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On Persuading an OvaHerero Community to join the Wikipedia Community.

Mark Mushiba¹, Peter Gallert², and Heike Winschiers-Theophilus²

¹University of Trento, Trento, Italy
mark.mushiba@unitn.it

²Namibia University of Science & Technology, Windhoek, Namibia
{pgallert,hwinschiers}@nust.na

Abstract. Wikipedia, an important bibliography and collaborative repository, is dominated by the Northern Hemisphere, in terms of content as well as editor participation. With an under-represented contribution from Global South editors and especially indigenous communities, Wikipedia, aiming at encompassing all human knowledge, falls short of indigenous knowledge representation. A Namibian academia community outreach initiative has targeted rural schools with OtjiHerero speaking teachers in their efforts to promote local content creation, yet with little success. Thus this paper reports on the effectiveness of value sensitive persuasion to encourage Wikipedia contribution of indigenous knowledge. Besides a significant difference in values between the indigenous community and Wikipedia we identify a host of conflicts that might be hampering the adoption of Wikipedia by indigenous communities. Further investigations into the cultural and collaborative gaps are to be done in order to promote an appropriation of Wikipedia by indigenous communities.

Keywords: Wikipedia, persuasive technology, technology adoption, indigenous language incubator, OvaHerero, Namibia, value based design

1 Introduction

Wikipedia has become an important 21st century bibliography, outline, and definition of human knowledge. In terms of accessibility it is the knowledge repository of choice for half a billion readers, available in 293 languages and comprising almost 35 million articles. However, the famous statement by co-founder Jimmy Wales, "Imagine a world in which every single person on the planet is given free access to the sum of all human knowledge" [1] is still far from being realised. Although Wikipedia covers a diverse range of topics, this diversity is challenged by its relatively homogenous editor community. The majority of Wikipedians are known to be formally educated white males with technical inclinations [2]. This unintentionally creates a one-dimensional narrative facilitated by the oligarchy of Wikipedia's long-term highly active ("vested") editors' systemic bias. There is little participation from the Global South, the female, the working class, the older generations and the not formally educated, among many

other communities. As a result of this systemic bias there is comparatively little [3] and low-quality [4] content about the things that matter to the non-contributing communities. Indigenous people in Africa are a typical example of such underrepresented communities, both in terms of participation in, and coverage on, Wikipedia.

One specific indigenous African community, the OvaHerero of eastern-central Namibia, has been the target of Wikimedia outreach programs in an attempt to recruit editors for the English language edition of the online encyclopaedia. These endeavours have been carried out under the Namibian Knowledge Portal (NKP) initiative to promote local content creation. The NKP is a public-private partnership enabling rural schools to enhance their curricular and extramural activities as well as their anchorage within their community. So far training sessions and workshops were organised at a number of rural schools introducing teachers and out-of-school youth to Internet basics and Wikipedia, thereby promoting technology-based knowledge preservation and local content creation. However, past efforts have not been sustainable; the only Wikipedia edits from the OvaHerero were made during the workshop days under the guidance of the instructor [5]

The little progress made in previous Wikipedia outreach efforts led us to explore causes of the lack of adoption as well as alternative ways to recruit and retain OvaHerero editors. It has been widely recognised that cultural logics and literacies are embedded in the strategies privileged by technology design, thereby replicating ways to organise, make sense of, and communicate about the world [6]. Wikipedia is no exception. Certain values and perspectives are embedded in the technology and its usage and fostered through the editor community. We intend to test our initial assumptions [7] that indigenous communities, such as the OvaHerero, experience major cultural barriers to the usage of established collaborative technologies such as Wikipedia. In this paper we therefore present a value sensitive design approach, scrutinising the target users' as well as the technologies' underlying value systems. We then postulate that using a persuasive technique based on explicated motivational factors will enhance the adoption of Wikipedia by the OvaHerero community. We present the results of this limited study and recommend further research. In the next section we first problematise the integration of indigenous knowledge into Wikipedia.

2 Indigenous Knowledge And Wikipedia

2.1 Knowledge systems

Knowledge repositories exist for all human groups and can take many forms. In "Western" cultures the prevalent method of transmitting, preserving, and codifying knowledge is writing, so much so that written repositories like journals, monographs and encyclopaedias are seen as the ideal way to develop, collect and represent what is

known.

