



Adoption of ICTs in a Marginalised Area of South Africa

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Abstract

This paper examines how a community in Dwesa, a marginalised area in the Transkei Region of the Eastern Cape, South Africa, adopts Information and Communication Technologies (ICTs). This research is part of the Siyakhula project, which aims at promoting the potential of the area through ICTs. The project is situated in four different schools: Mpume, Nondobo, Mtokwane and Ngwane. Fostering ICT awareness and a sense of ownership by the community are seen as crucial factors, and computer literacy education is an integral part of the project. The study focuses on how diverse groups of people adopt new technologies and approach ICT education. Qualitative research methods such as Participatory Action Research (PAR) and Participant Observation (PO) were adopted in the study.

Key Terms: marginalized, Siyakhula project, computer literacy, new technologies, adoption

Résumé

Le présent article étudie l'adoption par une communauté de Dwesa, une zone marginalisée de la Région du Transkai de la province du Eastern Cape, Afrique du Sud des Technologies de l'Information et de la Communication (TIC). Ce travail fait partie du projet Siyakhula qui a pour objectif la promotion du potentiel de la région à travers les TIC. Le projet est abrité par quatre écoles : Mpume, Nondobo, Mtokwane et Ngwane. La sensibilisation par rapport aux TIC et le développement d'un sentiment d'appropriation parmi les membres de la communauté sont considérés comme des facteurs essentiels. En même temps, la

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formation à l'utilisation de l'outil informatique fait partie intégrante du projet. L'étude se focalise sur l'adoption par différents groupes des nouvelles technologies et la manière dont ils abordent la formation en matière de TIC. Cette étude a fait usage des méthodes qualitatives telles que l'approche participative et l'observation participante.

Termes clés : Marginalisée, Projet Siyakhula, formation à l'utilisation de l'outil informatique, Nouvelles technologies, Adoption.

Introduction

ICTs are essential tools that enable communities to access information and other services in the world. However, most marginalised communities do not get the opportunity to use ICTs as they lack access to information relevant to their living. The Siyakhula project implemented an ICT project in Dwesa (South Africa), which aimed at creating ICT awareness. According to Harris (2001), technology has to be used resourcefully to develop local communities and accomplish affirmative results (and therefore create new opportunities). New education, health and business services have been put forward as a result of the introduction of the Internet. These include e-learning, e-health and e-commerce. These new services allow communities to access services regardless of their geographical location (Harris 2001).

Marginalised communities have lived for years without Internet or computers. Therefore, when these technologies are introduced for the first time, adoption becomes a complex problem. Also, as individuals are diverse, the way they accept and adopt innovation is also different. These differences are influenced by a number of factors that determine how each individual adopts a new idea. In this study, three independent variables have been identified as having an effect on how individuals adopt ICTs especially in marginalised communities. These are education, gender and age. The research reported here discusses and describes issues that affect and slow the adoption process. It investigates the problems different groups of people in Dwesa encounter when getting acquainted with computer use. The study also looks at the challenges that might cause discontinuation and resistance towards ICT use. In addition, the study examined the various stages of new technology adoption. It aimed to answer the following question: How do individuals with different levels of education, from different age groups and gender adopt ICTs?

The paper starts with a description of Dwesa and different groups that are found in the area.

Dwesa: An Overview

Dwesa is a marginalised area situated on the Wild Coast of Transkei, in the Eastern Cape Province of South Africa. It has been the site of extensive research for a long time (Palmer, Timmermans and Fay 2002). Its population is estimated at 15,000 people living in 2,000 households. The inhabitants of Dwesa survive through traditional farming and they depend on the land, arts and craft for their livelihood. The region features a coastal nature reserve. The community formally owns it and it is managed by an employee of the South African National Parks Conservation Board. The area has a potential for both eco- and cultural tourism due to the rich cultural heritage and the marine conservation project undertaken at the nature reserve (Dalvit et al. 2006).

In many ways, Dwesa represents many rural realities of South Africa and Africa. It is encircled by lack of infrastructure in terms of roads and electricity, as well as by poverty and lack of services (Human Sciences Research Council 2005). There is a high unemployment rate and most people are illiterate. People who manage to complete secondary education do not manage to go further (Dalvit et al. 2006).

