

Empowering Rural Citizen Journalism via Web 2.0 Technologies

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Abstract— Once acquainted with the modern information and communication tools made available with the advent of the Internet, five Brazilian rural communities participating in a pilot project to develop a self-sustaining rural community telecenter model, engaged in citizen journalism using inexpensive digital video cameras. Community members used Web 2.0 collaborative tools available through YouTube and Google to post short videos on the telecenter portal. The 95 video blogs published between September 2006 and May 2008 recorded various aspects of community life, including religious celebrations, oral history arts and crafts traditions, folklore, and environmental concerns. The videos also reported on issues that challenge the survival of the communities.

The availability of video collaborative tools expanded participation in the telecenter portal. One community in particular, Tombadouro, embraced the new found tools more vigorously than all others, generating 46% of all video blogs. This study evaluates the impact of video blogging in this community while identifying trends in the use of modern information and communication technologies for individual and community empowerment in rural settings of the developing world. The researchers attribute the increase in participation to the preference for face-to-face communication over the written word in communities with high rates of illiteracy.

Index Terms— Citizen Journalism, Digital Inclusion, Rural Telecenter, Video Blog, Web 2.0

I. INTRODUCTION

This study describes the conditions in which a video blogging project was executed in each of the five communities of the Gems of the Earth Rural Community Telecenter Network in northern Minas Gerais, Brazil. It

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analyzes the content of the video posts and contrasts those with the content posted on the blog posts published in the telecenter portal. The study concludes that the video journalism tools have generated greater interest in the communities to use the telecenter, as they provide the means of communication that resemble the more prevalent face-to-face exchanges among the villagers.

Video blogging is among the Web 2.0 technologies that became popular by the end of 2006 through the sudden success of YouTube. Even before the popularization of YouTube, several Web sites competed for the interest of Internet users to post their videos and share their comments in an online collaborative community environment. The idea that amateur video producers could share their media production with the rest of the world enabled a new generation of citizen video-journalists. More importantly in the context of community informatics, it made it possible for remote rural communities, where face-to-face communication prevails, to actively adopt information and communication technologies available at local telecenters. While telecenter initiatives abound in rural areas of the developing world, few offer access to video blogging tools that can increase participation by providing societies with high rates of illiteracy with tools that enable oral communication.

The Gems of the Earth Rural Community Telecenter Network was established as a Brazilian non-government organization (NGO) in September 2003. Its mission is to empower small rural communities through the use of modern Information and Communication Technologies (ICT), to bring them social and economic development through their integration into the Information Society. The Gems of the Earth NGO oversees a pilot project in five locations since 2003. The pilot project aims to develop an appropriate methodology to deploy self-sustaining community telecenters in small rural communities in Brazil.

The article “Impact of the Insertion of Modern Information and Communication Technologies in Brazilian Rural Communities” [6], presented at ICTD2006, in Berkeley, California, introduces the Gems of the Earth rural telecenter methodology, and evaluates its impact in the pilot project, as analyzed by a Master Thesis at the Federal University of Minas Gerais [5]. At the ICTD2006 conference, an enthusiastic collaborator offered funding to experiment with a video blogging activity. With the intent of increasing the capacity of the telecenter volunteers to express themselves, the funder projected that the use of video blogging would provide

more concrete possibilities to document and expose to a global audience the everyday facts of the community, as well as register the living history of its people.

In order to reach the intended objective, the telecenter volunteers and the community needed to go through a process of digital inclusion, then a process of informational inclusion to finally reach the social inclusion as proposed by Ferreira and Dudziak [3]. This model defines the concept of information appropriation, a process that occurs in three stages. In the first phase, digital inclusion, the emphasis is on the use of technologies, i.e., the ability to operate and communicate through the use of computers. The understanding of the functionality of the equipment (hardware) and its application programs (software) grows, as does the ability to produce, organize, disseminate and visit the information in an automated form.

The second phase, information inclusion, emphasizes cognitive processes. Its objective is to construct knowledge including the use, interpretation and search for meanings, and the creation of mental models. The construction of knowledge occurs at the establishment of relationships between the various information items. Uncertainty decreases as learning occurs and new knowledge is incorporated in the pre-existent cognitive structure of the individual [1]. Information systems are examined according to how they are perceived by individuals, with special attention to the understanding of how a person searches the meaning of their questioning and learning processes; it is the *sense-making* in the work of Dervin and Nilan [2], [4].