There are, however, many different alternatives. Knowledge can be narrated, represented in artefacts, in rituals, in play and dance. Millennia before writing was invented, knowledge was transferred in these ways, and they still played a role centuries thereafter, until and including modernity. [9] Moreover, it is widely recognised that there are vast sets of statements that in principle cannot be expressed in language.[9] points out that not just the writing system deforms knowledge that exists in oral repositories but that the way of organising information as prescribed by the scientific method, hides important aspects for which we lack a scientific theory. For example, when documenting how a traditional healer applies medicine the botanic name of the plant was captured while the harvest time was not. The general plant part to collect (root, stem, leaf) was captured, the specific piece (young or old, top or bottom leaf) was not.

Indigenous knowledge (IK) is “the body of historically constituted (emic) knowledge instrumental in the long-term adaptation of human groups to the biophysical environment” [10]. IK often is not codified in writing but narrated and demonstrated. Transferring indigenous knowledge requires different generations of the indigenous community to frequently congregate. Due to societal change this prerequisite of oral communication and subsequent knowledge transfer is no longer given for many communities. Urbanisation and change of lifestyle has left the elders-the knowers-behind in their villages while the youth has migrated to towns in search of work and ‘modern” educational opportunities. They now miss the ancient opportunities to gather knowledge from their home communities [4].

2.2 Digitizing the Knowledge Sharing Processes

The goal of recent digitalisation initiatives of IK has been to produce “more effective technology design to support, serve and preserve the use of Indigenous Knowledge” [8]. Although content sharing services such as Facebook and YouTube have encouraged the growth of collective content, little attention has been given to the homogeneity that pervades most of these platforms. While [11] suggests that cultural forces have a powerful influence on technology adoption, there has been little progress in accounting for cultural differences in collaborative computing. [12] contribute that the Internet’s usefulness and growth can be attributed to openness and universality but these principles are currently undermined by the rigidity of collective content platforms. The collective content platforms indirectly exclude certain communities. Indigenous knowledge communities in particular have been largely marginalised and left out of the digital collective content creation movement. The latter is illustrated by the challenges currently presented by including indigenous knowledge in Wikipedia.

Yetim [13] states that technology has strong ethical and value implications and so should involve values in the design process rather than reacting to them after the development of the technology is complete. Indigenous communities are established

cohesive groups with shared values. The identity of these communities is challenged when an attempt is made to virtualise these communities. Collective content creation platforms favour individual contributors of the close-knit professional groups. Olsson [14] argues that interactivity fosters collectivity for communities, and that the tool used for sharing can encourage or discourage collectivity and in turn, participation.

Musicant et al. [2] alert us to the fact that Wikipedia is inadequate at promoting or fostering interpersonal communication. This dampens the effectiveness of a community motivation. They further make a strong point by stating that "In both policy and culture Wikipedia is opposed to too much socialising among its editors. This is perhaps best exemplified via the Wikipedia policy page "What Wikipedia is not," particularly the sectioned titled "Wikipedia is not a blog, web space provider, social network, or memorial site." [2] Policy considerations aside, Wikipedia does allow socialising, particularly among established users that are prolific content creators. This particular aspect of the What Wikipedia is Not policy is rarely enforced for vested editors.

2.3 Challenges of Indigenous Knowledge in Wikipedia

One option of digitalising IK considered by Gallert [3] and Mushiba [15] is to use Wikipedia, in its English language edition or in the local language of the indigenous community. However, as it stands Wikipedians can contribute IK to the online encyclopaedia only if that information is backed up by published written sources. Wikipedia's editor community argues that IK knowledge holders give subjective information that is unverifiable and undermines their convention of acceptable sources. Thus only the small part of IK that has been covered by external researchers and been published in writing can be included in Wikipedia articles. However, the alien researchers might have inadvertently misinterpreted IK and warped its context. The majority of IK that exists within Wikipedia comprises of written accounts of indigenous people and their customs by missionaries, adventurers, travelers, merchants and colonial administrators because these are the only narratives available in writing [8].

3 Conceptual Framing

Having previously [7] confirmed the existence of a conflict between values inherent to current Wikipedia implementations and those of indigenous communities, the challenge then becomes how to support the discovery of competing values and reconcile them while at the same time galvanising a motivation for IK communities to emerge as contributors to the preservation of IK through Wikipedia.

Value sensitive design (VSD), although it does not offer an explicit method to value discovery or value conflict resolution, offers a conceptual baseline as well as guidelines on how to explicate values. With VSD we see an investigation on present values inherent in the current state of Wikipedia and the OvaHerero community in order to address incompatibilities inhibiting technology adoption.

The second, exploratory, challenge is dealing with issues of motivation that impede the emergence of behaviour whereby members of IK communities record IK on Wikipedia. Thus understanding collective content creation contributors' motivation and deploying related persuasive strategies seems to be a worthwhile effort.