Dwesa has a lot to offer tourists and the outside world in terms of preservation of traditional background and services. However, it is difficult for business people to advertise their goods to a wide market because of lack of computer and Internet skills (Dalvit et al. 2006). That is why it was decided by the Siyakhula project members that the development of the e-commerce platform was necessary. Most people in Dwesa, mostly women, are highly talented in arts and craft and they take pride in their culture. This shows that Dwesa has the potential to develop into a tourist hub, which would play a leading role in job creation. That would help to retain young people who usually leave the area to look for employment opportunities in big cities.

Siyakhula Project

The Siyakhula project is a project undertaken by the University of Fort Hare and Rhodes University to study the execution of ICT-based solutions in rural communities in regard to encouraging growth in the area (Dalvit et al. 2006). Siyakhula has deployed computers, connected to the Internet and these are provided with the use of the Very Small Aperture Terminal (VSAT), made available by Telkom. Computer laboratories were

set up in four different schools – Mpume, Nondobo, Mthokwane, and Ngwane primary schools – which were identified because of their central location (each school is named after its village).

Project members provide basic, intermediate, advanced levels and also Internet use training to teachers from all schools, learners and community members, so as to develop essential computer skills. The Internet is being paid for by the universities centres of excellence. Researchers from both universities go to Dwesa for a week every month to provide more training, introduce more ideas and programmes that would help the community, and also assess progress that individuals make. The project has embarked on the following:

1. **ICT Infrastructure:** The two universities provided the basic infrastructure necessary to undertake the project. The initial infrastructure comprises of computers, networking, software and other secondary devices.
2. **Computer Literacy:** Teachers at various schools were trained in computer use; they, in turn, train the learners and the rest of the community on the use of ICT tools and techniques. Training course material and initial tutoring of the community were also provided.
3. **E-commerce Platform:** A working prototype of an online portal to facilitate the economic activity in Dwesa was provided to ensure growth in the region. This was designed to enable the local entrepreneurs to advertise and sell their products and services to a wider market.
4. **Support and Upgrades:** Ever since the beginning of the project, technical support for hardware and software issues was provided. The two institutions have maintained an on-going presence in Dwesa and provide the necessary upgrading of the infrastructure.

Community Focus: The project is designed to encourage collaboration among community members. The resources were made accessible to all members of the Dwesa community.

Champions from various training sessions who led subsequent training were also identified. In this process new and appropriate venues for the subsequent training and installation of equipment were also identified. The aim of the implementation was to encourage the development of the area (Dalvit et al. 2006).

Diffusion of Innovation Theory

There are a lot of issues to be considered when technologies are being introduced in areas where there has never been any form of technology before. For example, who are the possible adopters? Do they have substantial reasons to adopt the innovation? Would the community perceive the need to adopt the innovation? These are some of the questions that need to be asked (Nedeveschi et al. 2006). Diffusion is a process whereby a product meant to bring innovation spreads within a population, reaching a number of adopters (Rogers 1995). The process begins with the introduction of the innovation to the population and ends when the population fully adopts it. A product or service of innovation can be disseminated and adopted at 100 per cent or less (Rogers 1995). Rogers differentiates diffusion from adoption in that the diffusion process occurs within a society to all different groups, whereas adoption has to do with the individual's feelings and needs (Rogers 1995).

Stages of Adoption

The adoption of innovation is made up of a number of stages that are usually followed by adopters. These stages assist in understanding how an individual adopts innovation. According to Rogers (1995), these stages can be broken down into five as follows:

- **Awareness:** The innovation is introduced to a person who does not have sufficient knowledge about the product or service. Because of this lack of information the individual does not feel the need to go out and look for more information, and also does not consider buying or using the product or service;
- **Interest:** One decides to find out more about the innovation/product, but does not really know how or if it can be useful in their own life. That is when the individual decides to access information and more knowledge about the product so as to decide whether or not to adopt;
- **Evaluation:** The individual starts making decisions about the innovation. The individual asks questions concerning the use of the product, whether it is really worth buying, whether it would make a difference, etc. These are the types of questions that individuals ask themselves during the evaluation stage. If the innovation appears to be useful to their life, they will try it out;
- **Trial Stage:** This is a stage whereby the product/innovation is used to a limited extent. That was when people attended the training in Dwesa to assess the project's usefulness. They thought about how ICT use

could become advantageous to their needs. After that, they came up with suggestions on how it could be used for the benefit of the whole community; and

- **Adoption Stage:** The individuals use the information they gathered in the interest and evaluation stages and with the results of the trial stage to make a decision to adopt the innovation. At this point, individuals consider a lot of opportunities concerning the innovation. It is adopted with ideas on how it will be used for improvement in their lives. However, due to various reasons, individuals might reject the innovation after they have adopted it (Rogers 1995).