The third stage comprises the process of social inclusion, understood as information literacy with emphasis on the construction of the sense of citizenship that emerges from the learning process. It must include, beyond a set of skills and knowledge, the notion of values connected to its social and situational dimensions. These values involve the development of attitudes and personal positions, including ethics, autonomy, responsibility, creativity, critical thinking and the learning of how to learn.

The field researcher who collected the data in one of the communities of the pilot project, Tombadouro, remarked that one particular instance made clear the extent to which the villagers have adopted the new information and communication technologies available at the telecenters. As he was leaving the village an elderly woman told him, "Please send us an e-mail letting us know you got home safe." The request was remarkable not only as evidence of the affection and concern of a community member for the researcher, but also for her use of the term "e-mail," expressed in its original form, in English, not Portuguese. The comment indicates that, despite being illiterate, she has adopted the technology as a communication channel. She and other illiterate members of the community rely on e-mail communication with the help of telecenter volunteers who connect to the Internet to retrieve

messages which they in turn pass along to the rest of the community face-to-face. This example shows how the community of Tombadouro has reached the later stage of social inclusion as described above.

The study reports detailed findings from the community of Tombadouro, which produced 46% of all videos posted to the telecenter portal, uncovering evidence that the video blogging tools empowered the community as a whole and youth video journalists in particular. It concludes with an analysis of the overall impact of Web 2.0 technologies in social and economic development, identifying the strengths and shortcomings in the application of the current tools.

II. THE ROLE OF CONTENT CREATION

Participation in virtual communities has been linked to increased political activism, greater civic engagement and the formation of social capital (Norris, 2006; Rheingold, 1993; Warschauer, 2003a). There is evidence that activities that used to take place in real-life neighborhoods are migrating or being complemented at virtual meeting grounds, where users create, nurture, and support social bonds (Burnett, 2000; Burnett & Buerkle, 2004; Rheingold, 1993).

Insofar as participation in virtual communities linked to telecenter initiatives, studies have found that the creation of relevant content that fulfills the user's information needs and complements the roles of real world social networks contribute to the sustainability of such projects (Roman & Colle, 2002; Warschauer, 2003b).

III. THE VIDEO BLOGGING PROJECT

The Gems of the Earth Video Blogging Project was launched at the Second Meeting of the Gems of the Earth Volunteers, which occurred on the second and third days of September, 2006, in the village of Tombadouro, in the northern part of the state of Minas Gerais, Brazil. The first video produced by the project depicted the meeting of the volunteers from the community telecenters of all five villages that compose the Gems of the Earth Rural Telecenter Pilot Project [8].

Two recently graduated communication professionals from outside the communities were tested on their abilities to create video blogs and then were hired to train the telecenter volunteers. They were given the assignment to spend seven days at each of the five villages, creating video blogs and training telecenter volunteers. The instructors had no formal training skills. Their objective was to teach others while doing the process themselves. The result was that the initial few videos produced by each of the communities were created by the instructors. Volunteers gradually took over production duties as they learned each step. At first, the instructors chose

the topics being covered; later the volunteers selected them on their own.

The trainers conducted training sessions in the communities starting at Conselheiro Mata [12], followed by Rodeador [13], Milho Verde [14], São Gonçalo do Rio das Pedras [15], and Tombadouro [16], in that order.

The equipment consists of one Digital Video (DV) camera at an average cost of two hundred and fifty U.S. dollars, connected to a personal computer (PC) at the telecenter through an IEEE 1394 (Firewire) interface card, which costs thirty U.S. dollars on average. The telecenter computers run a recent version of Ubuntu Linux, and the video production software used is the open source Kino. The video production process consists of selecting a topic, creating a shooting script, capturing the images and audio of interviews or narration, importing video and audio from the camera into the computer, selecting the appropriate shots for a three-minute long video, adding graphic titles, editing scene transitions, incidental music and credits, uploading to YouTube or Google Video, and finally posting a link to the video blog and an explanation of the content of the video on the Gems of the Earth Web Portal (www.gemasdaterra.org.br). The rural telecenters are connected to the Internet through a VSAT satellite antenna capable of 256 Kbytes/sec download and 128 Kbytes/sec data upload rate.