3.1 Value Sensitive Design and Information Systems

According to Friedman, Kahn and Borning [16] VSD is a "theoretically grounded approach to the design of technology that accounts for human values in a principled and comprehensive manner throughout the design process" [16, p.80]. The framework hinges on the concept that we can account for values within the design process thereby enhancing a solution to improve its adoption.

In terms of technical practicality, VSD is considered to be a well-established framework that has seen widespread application in areas like network browser security, urban simulation, large displays and safety technologies [13]. VSD is based on a psychological theory that there are universally held values, although these values may manifest differently in different cultures, and some of them might be entirely culture specific [17]. According to [18], cultural values are "the implicitly or explicitly shared abstract ideas about what is good, right and desirable in a society and are the basis of specific norms that tell people what is appropriate in various situations". The values are interpreted as discrete units that characterise groups. The values that are deemed as cultural values in our study are extrapolated from a broader group of human values, as presented by [16] in VSD.

A non-exhaustive list of human values includes human welfare, ownership and property, privacy, freedom of bias, universal usability, informed consent, accountability, courtesy, identity, calmness, and environmental sustainability [16]. An iterative tripartite methodology which features conceptual, empirical, and technical investigations is deployed within the system design process in order to infer cultural values from the larger group of human values relevant to the specific context [16].

3.2 Contributors' Motivation to Collective Content Creation

[19] showed that 0.1% of the editors (4,400 at that time) contribute 44% of English Wikipedia's value, measured in page word views. Moreover, these editors' activity pattern showed remarkable homogeneity, and it differed considerably from that of the other 99.9%, leading to the somewhat astonishing title of their paper, "Wikipedians are born, not made". The group forming as the encyclopaedia's 'inner circle', consisting of very active editors who contribute at least 100 edits per month, has in the meantime shrunk to 3,300 (Wikipedia statistics, 2016). By all accounts, Wikipedia is authored by a tiny minority, with just slightly over one very active editor per 500,000 speakers of English.

The question of why this very exclusive group of people spends vast amounts of their voluntary time to write Wikipedia has not yet been sufficiently investigated. [20] seems

to be the earliest study on this topic but did not go beyond a pilot phase. It pegs the editors' motivation mainly on the values of reciprocity and altruism, using the same conceptual framework as we do, the Tripartite Methodology for VSD. However, Kusnetzov's [20] conclusions are derived from theoretical considerations only, and not from their empirical results. Although there seems to be a relationship between values and motivation in previous Wikipedia studies suggesting that altruism and reciprocity can translate into motivational strategies [20], the relationship remains opaque.

[21] employ a different approach to explaining the motivation of highly active editors. They combine [22] framework to explain motivation in social movement with a classification of task characteristics that [23] found suitable to explain work satisfaction and intrinsic motivation, "the doing of an activity for its inherent satisfaction rather than for some separable consequence" (so defined in [21]). They found that there is a *negative* correlation between engagement and cost-benefit evaluation: Wikipedia's most prolific authors expect fewer material and immaterial benefits than less active volunteers. Instead, intrinsic motivation was the most important factor explaining activity and engagement to a degree that it positively influenced the perception of task characteristics. Of the task characteristics that independently had a positive influence on engagement, autonomy, task significance, and the variety of skills required to complete it, stood out. Again, Wikipedians are born, not made?

In collaborative cultural heritage preservation, [14] reported that the most prominent motivation to contribute to collective content creation activities in smaller close-knit communities was an intrinsic need to create memories and document them. Although this can be true for smaller communities that are bound by a professional activity or common interest, we are reluctant to assume this extends to cultural communities such as those of indigenous groups because the ties that bind them as community are different from small closed-knit groups. Values in indigenous communities are usually established and advanced, serving as the true social glue between individual members of the community. Cultural studies suggests that indigenous communities would be more susceptible to cultural or community level motivations than individualistic motivations. However the issue of motivation for collectivist versus individualistic cultures is beyond the scope of this paper. Studies on motivation of indigenous communities participating in digitalisation efforts of IK are nearly non-existent in the literature. Kapuire et al. [24] in their long-term collaboration with rural OvaHerero identified the following factors as significant motivators to participate in the development of an IK system: learning technology, appreciation of the common project goal (preservation of IK), the intrinsic pleasure of participation, as well as immediate rewards and expectations of gaining resources.

