stage reached

suggestions by including also the other student participants. It was made very clear from the start that very different results could be expected on how to approach working with maps for sensitizing matters of sense of place. In addition, a timeline was suggested for how to distribute the work across the eight weeks: one week for part 1, part 2 until end of week 3, the concept of the tool until end of week 5 and realization/documentation until end of week 8.

4.3. The resulting BL tools

Fig 2 provides some visual glimpses of the four BL tools developed by the ten students from the winter semester 2021/22. Particular effort on the lecturer's side went into ensuring that the overall aspect on space awareness differed, which the application intends to train. Tool A focuses on how cartographic principles/ methods influence our perception about the spatial occurrence of a phenomenon. Tool B questions the preconceived notions of space by using a selected theme and maps for illustration. Tool C aims at training the independent, indirect recognition of spatial structures by using maps, and tool D at training statistical understanding for spatial perception based on maps. Further differences are highlighted in Tab. 1, which also assesses the stage reached.

4.4. Workshop at HKA

On 7-8 April 2022, a two-day presence workshop at HKA allowed the presentation of the developed tools to the partners and a critical and joint reflection on the stage which had been reached by the students in winter semester 2021/22. 13 HKA Bachelor and Masters students (including one from the study programme Culture Media Management) and six lecturers (including three project partners from Kenya and South Africa) participated in the workshop. The major activity was the presentations of the four tools by the student authors and two feedback rounds per BL tool in three groups, balancing student and lecturer participation. Due to the limited number of workshop participants and to facilitate a lively discussion, tool A was not included at this stage. Of importance was also to ensure that at least one of the two or three authors of each tool was present. To guide the feedback and discussion and to stimulate further ideas for each tool, a handout had been prepared, pointing to the following aspects: testing of the tool (functionality), explanations/thoughts of the authors (reflecting), alignment with the overall aspect on space awareness which the app intends to train, additions/modifications still needed, whether the app was applicable in all three countries, and possible use cases from a sense of place teaching point of view.

4.5. Second-time semester project

Instead of engaging student assistants to advance the tools until the end of the subsequent semester, again the same semester project module was used in the winter semester 2022/23 for reaching a rather advanced stage in the tools' preparation, i.e. proceeding again class-based with the initial plan for regular virtual support by the partner universities to ensure that the materials could be used at all three universities and in all three cultural contexts. The following had been identified as aspects which still required attention: embedding the learning/teaching tool into a literature review, instructions for lecturers and students (i.e. two different perspectives), finalizing and/or modifying of the students' ideas with data ideally for all three countries, the translation of the tools into English, and testing of the tools by students from the partner universities.

This time part 1 (in week 1, in groups of two) started with a literature review on BL, and the task of elaborating a small BL unit in English on 'blended learning' (e.g. based on information as provided by Hockly, 2018). The aim of this unit was to allow students to generally learn and reflect on the meaning of the term and what is expected from them. However, the presentations turned out to be not very convincing. Part 2 (until week 3, in the same groups) required an intensive engagement with one of the tools developed by the students in the year before. The URL for the tool, the data used for coming up with the tool as well as the previous students' documentation of the tool were made available to each group. It provided the basis for conceptualizing advanced versions of the tools considering BL, user group and context, two perspectives (lecturer, students) and respective teaching/learning aids, sense of place teaching aims – learning contents, the language (in English, in addition also in German?), statistical data, correct and appealing cartography, as well as means for testing the students' knowledge gained and for reflection. The regular exchange with the lecturer of the module and thus an iterative approach was pointed out to the students as being of importance to ensure guidance and hopefully also an advancement in the case of all four tools. Part 3 (up to week 8, in the same groups) followed with the realization/ implementation as well as that an iterative testing with UP and UoN was envisaged. Again, the project work was to be rounded off with written documentation and a final presentation in class. There was no time yet for an assessment of the project work similar to that during the in-presence workshop at HKA after round one. Therefore, Fig. 3 just provides an example of visually juxtaposing pages of one of the tools as evidence for advancements achieved in this second round.

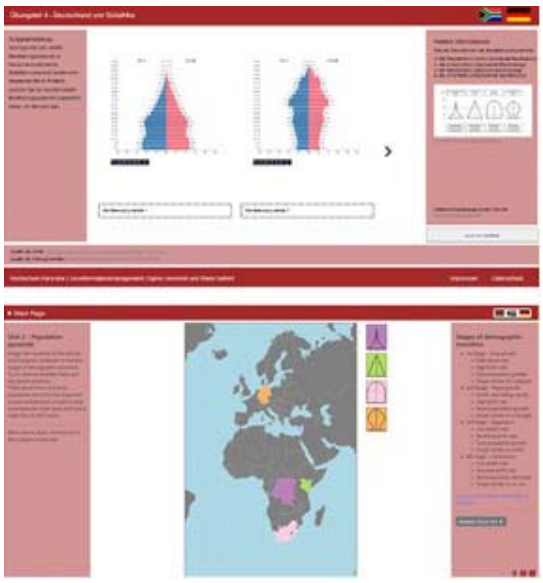

Fig. 3: Comparing stages reached in the two rounds of student project work for one of the blended learning tools developed by HKA students from scratch in winter semester 2021/22 and further enhanced in winter semester 2022/23

4.6. Challenges encountered

For the same reason, the discussion on the challenges encountered by asking students to develop learning/ teaching materials for BL on the topic sense of place is incomplete for the second round and only covers the experiences at HKA. The student participants involved in developing the BL tools from scratch pointed out that the data search was demanding, as was working through the entire web mapping tutorial. They still had other modules to complete, which distracted their focus from the actual module. Nevertheless, they expressed that they enjoyed realizing their own BL tools. To the surprise of the lecturer the SDGs and their indicators was a new topic to all students of that class, apart from one. Other observations made by the lecturer were that generally the students aimed at stand-alone tools, where the users can independently click through the provided content. However, the extent of this feature being typical for pure e-learning varied among the tools. Only one of the groups, which had studied a relevant paper, prepared additional instruction aids. Regarding the programming, one group experimented, while others stuck to what was known already or failed in their original plans. As often, time issues and particular group dynamics were also experienced with some groups. And, quite some guidance was required to make the four tools focus on different aspects when aiming at training awareness of space by means of maps. Although having pointed repeatedly to the term ‘cognitive map’, students were weak in basing their project work on a literature study in this regard.