Different Groups of Adopters

According to diffusion of innovation theory (Rogers 1995), there are five categories of adopters of innovation. It is very clear that people adopt innovations at different times and for different reasons. The community in Dwesa also comprises of different types of adopters:

Innovators: This is a group of risk takers, people who calculate the risk. In the case of the Siyakhula project, this group is made up of the project members; they calculated the risks involved in the diffusion of innovation, but resolved to make the project work. They came up with ideas on how the project can become successful in marginalised areas.

Early Adopters: Teachers in all four schools, who have been approached by the project members to learn and help to conduct training for learners and community individuals, represent this group. With help from certain individuals in the community, they helped in recruiting people from the village and they also helped the project members to introduce the project to the community leaders and elderly citizens in the village.

Early Majority: This group comprises of a few people who have been attending the training from the beginning. There were challenges at the beginning but they continued to learn. Some have become champions who also took part in teaching the beginners. They have been learning to use computers and the Internet. For example, they practice typing and also search the web for useful information.

Late Majority: This group is made up of a few arts and crafts makers who attended the meetings and only decided to adopt the project if they felt it was going to help in improvements in the arts and craft business. However, they did not want to participate fully in the use of computers and the Internet because they felt their age was a handicap. As a result, they decided to work with one of the teachers.

Laggards: Among the adopters of innovation, there are also a number of laggards in all different groups. This group believes that ICTs are meant to be used by a particular group of people. As a result, they are not keen to learn. A few women who also proved to be laggards believed that computers were supposed to be used by teachers, because they were educated. Men believed that ICTs should be used by women only; a few teachers also did not show much interest. As a result, they were not willing to participate in the training.

Motivation to Use ICTs

Based on the interviews, most people mentioned they were 'not motivated to use ICTs because we would not know what to do with them. Mostly, we do not know what we will benefit from them'. Given the conditions the community has been living in, this proved to be a reasonable feeling. There have never been computers in the village even in schools. Individuals have traditional businesses that had been operating since they were young, so it would not be easy to understand quickly how ICT use would improve traditional businesses. However, arts and craft makers were motivated with the hope that they could market their products to a wider market.

Marginalised communities adopt ICTs differently from urban populations. Findings from Pierson's study (2002) on ICT adoption and use by self-employed persons and micro-enterprises in Flanders (Belgium) suggest that people living in marginalised areas are more likely to adopt ICTs for personal and work related reasons. People living in urban areas were more likely to adopt ICTs for personal reasons. These include (aside from an individual's work) online shopping, viewing holiday destinations, communicating with people from other countries, etc. (Pierson 2002). This is due to different information and communication needs and motivations (Shields and Samarajiva 1993; LaRose and Mettler 1989; Patterson and Kavanaugh 1994). For example, Patterson and Kavanaugh (1994) found that marginalised residents in Australia were more interested in telecommunication services that facilitated interaction with people and events in their local area.

Attempts to understand and improve the effectiveness of ICT adoption for agriculture have also been noted ever since ICTs became available for agricultural management and production. ICT adoption for agriculture and rural development remains a major national and international concern. In addition, education through ICT and ICT training are also identified as common poverty alleviation factors (Gelb et al. 2004).

According to our findings, most individuals in Dwesa believe that, in order to get motivated, they need to learn more things they can do that are interrelated to their daily living. The introduction of e-commerce platform gave people hope. During the meetings, a few people suggested new ideas, such as typing and printing of programmes for events like funerals and traditional ceremonies. Mpume community became motivated to buy a printer, and it is used by the community and the school.