3.3 Persuasive Techniques

Persuasive technology is a design paradigm that proposes that computer systems, devices and applications can be intentionally designed to change a person's attitude and behaviour in a predetermined way [25]. [26] posit that the fundamental idea of

persuasive technology is that it serves as an ambient reflection of the user's environment in the hope that aided by suggestive nudges the user makes a conscious decision to alter the state of their reflection in turn changing their behavior. This method is hailed as one of the most effective ways of engaging users and is part of nearly every feedback or incentive system [26]. As an action oriented framework, persuasive design offers a systematic way to use motivational strategies for the purpose of behaviour change. The most influential persuasive approach has been based on Fogg's behavior model (FBM), which postulates that once a person has sufficient motivation, equally sufficient ability and a well-timed trigger, only then can a target behaviour be achieved [25].

4 Research Approach

Our research is a continuation of previous efforts to introduce rural OvaHerero teacher communities to Wikipedia for local content creation and cultural knowledge preservation. We applied the iterative tripartite methodology common to VSD in order to extrapolate cultural values, to derive motivational strategies and to deploy a persuasive intervention with technologies. Motivational factors were extrapolated from past literature on Wikipedia. We applied a constructivist approach following the FBM to support the desired community behavioural change.

4.1 Community Participants

Our research is focused on the OvaHerero teachers of the Epukiro Post 3 Junior Secondary School, who were previously part of one or two of the Wikipedia workshops held under the NKP initiative. The teachers at Epukiro are relatively tech savvy, at least in the sense that most of them had smart phones and laptops and accessed the Internet at school. The school was fortunate enough to have received the technological infrastructure that made Internet use possible. Even so, there was a clear lack of technical support, at the time of our visit it had been several months since the local technician had last visited the school. Problems with the lab were simply ignored; this was not surprising since the lab was locked most of the time. Although the lab was equipped with functional computers it was often the case that the network between the them was not configured. Out of the twenty computers forming the school lab, only two were working without any problems. A further three could be made to working with relatively little effort.

Epukiro itself is a rural cluster of settlements in the remote eastern part of Namibia 290 km away from the capital, where a large group of OvaHerero people reside. The OvaHerero have been described as full of racial pride and conservatism. In the earliest pictures and journals of missionaries, emphasis is placed on the enthusiasm OvaHerero have for pastoral culture and how cattle are greatly valued within their traditional communities, enough of this narrative has survived even in contemporary Namibian lore. The Ovaherero are one of the ethnic groups in Namibia that still maintain strong cultural and traditional ties. Despite ongoing rural to urban migration they continue to display significant cultural pride as can be seen in their dressing codes and social habits

Kapuire et al. [24] Very little history was written by Herero people themselves, and accounts of missionaries and other settler communities are usually the bedrock of scientific investigations.

4.2 Tripartite methodology applied

[16] describes the Tripartite methodology as a process to carry out value sensitive design. The methodology itself features a series of iterative processes sometimes working in tandem to create a final product. The main processes of the tripartite method are conceptual, empirical and technical investigations. It is important to note that the tripartite methodology is not a sequential activity but an iterative and integrative one. There is a strong working cohesion between these processes and this in part due to the fact that each process has valuable learning outcomes that can be used in subsequent processes. [13] advocates executing the empirical investigations first, this process has a good balance of valuable insight on both the conceptual and technical feasibility or value of a design strategy.

4.3 Conceptual Investigation

A pre-study was conducted at Theo Katjimune Primary School in Windhoek. Although the school is located in the capital it has many socio-cultural traits similar to the target rural school. The teachers are of the same cultural group as the target school. The pre-study in the urban area served to inform the researchers on OvaHerero teacher values and to gauge Wikipedia exposure and interest amongst teachers. Qualitative data was collected with the use of personas, semi-structured interviews and surveys. As part of the studies, discussions were also focused around the practical, ethical and moral issues that teachers had with Wikipedia and technology at large. Some resolutions to early value conflicts were simply discussing conflicts and addressing concerns around content ownership and usability.

4.4 Empirical Investigation

The studies were carried out at the Epukiro Post 3 Junior Secondary School and involved fifteen teachers. Here the studies were used to validate our preliminary pre-study findings and for performing a more refined version of our own value discovery. Different qualitative tools were used to identify values, such as a provocative cultural probe, video interviews with individual teachers, a survey as well as a motivational talk and a planning meeting. Based on the experiences from previous unsuccessful outreach activities in recruiting Wikipedia editors among the Epukiro community, our OvaHerero co-researcher held a motivational talk to emphasise the role of teachers as protectors of IK and the pillars of rural communities. IK was introduced to the teachers as a collection of knowledge that is unique to their lives and their history and as something that will safe guard their identity in an ever changing world. Upon apparent commitment to the cause a group of teachers organised themselves into a committee that made decisions on how they would collectively create IK content. A balance was negotiated between professional duties of the teachers and the Wikipedia project, a significant achievement for value discourse.