The Gems of the Earth Web Portal was redesigned to accommodate embedded video blogs. A special category was created to organize the video blogs in the portal's Phpnuke implementation, which utilizes the MySQL database, running Php on an Apache server under Linux. A direct link to this category, named *TV Gemas da Terra* (Gems of the Earth TV), was included in the portal's main menu, under the menu item *Comunidade* (community), and the sub-menu Video blogs. A click on this link provides a list of all video blogs published [9]. The video blogs are also organized by community, so that all video blogs from one specific community may be selected by going to the menu *Notícias* (news) and the sub-menu *Tópicos* (topics), then selecting the name of the community [10]. The news items with a heading *TV Gemas da Terra* contain video blogs published by the community. The portal can also display the complete news archive with number of views for each post or video blog, number of comments, and ratings awarded by users [11].

IV.METHODOLOGY

Given that the study pursued a qualitative research approach, which as described by Minayo [21] is characterized by its mutating and dynamic aspect, where “individuals and groups and the researchers are dialectically authors and characters of their historic time,” the researchers opted for the technique of semi-structured interviews, in which according to Laville and Dionne [22], “the themes are specified and open questions are

formulated previously, but total freedom is permitted concerning the repetition of some questions, the order in which the questions are made and the addition of improvised questions.”

In order to present the impact found after the execution of the video blog project, a visit to the community of Tombadouro was made in August of 2008. Several interviews were conducted with the video bloggers and the villagers which participated and continue to participate in the project. The interviews occurred at various locations, including the community telecenter, the school, the Cooperative of Rural Workers, the main square, and in some of the houses of those villagers who participated in the videos produced. The interviews were recorded and later organized sequentially and by themes described in this article.

The researchers also conducted a content analysis of the video blogs posted on the *Gemas da Terra* portal. The classification scheme measured dimensions of diversity based on a modified version of the model proposed by Hoffmann-Riem (1987) and McQuail (1992) where the content was examined for topics, the representation of different ethnic groups and genders, and geographic coverage and relevance.

The coding scheme identified the community covered in the videos, their length (duration in seconds), the location where it was shot (exterior, interior, or both), the two main subject matters or topics contained in each piece. It also identified the first two actors (a person, concept, entity, organization, agency, etc.) and categorized those according to gender, whether or not their image was shown, their voices were heard, their gender and ethnicity where applicable.

Two coders independently analyzed one-tenth of the video blogs sample to establish inter-coder reliability. The coders were native Portuguese speakers who underwent two virtual training sessions and never met in person. Coding decisions about 14 different criteria in each of the ten videos generated inter-coder reliability of 80.71%.

V.CITIZEN JOURNALISM IN TOMBADOURO

The video blogging project was introduced to the community of Tombadouro during the II Meeting of the Gems of the Earth Volunteers [8]. A few weeks later, the video blogging instructors spent an entire week training 4 volunteers of the community telecenter. The training developed with technical presentations and the realization of practical exercises, being the object of the work the community itself. Random shots were made, attempting to learn how the video process works while exploring the various technological resources that the video camera offered.

Once the capacity-building process was completed, the volunteers continued the video production activities while searching to learn on their own other resources that had not been explored during the training, and “today, we have a technique to produce videos,” as expressed by one of the video bloggers.

This movement of search for new knowledge shows concern born out of the initial contact with the instructors, and following this concern, several experiments were made until they reached their first independent production, which displayed the work developed in the community by the Rural Workers Cooperative [18].

Several other video productions happened after this first work and it is important to note the evolution perceivable when one observes the themes contemplated by the videos. In the first moments, the productions did not have a defined focus. As time goes by, more clear objectives develop, with motives that reflect an awakening of ideas by the volunteers for what really makes sense to the community, which justify the theory presented by Ferreira e Dudziak [3] regards the process of informational appropriation (digital, informational, and social inclusion). This learning process also confirms the proposition that the uncertainty decreases as the learning develops and new knowledge is incorporated to the pre-existent cognitive structure through the process of accommodation and assimilation proposed by Piaget [39]. Furthermore, there is a concern to understand how people search for the meaning of their questioning and learning, i.e., it's the sense-making of Dervin and Nilan [2].