The most relevant feedback during the workshop, when presenting the tools, can be summarized by the need to specify the target group and context (i.e. field of study) for each tool, to improve design issues and to close data gaps, the need for an English version (although the German students favoured a German version in addition) and the necessity to prepare two sets of instructions, one for lecturers and one for students. Finally, testing of the usability would be required in future. Most of these issues (apart from multilingualism and a proper usability test) were taken up for the second round of the student project work, now aiming at the advancement of the BL tools. Here, it was considered advantageous that the lecturer knew the students from a previous intense face-to-face project module in the semester before. The class size was just large enough for having groups of two students each advancing all four tools. The students pushed for deciding themselves how to pair into groups of two, interestingly, resulting in a division related to skills thus forming a strong gradient among the groups. Before the semester start, the lecturer had questioned the likely motivation by the students due to the task of building on previous students’ work and thus limiting the freedom regarding their own ideas, as well as due to not knowing the participants’ English language skills. Building on previous work also meant more guidance for the students from the start. It proved difficult to involve students from UP and UoN for feedback and testing. Project partners were already challenged by chasing lacking data from institutions in their home countries. But organizing student meetings which would have benefitted the HKA students in their tight time plan of progressing the BL tools while minding the availability of students on the South African and Kenyan side due to the asynchronous teaching schedules was unfortunately not feasible.

4.7. Summary

Up to now, no actual testing of the BL tools in class situations has been conducted, however, such a pre-testing is planned for the forthcoming summer school. While all four tools deploy thematic maps as the basis for discussion and reflections on sense of place with students, engagement with place is approached differently. This is achieved by targeting different SDG indicators, as well as distinct aspects of space awareness. In summary, tool A and D are meant to train students’ map interpretation skills, i.e. to make sense out of thematic maps by reflecting on how map design and data aggregation can impact sense of place. Tool B and C, on the contrary, challenge students via sense of place questions from the very start and steer discussions on what thematic maps allow to infer and are able to reveal.

5. Outlook and conclusion

Having started phase 2 at UP in September 2022 with a workshop format, which involved many students within their actual courses, the plan is to develop the blended learning tool during the first semester of 2023 (February to May). Under the guidance of the lecturers, a Geoinformatics student and a student from the Social Sciences will develop the tool together. The Geoinformatics student will take responsibility for the technical side (design and implementation of the tool), while the student from the Social Sciences will provide input into the requirements development based on a literature review of sense of place, how this concept is typically taught and how sense of place can be mapped. This will provide a different focus and as such offers additional teaching/learning materials. Virtual sessions, together with students from HKA and UoN, are planned for brainstorming, feedback and testing.

With all the efforts put into tool development during the first half of the three-year project, the summer school in September 2023 will offer ample opportunities for testing the tools and the stages reached in tool development by then, this by a culturally diverse group of students and lecturers from different study programmes. It will ensure a direct and vivid international exchange on opinions and experiences and will thus lead to additional or new insights of how sense of place can be taught. For the BL tool development at UoN, which will be kicked-off during the summer school event, it provides the advantage of, although starting last, benefitting from the experiences and working concepts made so far right from the start of conceptualizing the teaching/learning materials. Space for creativity and freedom of realizing own ideas are nevertheless given due to an again different focus of the tool(s): the importance of a sense of place in satellite image analysis.

The project activities of developing teaching/learning materials together with students are adding new teaching and learning experiences from the very start, which overall are motivation triggering on both sides, for the lecturers as well as the students. Already when writing the project proposal, the decision for a different sub-topic per university was made in order to consider different interests and research foci of the project leaders. Such flexibility shows to be also relevant in regard to the approach taken at each university for coming up with the promised BL tools: not only do the necessities and constraints of the actual teaching set-up (e.g. modules, student groups) differ but also teaching styles due to background and experiences.

The project promised to test and prove a design of virtual formats for a cooperation focussing on an active exchange between students that is feasible under pandemic conditions with reduced travel opportunities and nevertheless delivers joint results to benefit from as partners in the long term. The anticipated approach was set-up when the end of the COVID-19 pandemic was not yet to be foreseen. Reasons of having dropped regular virtual support by the partner universities for feedback during tool development can be linked to enjoying being back in class again for face-to-face teaching and learning and to avoiding the additional burden of organizing meeting times within the rather asynchronous teaching activities (time of day, course of the semester) at the three universities involved.

To summarize, the project supports geo(infor)matics towards the desired digitization of teaching, more precisely, the development of useful geodata/map-related teaching and learning resources together with students. Although virtually less active than originally anticipated, nevertheless through the international, north-south university cooperation, the gradually emerging digital teaching and learning resources should be usable in different teaching environments and cultures to create awareness of space, i.e. sense of place, in different cultural settings.

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