4.5 Technical Investigation

The technical investigation involved collecting data produced by the participant's direct interaction with Wikipedia as well as the persuasive intervention. The OtjiHerero Wikipedia Incubator (<https://incubator.wikimedia.org/wiki/Wp/hz>) was used as a technical platform while Facebook was used as a persuasive communication channel. The collected data demonstrated the effectiveness and progress of the persuasive interventions which aimed at a target behaviour of participants to adopt Wikipedia for collective content creation and uploading indigenous content.

4.6 Otjiherero Incubator

The notability and reliability sources rule of Wikipedia language editions determine what the editor community regard as important and what is needed to anchor the articles. These rules have been established by consensus among all early writers of the encyclopaedia, and by design all people to whom the global editing community now tries to reach out to, were not involved in this development.

OvaHerero culture relies on oral traditions of transferring or contributing knowledge. Forcing “Western” relevance criteria and citation requirements onto this indigenous group is tantamount to insisting that OvaHerero record their culture by conforming to the traditions of another culture, or to forfeiting their own culture in order to preserve it in a form that pales when compared to its original.

Consequently, there was no particular sense of urgency to conform to Wikipedia's rules of syntax and sufficient referencing clauses, and ultimately to contribute to Wikipedia at all, as evidenced by many rounds of unsuccessful outreach activities to this particular group. While the participants desire to pronounce their identity and autonomy, rules on the English Wikipedia actively repress these values by requiring participants to contribute in a way that is incompatible with their own culture.

The teachers did not see the need for these rules and perceive them as distrustful and an attack on their integrity since they felt they had no need to lie about their own culture. Indeed, for an oral knowledge repository the existence of written accounts is inconsequential, particularly as such writings are almost exclusively authored by people alien to the indigenous group. The purpose of written references for the English Wikipedia: to ensure that what is collected there is accepted mainstream knowledge rather than some fringe theory or speculation, does not work for the OvaHerero. Deviating opinions and fringe views of this cultural group are fought at the very occasion of their performance in form of an alternative narrative or a plain rejection statement, but not in writing.

Previous outreach activities for the Otjiherero community were conducted using the English Wikipedia, as English is the official language of instruction at schools, and the one in which both teachers and instructor are fluent. However, new editors have a particularly tough time on the English edition, as a famous experiment by experienced Wikipedia authors [27] posing as newbies, shows. Much of the workshop time was

consumed by introducing the English edition's very sophisticated set of rules instead of developing the editing community and the still very meagre local content. Through discussions and a value discourse we understood that the narration of local content is most appropriate in the indigenous language. Thus we considered a shift to the native language Wikipedia incubator. Results of the preliminary studies also suggested that the current state of English Wikipedia defies the development or expression of any kind of intrinsic motivation in our target group. Wikipedia is viewed as an uncharted and perhaps also unaccommodating environment by the teachers.

The Otjiherero Wikipedia (<https://hz.wikipedia.org>) was created in 2004 along with many other standard language editions for sizeable language communities. Due to inactivity, it was closed in 2007 and its few entries moved to Wikimedia's Incubator (<https://incubator.wikimedia.org/wiki/Wp/hz>). A Wikimedia language incubator is “a place where potential new linguistic editions for existing open content projects supported by the Wikimedia Foundation can have their own wikis” [28]. The Wikimedia language incubator serves as a testing ground for wikis that can be graduated into Wikimedia if they show sufficient sustained editing activity by native speakers. The rules are usually more flexible than those found on English Wikipedia. One of the requirements to start a wiki in a particular language is having a valid ISO 639 language code. For a language edition to be promoted from the Incubator, a steady editing activity of three to five native speakers has to be established and maintained for several months.

Thus the Otjiherero incubator appeared to be the ideal environment for our intervention, to train and inspire our target community to achieve steady editing activity. The incubator editing space became one of the key areas critical for value negotiation and resolving value tensions. The incubator allowed the teachers to perform their culture unchallenged, since contributions or edits to articles were in the Otjiherero language and only Otjiherero speakers could accurately edit the text. The latter placated the autonomy and identity value tensions.

All the participants were added to our Epukiro project page on Wikipedia; this allowed us to monitor the activity of each of our participants. Edits were tracked using a revision history function as well as a workaround that allowed us to follow the changes made by any user who was part of the Epukiro Wikipedia project.

4.7 Communication Channel

During the study, teachers were tasked with choosing a suitable communication channel. Due to their previous experience and the pre-established social and community ties on the social network, the teachers decided that Facebook would be the communicative channel between research team and themselves. This decision was reached after a discursive session.