In a sequence of very intense production, some examples show how the evolution of the video blogs of the community of Tombadouro over a period of 22 months of activity. After registering the work of the Rural Workers Cooperative [18], the videobloggers start a sequence of videos taking as basis the cultural and religious events typical of the region, like “The New Cross of Tombadouro” and “The Coronation of Our Lady, Mother of Jesus”. The local school is a reference for the community and is also registered in the early stages of the project in “Ten Years of the School of Tombadouro” and “Dance Festival at the School”, besides the “Adult Learning in Tombadouro.”

The themes later take a broader view when the video bloggers start to look at issues of concern to the community, such as the work of awareness building regarding the treatment of trash in “Trash we Throw in the Trash Can”; environmental awareness building as in “The Tombadouro Waterfall”, “Ecological Walk in Tombadouro”, “Planting of Seeds in Tombadouro”, and “Preserving Nature”.

The concern for the local culture can be seen in the strength of the videos: “The Music Band of Tombadouro”; the traditional dance party “Forró Tomba”; “The Children's Choir”; and the “The Knowledge Masters”, which registers the culinary

knowledge of the people of the community as the means to transfer knowledge between generations.

VI. COMMUNITY EMPOWERMENT

Once aware of the possibilities of video journalism, the video bloggers of Tombadouro start to document actions with the intent to mobilize the community. For example, the video blog “Trash We Throw in the Trash Can” not only brings awareness about the issue of education and the need for all to take responsibility for the actions needed to take care of the community's trash, but it also demands effective action from the local authorities in what means an improvement in the quality of life for all, a question of citizen's rights.

Another video blog that demonstrates community empowerment is the “Problems with the Plantation of Oranges in Tombadouro” [19]. After registering the problem that was occurring with the orange plantations in the community, the video was posted in the Gemas da Terra web portal. After seeing the video, an outsider collaborator called the attention of a relative connected to the Brazilian Ministry of Agriculture, which showed the video to a leading citrus researcher at the Brazilian Agriculture Research Agency EMBRAPA. After analyzing the video, the EMBRAPA researcher detected that the orange plantations were suffering from a plague called *Bicho da Fruta* (South American cucurbit fruit fly). In an email message sent to the video bloggers, he suggested some low cost techniques to deal with the problem. The video bloggers passed the information to the orange producers, and those who followed the instructions were able to solve the problem.

The case just described indicates how the use of video blog may affect the life of a rural community benefited by the presence of a telecenter. The problem faced by the orange producers was related to the lack of access to technical knowledge in a frequent basis due to the community being remote and of difficult access. The access to the modern tools of Information and Communication Technologies (ICT) eliminated geographical barriers and allowed for an expeditious solution of an otherwise total loss of agricultural production. The solution of the problem guaranteed the orange production leading to preservation of income and ultimately empowering the community both financially and socially.

The World Bank Report on Empowerment and Poverty Reduction [20] states that empowerment can be defined as “the expansion of assets and capabilities of poor people to participate in, negotiate with, influence, control, and hold accountable institutions that affect their life.” The video blogs presented in this study are a clear example of community empowerment through the use of modern ICTs in the rural telecenter in Tombadouro. While initially reporting on an issue of interest to the community, the citizen journalists of Tombadouro now understand they can access government institutions and acquire knowledge to solve their community

problems, fully exercising their citizenship by means of digital communication. They have ultimately become participative agents in their community.

According to Freire [40], to participate is to discuss, to have a voice. The video blogging activity described in this article expanded community participation in Tombadouro, once individuals became aware of their ability to have a voice that reached beyond geographical boundaries, via the Internet. This is a case where the rural telecenter became a public sphere that generated empowerment of the people and brought about social change in the community.

Likewise, it is possible that the role of women as prolific reporters and content producers may have contributed to the increased representation of diversity in the video blogs, as proposed in Hoffmann-Riem's model (1987), where access and representation of persons and groups to the media accounts for one of the four dimensions of diversity.

Burd [42] reports in his work that various telecenters are being under utilized and do not contribute to the improvement of the quality of life of their community. In several cases, the telecenter activities focus primarily in the development of technical skills for the industrial job market. Without considering the local needs and values, these initiatives do not help in the process of comprehension by the participants regarding the potential of ICTs for the development of the local community. The focus on job market training in a rural setting also foment the idea that to succeed in life one needs to leave his/her own culture and place of residence. The examples of video blogs developed by the community of Tombadouro give signs regarding the development of digital inclusion activities that transform the lives of those living in rural settings, while empowering communities and individuals alike.