Challenges Encountered in the Adoption of ICTs

Osborn (2005) believes that successful development projects connect and balance local skills and knowledge rather than trying to change people into having the skills they need. Much of people's cultural and indigenous knowledge, especially in rural areas, is enclosed within and is expressed through their local languages. Limiting people to the use of ICTs in a foreign language tends to intensify the digital divide. In the process, it makes it difficult for people to quickly adopt ICTs and, in fact, it generates fear. As a result, ICTs are perceived as tools for educated people only (Osborn 2005). A community member pointed out that 'it gets difficult to understand and follow instructions given when using computers/Internet, because we do not understand English; it would help if project members could provide isiXhosa written material as well'.

Methodological Choices

We used two methods, namely participant observation (PO) and participatory action research (PAR). These two methods required that we get involved in the area of study and work closely with the population. PO allowed us to learn more about the environment, inhabitants and their activities. PAR has a cyclical aspect to it. It allowed the community to be active in the project, to be involved in decision making and planning. It also equipped them to be prepared for the changes that occurred in their environment. It also encouraged people to reflect on and give feedback about the project. Their feedback contributed to our insights into how they perceived the project and adopted ICTs.

Participant Observation (PO)

According to Bruyn (1966), PO is a method used by researchers who spend time and observe the research area as participants. The researcher takes part in the activities of the research area and in the process the researcher gets to know the respondents and the environment. This framework was used in order to discover in-depth information about social ac-

tivities in the community. The process involved observing the environment and how it plays a role in the way people adopted ICTs.

Our observations comprised of general observations about the four sub villages in Dwesa and members of the community that showed interest in the project. Dwesa is led by chiefs with their headmen in each sub village. It has a shortage of basic infrastructure such as electricity. Even the schools that have electricity are subject to frequent power cuts. On one visit by the researchers it became difficult to conduct the training because there was no electricity for almost the entire week. The electricity company (Eskom) could not fix the problem because of rains and the muddy roads. Homesteads in each village are somewhat far from one another; as a result, individuals walk long distances when they need groceries and when they visit relatives and friends. Mode of transport to town is an individually owned bus, and a few minibuses. The bus leaves the village very early in the morning and comes back later in the afternoon. Most young people, who do not study, work on projects in the village. Those who do not help their parents in taking care of livestock and in ploughing fields.

Training at Mpume showed that some individuals were somewhat reserved when teachers were using computers/Internet. When it was time to make decisions about the project, it was difficult for individuals to put forward ideas; as a result, a few discontinued with the training. Teachers were keen to learn new ideas and also to train others. Arts and craft makers showed interest but because they were mostly middle aged, they indicated that they struggled with poor eyesight. Long distance to the school also affected their daily attendance. Individuals walked long distances as there was no regular transport between the villages. It was also mentioned that they were preoccupied when selling their products. At Mthokwane School, teachers opened the lab for the community to use computers until afternoon and learners would come after school hours.

Mpume School is one of the under-privileged schools in Dwesa; it lacks infrastructure such as equipment to trim lawns. There were no telephones, fax machines, etc. The school had no proper fences; as a result, livestock from the village moved about freely. Classrooms were not properly furnished and some windows were broken; most doors had no locks. The environment was not very attractive for computer use and training. However, teachers managed to integrate ICT use in their teaching activities. Compared to Mpume School and Ngwane, at Mthokwane and Nondobo some teachers seemed less keen to use computers/Internet. They were busy with their work and left immediately after school hours.

Participatory Action Research

Participatory Action Research is somewhat similar to Participant Observation method in that it requires a deep understanding of the community's lifestyle and background. PAR also requires that respondents put their practices, ideas, and assumptions about institutions to the experiment by gathering evidence. It involves, allows and equips participants in objectifying their own experiences (McTaggart 1989). The community participated in the implementation of the project. For example, the community helped in recruiting people from the village. Also, key people to be consulted were identified and meetings were arranged to discuss the project.

Other Forms of Data Collection

In-depth Interviews: According to Sekaran (1992), respondents should be allowed to speak openly especially about issues that affect them, which is why open-ended questions are important in an interviews (Sekaran 1992). Open-ended questions allow respondents the independence to raise new topics, an opportunity to clarify responses and also to ask questions if they did not comprehend. Additionally, interviews provide researchers an opportunity for follow-up questions or to ask for additional explanation (Openheim 1992, cited in Wimmer and Dominick 2003).