4.8 Persuasive intervention

The persuasive intervention was performed on a community level and in accordance with the components specified in the Fogg behavior model. The persuasive intervention

focused on the established values to enhance motivation. A motivational talk, formation of a Facebook community group and early discussions helped to peak motivation levels. The ability component was enhanced by providing clear instructions on how to perform the target behaviour through the Wikipedia training, technical support documents such as user manuals. The trigger part of the FBM was almost absent in the early stages of the intervention but later encouraging tailored SMSes and Facebook posts provided a trigger mechanism bringing about a confluence of all three factors needed to achieve the target behavior.

The measurable variable was an edit performed by any user from our Wikipedia project group. This variable indicated that an instance of the target behaviour was performed and its frequency determined the efficacy of different stages of the persuasive intervention. There were only two stages to the intervention, the first involved posting facts and relevant information to trigger for low level motivation while the second phase was more rigorous, using tailored messaging and SMS to engage the participants personally. Recorded inactivity on the Incubator prompted us to respond by posting messages on the Facebook page enquiring whether our team at Epukiro was experiencing any problems.

The monitoring of the behaviour change is part of a longitudinal study but for the purpose of this research it was pegged at approximately one month. For the longitudinal purpose the success of the persuasive interventions would be three full months of weekly sustained activity. This is the criteria set by Wikipedia for a language in Wikipedia's incubator to become active and was explained to the participants.

5 Results: Value Comparison

Although VSD is good conceptual framework it can sometimes be practically lacking. There is no systematic way of accurately identifying, isolating or addressing a plurality of values. It can also become difficult to study cultural values without considering the way they are influenced by professional values. This can be a consideration for further study. Value tensions themselves warrant a complete re- design effort, we only tried to enhance participation with Facebook and Wikipedia but some value tensions require the design and development of a system that is flexible enough to support the ongoing negotiation of values in a participatory space.

5.1 Identity and Pride

During our studies we deployed a cultural probe that also doubled as an English test. The probe tested participants on their views of open Wikipedia authorship by presenting an article "Epukiro", both in English and in Otjiherero, that contained false factual information. As expected the teachers demonstrated a good command of English, the returned probe had corrections made to highlight incorrect information.

Most teachers preferred to review the English probe over one written in their native language. This appears contradictory; During many of the interviews participants expressed the desire to contribute IK in their native language. However, the probe consisted of the original factual content as presented on English Wikipedia, and albeit altered in some places, it contained no IK. Naturally, the teachers were also interested in what was written about their community by outsiders of the cultural group. The teachers vehemently voiced their dissatisfaction with the inaccuracies of the probe and enquired about how they could correct the source of the information on the probe. Although the probe provoked some anger it inspired much needed dialogue on authorship and other topics that steered the teachers into understanding the importance of their contributions.

The users were also vocal about the historical injustices perpetuated by foreign powers and view some technologies as an extension of that unfair treatment. The latter also indicated a value conflict between more centralised systems and the freedom from bias value.

5.2 Property and Ownership

As reported by [7], for all Otjiherero speakers, property and ownership are very important values with respect to intellectual property. This applies particularly to information regarding their own history and culture. Our studies confirm this for the communities in Windhoek and Epukiro. During the unstructured interviews, participants expressed fears around the issue of ownership. This was highlighted by questions about whether the teachers would retain the control of their IK contributions, fears that were aggravated by the fact that they were made to understand that virtually anybody could edit their text on Wikipedia.

While engaging in a general discussion about the way Wikipedia works teacher's concerns about the possible distortion of their original contributions began to surface. The teachers frequently asked what would stop outsiders from warping the meaning of their contributed text and frequently remarked on the fact that it was futile and counterproductive to contribute information that could be changed by anybody but especially by people who were not members of their cultural community. This presented a value conflict between the trust, freedom from bias value and the openness of Wikipedia.

5.3 Universal Usability

Editing on Wikipedia is a manual process that, unless additional tools are used, requires the modification of a source document which will be rendered by a browser only after it is saved. This type of text processing, although common in the past and still used in desktop publishing, is cumbersome for anyone accustomed to What You See Is What You Get (WYSIWYG) text processing like MS Word or OpenOffice. The inclusion of navigation boxes, formatted references, and tables to Wikipedia articles is particularly unwieldy, and there is for copyright-related reasons no simple way to add own pictures to any text.