VII. YOUTH EMPOWERMENT

The volunteers who participated in the Gems of the Earth Video Blogging Project age from 16 to 22 years old. They invested their time to learn a new tool and engage their community. In the video blog "The Talent of Leonardo Patrick", the video blogger interviews a young talent in the community of Tombadouro who shows special abilities in the art of drawing. The video blogger is a student of Pedagogy in the modality of distance education via the Brazilian Open University Program. She utilizes the telecenter to develop the activities of her distance learning courses. According to her, she is in the early stages of her studies of the theory of education developed by Paulo Freire [40], [43]. However, through the use of video blogging she has been developing some innovative work in the area despite her unawareness of it. She is also showing great talent as a popular educator as described by Freire.

There are several digital inclusion projects in Brazil utilizing Freire's pedagogic referential. Rare are the projects, however, that utilize Web 2.0 technologies. In some of her video blogs, the above referenced popular educator interviews members of the community bringing rich examples of Freire's dialogism in a rural setting utilizing ICTs as proposed by Gomes [24], which addresses the concept of the emancipation of education in a global level. The researcher who interviewed the video blogger was impressed with the great effort dispensed by her in the reading of the works of Paulo Freire that she finds online. She has also shown impressive creativity and sensitivity in reporting the everyday life of the people of Tombadouro.

The example shown here is a clear indication of youth empowerment in the community of Tombadouro due to the presence of the telecenter and the video blogging project.

VIII. RESULTS

Community members posted a total of 95 videos in the Gemas da Terra portal between September 2006 and May 2008 (see Table 5). This represents an increase of 53% over written blog posts published over the course of the same 22-month period. A total of 62 written blogs were posted in the same period. However only 38 were posted by community members, i.e., 61% of the total written blogs posted. The other 24 were published by project volunteers and interested global users of the web portal. When only video and written blogs from community members are counted, the increase rate raises to 139%.

In Conselheiro Mata, youth volunteers produced and posted 12 videos with an average length of 282 seconds (see Table 1). Two of the telecenter volunteers showed great skill in video blog production, yet they soon moved out of the village to attend school and work in a bigger city. The telecenter's video camera needed repair and the telecenter itself was shut down due to lack of community support when the owner of the building where the telecenter was located decided to re-purpose it. As a result, the video blogging experience in Conselheiro Mata was short-lived. The community is currently re-organizing and has vowed to bring back the telecenter.

Table 1. Topics of videos posted by the Conselheiro Mata community.

Topics	Number of Videos
Community	6
Telecenter	4
Local Culture	3
Education	2
Public opinion	2
Students	2
Artistic Expression	1
Entertainment	1

Healthcare	1
Technology	1

In Rodeador [13], the instructors trained four volunteers and produced 11 videos with an average length of 148 seconds (see Table 2). The personal computers at the Rodeador telecenter run Microsoft Windows NT Operating System and Microsoft Movie Maker freeware. In this community, the video blog project did not get past the training stage due to technical problems with the video camera, which has yet to be replaced.

Table 2. Topics of videos posted by the Rodeador community.

Topics	Number of Videos
Community	7
Telecenter	5
Artistic Expression	1
Education	1
Environment	1
Food	1
Local Culture	1
Particular industries	1
Public Opinion	1
Students	1
Technology	1

In Milho Verde [14], the two instructors attempted to train several uncommitted volunteers. They produced two videos which were not uploaded to the portal because the Internet was not available at the time. After the instructors left the village, the volunteers were never able to proceed beyond the training they had received and there were no additional video blogs produced in that community. The telecenter in Milho Verde has been beset by lack of leadership and commitment on the part of the community.

In São Gonçalo do Rio das Pedras [15], the instructors successfully trained two volunteers in the community telecenter. Overall, 22 video blogs were produced with an average length of 193 seconds (see Table 3). The volunteers created video blogs after the departure of the instructors, but the community eventually ran into technical problems with the video camera. After several attempts to repair the camera at a nearby town, the community purchased a new camera and resumed the production of video blogs. The community published 23% of all video postings on the Gemas da Terra portal.

Table 3. Topics of videos posted by the São Gonçalo do Rio das Pedras community.