Informal Conversational Interview

According to Patton (1990), this is a relaxed way of interviewing respondents. This is an informal conversational interview that may occur spontaneously in the course of field work, and the respondent may not know that this is an interview. Questions appear from the immediate perspective, so the wording of questions and even the topics are not pre-arranged. The researchers do not compile questions, they just engage in a conversation with the respondents (Patton 1990). That was possible in our research because we understood the language and the background of the respondents. According to Patton (1990), this type of interview requires an interviewer who is knowledgeable about the area of the interview and strong in interpersonal skills, since he or she will have significant decision in terms of directing the interview. We used this method to interview male and female respondents, but mainly with men in the village and that helped to create a relaxed environment. Respondents led the discussion by asking questions and we found a chance to ask our own questions in a conversational manner.

Interviews

These interviews were conducted in a manner that ensured that all individuals expressed themselves freely about the project and ICT use. They were both in-depth and informal conversational for all groups. Respondents were interviewed every time we went to Dwesa, so as to assess changes and progress among individuals and groups. The interviews were conducted with individuals and also in groups. The four schools were all primary schools from grade 1 to grade 9. Each school had about 200 learners and 12 teachers. Teachers from different schools were interviewed individually and also as groups. From Mpume Primary School, 8 teachers were interviewed, 6 from Mthokwane, 6 from Ngwane and 5 from Nondobo. At the beginning, all teachers were interviewed, but as time went by, a few mentioned that the training sometimes clashed with their lessons. They believed that the project was good for the school and the community, but still showed reluctance to participate. However, they noted that the projects helped to increase the number of learners, because they had received a number of applications from learners for next year.

Each village had a few individuals involved in arts and craft and these were mostly middle-aged and elderly women. Eight women from Mpume village were interviewed as two groups; five women from Ngwane village as one group; 7 women from Mthokwane as two groups and 4 women from Nondobo as a group.

From the four schools, learners from Grade 9 attended the training and a few were selected for interviews – 10 learners from Mpume, 12 from Mthokwane, 7 from Ngwane and 4 from Nondobo. Four grade 12 learners from Nqabara High School were keen and at the beginning they came for the training but discontinued later. Nqabara village is situated far from the other four villages.

Men of different age groups from the four villages were also interviewed – 6 men from Mpume, 4 from Mthokwane, 3 from Nondobo and 6 from Ngwane. They were all interviewed as groups. Most men were not available and those who participated in the interviews said, 'We work in other projects in the village; so we do not have time after hours'. Elderly men showed interest but only for their children; they committed themselves to ensure their children attended the training.

Power Struggles Regarding Ownership and Control of the Project

On the one hand, community members (especially at Mpume) did not see the need for teachers to conduct the training because they believed that

teachers were already employed so they should allow unemployed people to conduct the training and to develop their skills. On the other hand, others believed that computers should be used by the teachers because they were educated, and they knew what they wanted to do with them. This led to a few people being reserved in decision-making. Four nurses who were interviewed at the clinic at Mpume believed they were also in the right position to control the training. One nurse mentioned that: 'It would be easy to instruct people because I have done computer literacy training'.

According to the nurses, the clinic was open till 4pm, whereas the school closes at 2pm. This implied that people would use computers until late. Observations showed that community members were dependent on the teachers. This created the impression that teachers controlled the project. That gave teachers the power to dominate although not deliberately. In the perceptions of the community, teachers were in control because they were educated. One other problem concerned the general lack of knowledge of the benefits of computer use. This did not apply to teachers who were skilled in computer use. In addition, there was the perception that teachers were in a position to use computers because they understood the language of new technologies.

Variables Identified in the Adoption Process

There are three variables identified as having an effect on the way communities in Dwesa adopted ICTs. Education was found to be a fundamental variable in the adoption process. It proved to have a major role in creating some misunderstandings between different groups in the community. Age and gender were also identified as having an impact on the adoption process.

Education

Education is one independent variable that played a fundamental role in ICT adoption in Dwesa. It had positive and negative impacts. Teachers adopted ICTs in order to enhance their teaching skills, to teach learners and community members and also for their own personal benefits such as reading newspapers, shopping online, internet banking, applying for education and bursaries and maybe other employment opportunities. This showed that teachers had clear ideas on how to use computers, as compared to community members who did not have formal education.

Most young people received some high school education but could not complete their studies. Some community members who showed interest in ICT use had completed high school education but could not further their

studies. This was a major issue in regard to adoption of ICTs because community members who were not educated had noted that computers were for educated people such as teachers in Dwesa.