Wikipedia started at a time when many content producers for the World Wide Web were “fluent” in HTML, and it recruited its first cohort of editors from this sizeable group. Now in its sixteenth year, its editing interface is archaic, and only learning its basic syntax takes time and effort. This is in contrast to a relatively low level of computer literacy among rural OvaHerero in general, particularly within the Epukiro group [7]. Many of the participants obtained their first computer course from us as a prelude to our earlier outreach activities. Some acquired their literacy from the use of a smart phone, and some had minimal formal training before we arrived, but literally no-one possessed the technical expertise, or even felt comfortable, to use an HTML-like markup language to author text. This apathy can still be seen in the article they developed together (https://incubator.wikimedia.org/wiki/Wp/hz/Omimbonde_Vitano) which is a wall of text whose only formatting has been added by community outsiders.

There are many promising ways to make editing technically easier, both general solutions authored by the editing community or the Wikimedia Foundation and tailor-made applications for our cultural context. Developing and testing such tools is the subject of some of our further research. For now, we record an important value conflict, as the MediaWiki editing interface is unusable for non-technical volunteers without a lot of training and practice.

5.4 Consensus

The teachers were quite adamant that all contributions on matters of IK had to be well researched with the community. This was perhaps spurred on by the probe articles. They also wanted to consult with each other before any uploading of information could commence. This is what led the teachers to agree on an organisational structure whereby all information was discussed and developed in an offline meeting before it was delegated to a person within the group that would upload it. In subsequent weeks of active group work content from previous consultation sessions was never changed. Every editing activity resulted in an addition of text. Of particular importance to the group was that no unapproved version of their content ever becomes visible online. This is diametric to how editing usually is done on Wikipedia, where a possibly very rough draft is improved over time by many different editors, some of them specialised in just a few narrow areas of improvement. It is also very common to shorten existing paragraphs, change grammar, wording, and flow of prose. For many Wikipedians, the visibility of how a text developed to what it is today via the page history function, is an important software feature and a relevant proof of the value of their individual contributions. Contrary to that, research in the OvaHerero community shows that individuality has next to no value and meaning, and is negatively connoted [11].

This is a value conflict between the need for the OvaHerero to collectively reach a consensus versus Wikipedia individual-driven contribution mechanism cannot easily be reconciled. In fact, the OvaHerero’s organisation of content development is so unusual for Wikimedia projects that, if detected, it would violate the respective username policies of Wiki projects that invariably forbid group accounts. On English Wikipedia, only one group account (Schwartz PR) has ever been approved and allowed to edit, by

a special decree of the Wikimedia Foundation. Today accounts whose names hint at shared use are blocked on sight. Due to the copyright requirement of attribution, there is no way for ordinary editors to undo a substandard edit in a way that it wouldn't be preserved in the page history, and thus remain visible for anybody who cared to look. This applies also to talk pages where editing improvements can be discussed. Editors could thus not discuss different versions of articles without at the same time immortalising the wrong wording somewhere in the page history. MediaWiki clearly has not been designed to support the collaboration technique that we found in Epukiro.

5.5 Community interactions

An interesting situation arises from Wikipedia's anonymous nature and the user's strong need for community. Many users expressed that when participating on collaborative projects they require an easy and casual way of communicating with collaborators on the platform they are working. This implicates a value tension since Wikipedia contributions are acknowledged to individual usernames, which are often pseudonyms, or Internet Protocol (IP) addresses that identify computer configurations, not individuals. Moreover, casual communication among Wikipedia editors is, although not forbidden, not very common and not specifically supported by site rules and editing tools. Where editors do communicate on Wikipedia their participation is publicly visible which may raise privacy concerns.

This particular value tension was addressed by creating the Facebook group. Here not only can the teachers interact with each other but they are also able to communicate with other Otjiherero-speaking Facebook users who joined the page. The first three weeks of our intervention held the Facebook group as a secret group but we made it public towards the end of our study in an attempt to solicit more discussions. This seemed to work; Outside members sent requests to join the group and put up posts of their own. This is one indication that a sense of community started to develop within our Facebook group.

Dialogue and consensus are the tools which are used to resolve value tension, this is central to any value discourse. We avoided making any hard assumptions towards an effective persuasive strategy. Instead we allowed the participants to engage discursively around the results of our tripartite investigations, constantly making way for internalisation of learning outcomes between our research team and the teachers.

6 Results: Persuasion

Because the target group is constituted of teachers we attempted to inspire an intervention strategy that supported the work practices of teachers, this was to avoid possible conflicts between the cultural values we were reinforcing in the teachers and those of the organization (school). At this stage it might have been useful to rank motivational strategies; however, the scope of this research does not cover measuring

the efficiency of individual motivations. We also encouraged teachers to suggest their own motivational strategies. Below we describe the effects of our persuasive intervention.