Topics	Number of Videos
Artistic Expression	6
Education	4

Local Holidays	4
Entertainment	3
Environment	3
Local Culture	3
Religion	3
Community	2
Community Members	2
Particular industries	2
Students	2
Telecenter	2
Healthcare	1
Social Programs	1
Technology	1

The community of Tombadouro [16] produced 48 video blogs, with an average length of 216 seconds (see Table 4). These make up almost half of all videos published on the portal. The youth volunteers were very receptive of the new tools and the entire community adopted the new technology, as evidenced by their participation in video interviews. They recently experienced technical problems with the video camera, which is now being replaced.

Table 4. Topics of videos posted by the Tombadouro community.

Topics	Number of Videos
Education	9
Artistic Expression	8
Agriculture	7
Children	7
Community Members	7
Local Holidays	7
Students	6
Telecenter	6
Community	4
Entertainment	4
Environment	4
Food	4
Religion	4
Industry/Business	2
Sports	2
Human Interest	1
Local Culture	1
National Holidays	1
Outside guests	1
Race	1
Technology	1

The community of Tombadouro produced the most video blogs through the course of the 22-month period. The data provides an indication of change in adoption of the new technology. This community posted almost three times the number of video blogs as compared to written blogs. It is also noted that the subject matters of the video blogs were much more varied than that of the written blog posts, which were

limited to event announcements and telecenter development issues.

Table 5. Video and written blogs posted in the network portal

Community	Videos Posted	Blogs Posted	% Change
Conselheiro Mata	12	1	1100
Milho Verde	2	5	-150
Rodeador	11	7	-57
S. Goncalo	22	10	120
Tombadouro	44	15	193
Collaborative	4	24	-500
Totals	95	62	53

Evidence of the increase in participation by community members in the telecenter is shown by the number of accesses to the network's web portal, which almost doubled in the months following the introduction of video blogging [17]. While the total number of accesses to the site in September 2006 was 22,756, the same number increased to 46,917 in October 2006 and 40,363 in November 2006. Given that during this period the communities were still learning how to use the video blogging tools and there was little knowledge of the project outside the communities, it is acceptable to deduct that the increase in accesses to the network's portal is a result of more participation by the villagers in the use of their telecenters.

Community, whether as an expression of place, a gathering of individuals or as a reason for a common activity, was the most frequent topic of the video blogs, surpassing video blogs about the telecenter(s) (see Table 6). The video blogs also featured topics revolving around education (whether in school activities or in less formal settings) and artistic expression, the latter often in the form of displays of the arts and crafts of the region and the talents of local artisans. The overall content privileged local community events and activities, topics that do not receive wide coverage in broadcast television, whose programming closely mirrors the dominant culture of major urban centers São Paulo and Rio de Janeiro (Straubhaar, 1996).

Table 6. Primary and secondary topics of all video blogs posted in the network portal

Topic	Primary	Secondary	Totals
Community	18	3	21
Telecenter	5	14	19
Education	13	3	16
Artistic expression	6	10	16
Local holidays	4	7	11
Students	0	11	11
Community members	0	9	9
Environment	7	1	8
Local culture	5	3	8
Entertainment	4	4	8

Religion	7	0	7
Agriculture	5	2	7
Children	3	4	7
Particular industries	4	1	5
Food	2	3	5
Public opinion	2	2	4
Technology	1	3	4
Sports	2	0	2
National holidays	1	0	1
Outside guests	1	0	1
President	1	0	1
Race as an issue	0	1	1
Social programs	0	1	1
Human interest stories	0	1	1
Totals	91	83	174

The video blogs represented the diversity present in the communities. In a majority of the video blogs, the primary or secondary actors were female (see table 7). Male actors were less prevalent. Roughly one-third of the videos showed both females and males as first or second actors. The actors were almost always visible in the shot, and more often than not their voices were heard. The majority of the video blogs were produced by women working alone as reporters or as partners with a male reporter. As table 8 indicates, the primary or secondary actors featured in the video blogs represented a diversity of ethnicities.

Table 7. Gender diversity of primary and secondary actors and reporters

	Female	Male	Mixed (both female and male)
Primary or secondary actors	67	41	35
Gender of reporter	42	15	28

Table 8. Ethnic diversity of primary and secondary actors

Primary or secondary actors	
White	35
Light brown	28
Dark brown	27
Black	10
Mixed group	40
Unclear	12

IX. CONCLUSIONS

The results achieved in the video blogging activities in the rural communities where the Gems of the Earth Rural

Community Telecenter Network **operates** reminds us of the importance of Papert's affirmation that equal access to computers and the Internet require an epistemological pluralism and the acceptance of multiple forms of knowledge and thinking [41].