Education also affected ICT adoption in the sense that community members felt inferior to the teachers. This affected community discussions on the ICT project. Lack of education implied that most people in the community depended on teachers; for example, it was difficult for individuals to use computers if teachers were not available. Community members who needed to use computers on weekends and during vacations could not express their needs during community meetings.

Some nurses from Mpume village clinic also showed interest in ICT adoption. They said they were unable to attend the training because, by the time they got to Mpume school, they would find that the trainers had already closed for the day. 'We should be given one computer or keys should be given to one responsible person in the village, who can continue with the training when teachers leave school in the afternoon.'

At Ngwane Primary School, ICTs are used mainly by teachers and learners. Young people were encouraged by their parents to attend the training. Arts and craft makers were keen on advertising their products online; however, they showed reluctance in the practical use of computers. Some of them said: 'We will not always have time for the training, because we have to make our products for selling and we will ask teachers and learners for help.'

Gender

Gender also played a role in the adoption of ICTs in Dwesa. The general assumption is that men pay greater attention to technology. Dwesa village proved that women willingly adopted ICTs and became skilled in ICT use. Our findings showed that men were slow to adopt ICTs, with the exception of teachers in the schools.

Women showed greater interest in attending computer training programmes in the community. Some men explained: 'We do not see the necessity to attend the training because we do not wish to use computers.' Some men said they would like to attend the training but could not do so because of their commitment to other jobs in the village. A few young men mentioned that 'we have been away; and when we got back we saw the project and we saw that there are not many men attending the training; project members should recruit more young men'. Elderly men were cooperative but could not use computers. This general lack of interest might be caused by the fact that, in most marginalised areas, where most people

are not educated, manual labour is seen as an appropriate way for men to earn a living. In most cases people from marginalised communities prefer to live life traditionally in the way they have been used to. They do not accept change easily. In the perception of some community members, the introduction of technology has never seemed appropriate to the traditional way of life. However, those who sent their children to school believed it would be a good thing if they (the children) could learn to use ICTs. One elderly man said: 'My wife makes arts and craft and my daughter finished grade 12 many years ago, but we do not have money to send her for further education. She helps my wife in making arts and craft; she got very excited when she heard about the e-commerce platform.'

Age

Age also proved to have an impact on the way individuals adopted ICTs in Dwesa. All age groups showed there were people who became first adopters and also laggards. Elderly men and women accepted the project but could not really adapt to ICT. Young people were perceived as the ones who should learn to use ICTs, as they might be relevant to their lives. During meetings which were called to introduce the project formally, elderly people promised to support the project. For example, when extra equipment was needed, the community rallied around members, collected money and bought the equipment. Arts and craft makers also accepted the project but they noted they could not afford to be at the training sessions all the time because of their engagement with the products. Teachers and young people were asked to help to upload the products on the Internet for advertising and marketing.

Misconceptions about the Project and Computer Use

At the beginning of the training, community members were not well informed about the project. Some people felt the project was a government initiative to develop marginalised areas. The perception was that the project was for schools and teachers only because the project was located in the schools. This made it difficult to convince people to attend the training. People of all ages were invited to a meeting during which it became clear that many people did not understand the objectives of the project. Community members could not understand why a marginalised community should have computers. Project members emphasised that the project was not only for the schools and a few community members but also was for the entire community.

Conclusion

As shown in this study, there are three factors that influence ICT adoption in a marginalized community in South Africa. The factors are education, age and gender. There are several indications that show that Dwesa community can fully adopt ICT use. If the arts and craft women were able to adopt ICTs and develop their businesses, it would be a practical example for everyone in the community. People would see the benefits of ICTs and start developing interest in the project.

Learners who would like to advance their education elsewhere would find they could also use computers to access information about different institutions. This suggests that learners in Dwesa community should participate in the computer training programme, so they can acquire the necessary skills.

All community members need to take a more leading role in ICT use. Use of ICTs helps to create job opportunities in the village, as well as in the urban centres. For this to happen, a range of training programmes should be introduced. All schools would need a permanent trainer and most teachers should include ICT use in their curriculum. With improved computer skills, businesses would develop and young people would be able to find jobs in their communities rather than migrate to the cities in search of jobs.

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