6.1 Collaborative article creation

In the Otjiherero incubator participants decided to make edits to a topic of their own choosing. The chosen topic has the title “Omimbonde Vitano” or “The Five Trees”, a location where the earliest leaders of the Epukiro settlement came to congregate under five trees to discuss matters of great importance to the community.

A single article was edited during our observation; the article was edited on Thursday of every week for five weeks. The Epukiro teachers had collectively decided on this work schedule. All edits were done by a single user who was appointed as the uploader of the article content. The nature of the content is collective but a single uploader is responsible for editing the article on Wikipedia.

Throughout our observation the target behaviour remained consistent at one edit per week, the content of this edit is not analysed but growth is observed in article size, the article size grew from 123 bytes to 2086 bytes in the five weeks. At Week 3-4 a spike in growth from 740 bytes to 1114 bytes is observed, this time was also the time we implemented persuasive tailored SMSes and agency strategies but the results are too inconclusive to attribute the ramp to the new persuasion strategies. We suspect that the increase in persuasive effort had some effect because in Week 5 we see that article size grows to 2086 bytes nearly doubling the article in size.

Within the time frame of our observation the persuasive intervention was not deployed in isolation, it was a mixture of various formative interventions such as motivational talks and value discourse. It would be inaccurate to single out a single instance of the intervention as the sole cause of the target behaviour. Because of its inextricability the independent variable is regarded as the sum of all formative efforts. We note that editing activities came to a complete standstill after the persuasive intervention was terminated.

Uncommon in most persuasive interventions is that the time of the target behaviour and the manner in which it is performed was pre-negotiated by the participants. The teachers decided when they would upload or edit articles based on their schedules and teaching duties. This potentially undermines the effectiveness of a trigger mechanism. Motivation when it is quickly cultivated as in our case, needs to be sustained otherwise the target behaviour is easily lost. Remote persuasion is most effective but it relies on an established rapport with the participants. Even though Facebook is a good behaviour support system it can become difficult to reinforce the target behaviour because of distractions.

A consideration for future work would be to automate the role of the human behaviour support role that we played. A motivation for instance could be automated so that contributions are visible to the members of an online community and the feedback on the contributions can be relayed back the contributor's mobile phone. This tool can be integrated with Wikipedia and automatically respond to edit history data by selecting a

suitable persuasive intervention strategy depending on the performance of the teachers.

7 Conclusion

Wikipedia, as an open and collaborative platform is subject to continuous change embedding values of its active contributors. However as [28, p.315] critically remarks: “In Wikipedia the design process is ongoing but no longer dynamic or transformative. The design of Wikipedia has become hegemonic, stifling other perspectives and ways of knowing the world.” Not only from an epistemological point but also from a value perspective Wikipedia falls short in accommodating indigenous communities. However one of the opportunities currently excluded indigenous communities can make use of are the native language editions, where the likelihood of domination by the existing contributors is practically non-existent.

The lack of Wikipedia editing uptake by OvaHerero teachers has been the starting point of this research. Deploying a value sensitive design approach, we uncovered major cultural barriers for OvaHerero community members to join the Wikipedia editor community. Based on those findings we deployed persuasive techniques, which showed preliminary positive results. However, we argue that closing the cultural gap between the OvaHerero community and Wikipedia needs further investigations. Special focus should be on the adaptation of Wikipedia itself to become an appropriate technology for indigenous knowledge holders.

As demonstrated, the editing cycle of an article in Otjiherero differs considerably from the ordinary work pattern on articles in some of the major languages of Wikipedia. We expect decisive differences in how OvaHerero will organise their Wikipedia work and how other communities operate. Many of the expectations could be supported by Mediawiki software features, but as long as the Otjiherero language is in incubator, it inherits all software settings from it. In order to have the complete freedom of adapting not just community rules but also the interface, hz.wikipedia.org needs to be reactivated first. Should editing in Otjiherero pick up to an extent that the language edition could be released from the Wikimedia Incubator, OvaHerero rules and expectations could be made explicit. Furthermore, in this case specific technical features could be implemented locally, for instance that article changes have to be approved by a member of a designated group of editors before becoming visible (“flagged revisions”) and that the primary representation of content be audiovisual rather than textual. Rules could further be established on who would be allowed to create new pages, and what constitutes a proper citation. In other words, a language edition could be created that mirrors the knowledge representation of the indigenous community, how their knowledge is gained, codified, and transferred. This project stopped short of formulating and formalizing the exact principles by which the OvaHerero community wishes to create the Otjiherero language edition of Wikipedia. We concur with [29] that a participatory approach to design will represent the indigenous communities’ values. Thus we promote a participatory re-design process based on the explicated community values thereby resolving current clashes.

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