The Gems of the Earth Video Blog project set out to empower rural telecenter users in the community with video editing and publishing capabilities. One of the most noticeable impacts of the project is the increased awareness of the presence of the community telecenter by the villagers. Suddenly there is a new tool at the telecenter that engages everyone in the community from all ages and occupations. The few that were trained in the use of the new tool raised their status in the community, and are now recognized for skills that can lead the community in new directions. These few people were all youth.

This study shows that the level of adoption of the new technologies has increased considerably with the introduction of video blogging capabilities, when compared to a previous qualitative evaluation of the impact of the telecenters in the communities [6],[7]. The results signal a further step towards the self-sustainability of the telecenters, as the villagers take full ownership of the telecenter project. The number of visualizations per blog post on the Gemas da Terra portal also increased significantly when comparing written posts to video posts, as seen in [11]. This result indicates an increase in interest by global and community users of the web portal, due to the introduction of video blogging.

The increased adoption of the new video tools by the rural villagers, in comparison to written contributions, and the broader set of issues addressed by the video bloggers lead the researchers to conclude that the video blogging project was received positively in the rural telecenters. The researchers attribute the increase in participation to the preference for face-to-face communication over the written word in communities with high rates of illiteracy.

The case study of the successful adoption of video blogging by the community of Tombadouro indicates the growth path of the Information Society in rural settings. Video provides the ideal mechanism for rural people to adopt modern ICTs and engage in cyberspace. Contrary to the current trend that providing low bandwidth Internet access and job training suffice the needs of rural communities to engage in digital inclusion, this study indicates that rural telecenter projects shall start with the use of video tools and provide plenty of bandwidth to access the Internet. The extra investment pays itself in the earlier adoption of the ICT tools by the villagers indicating a shorter path to telecenter self sustainability.

The prevalent problem seen in this project with the digital video cameras is an example of where the technology requires improvement. The cameras utilized in this project use tapes and thus require mechanical parts to operate. In a rural setting, the cameras are highly susceptible to dust, extreme weather conditions, and unstable electrical supplies (while in charge

and connected to computers). All of the cameras purchased for the project failed at some point during the 22-month period. However, newer and lower cost all-digital cameras with no moving parts that can easily record good quality video have become available since. And so have low cost video projectors that allow the video bloggers to share their productions with the community, further increasing participation.

Video blogging is also starting to find limitations as the bandwidth of the Internet backbone shows lack of capacity to attend the growing numbers users. As it becomes clear that video is the best means of communication for less sophisticated users, we should expect increased demand on higher bandwidth both in the Internet backbone and in its periphery, the so called last mile. More than 78% of the world's population is still to engage in the Information Society [44]. While bringing about universal access to the Internet is a global challenge, utilizing the current state of ICTs makes the challenge even more difficult. The success of many rural telecenter projects worldwide thus depends in the improvement of Internet tools, the so called Web 2.0 technologies, the overall increase in bandwidth both in the backbone and the periphery, and the continuous improvement of the cost performance ratio of hardware tools such as computers, video cameras and projectors.

X.FUTURE CONSIDERATIONS

While this article describes both the failures and the successes of the video blogging project in five rural communities, its main intent is to document the investigation of the case of Tombadouro and derive lessons learned that may be applied in other rural telecenters. The weakness of the project itself is not of concern to the researchers. The entire project cost only five thousand US dollars. It is the fact that Tombadouro succeeded despite all the potential for failure that justified this case study. The Gems of the Earth NGO provides opportunities for the five rural communities of its pilot project to learn about new ICT tools and decide upon themselves to engage or not in their application. Identify the traits that make up the success stories and attempt to codify them to enable replication are the goals of the researchers involved in the Gems of the Earth project.

The lessons learned with the video blogging project will influence the Gems of the Earth rural telecenter methodology both in the training methodology given to telecenter managers and the overall strategy to reach telecenter self sustainability. It is clear that community engagement is a first step on every telecenter project. Video blogging shows the way to achieve earlier community participation.

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