Examining e-literacy Using Telecenters as Public Spending: The Case of Akshaya

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Abstract— **The Akshaya project from Kerala has been a much discussed case for the community of practitioners and scholars working on technology and development. A unique feature of the project is its state-wide e-literacy goal in which one member of every household was trained in the telecenters set up under Akshaya. Using a survey of 1750 households in the experimental area of Malappuram and a comparison group of neighbouring Kozhikode, this work investigates the extent of e-literacy and discusses the performance of service delivery using telecenters.**

Index Terms—**Developing nations, Human factors, Rural areas, Technology social factors**

I. Introduction

STARTING 2003, the state of Kerala in southern India initiated the exercise of setting up one of the world's largest mass public-use computing center kiosks throughout the 300 sq km area of Malappuram, a district with a population of about 3 million residents. The district is largely rural, with the lowest human development index in the state. Although the project primarily set up telecenters through the expanse of the district of Malappuram, the initial phase of "e-literacy" involved a budget providing for one person per household trained in computer literacy over a 15 hour training period spread through ten sessions at an Akshaya "e-Center" for Rs. 140 (~$03.50). The State government and the village councils together paid Rs 120 (~$3) towards the training, and each household paid Rs. 20 ($~0.50) to have one person put through the training. At the time Akshaya was originally envisioned, Malappuram was projected to be India's first completely 'e-literate' district.

Under the project, about 630 telecenters were set up to geographically ensure that, to the extent possible, no household was any more than 3 km walking distance away from an Akshaya e-Center. Each e-Center was meant to service approximately 1000 families within a radius of its location, and in the e-literacy phase, a list of those assigned households was provided to each e-Center entrepreneur. Each household in the district thus had access to one e-Center where one family member could avail of training. While about two-thirds of the e-Centers were newly established businesses, about a third were pre-existing internet cafés or computer training institutes incorporated into the Akshaya brand. All new e-Centers were given subsidized agricultural rate bank loans for initial capital costs. At the end of the first phase of the Akshaya project in 2004, e-literacy was completed and most kiosk entrepreneurs claimed that over 90% households in their immediate vicinity had availed of the courses. About a third of the e-Centers also shut shop after the completion of the e-literacy phase. The net amount sanctioned for the Akshaya project by the government of Kerala is roughly Rs. 60 crores (US$15 Million) per district. Part of the reason behind the selection of Malappuram as the pilot district was the high rate of migration of its work force to the Persian Gulf nations, which seemingly offered a ready market for international communication from the e-Centers using Voice over Internet Protocol (VoIP).

At the time of publication, the State of Kerala is in the process of setting up the Akshaya program in several other districts of Kerala.

II. Previous Work

This paper builds on three major studies of the Akshaya project, each of which studied aspects of the project that help creating the case for this work

A. Studies of Akshaya

The early studies of Akshaya looked at community telecenters from the point of view of State-led development, a prevalent trend in a leftist government led Kerala state [1]. The second study of Akshaya, relevant here, looked at the entrepreneur-driven aspects of the project, and the consequences of the association of a government branding with the Akshaya project. Kuriyan [2] found that association with the Akshaya project raised speculation that the typical commercial service provider would offer better quality services. This in turn affected the economic sustainability of e-Centers as viable businesses once the core engagement with the State, namely the e-literacy phase, finished. The third study took on the question as to whether the State subsidizing internet access was based on expectations that rural e-Centers would provide local populations access to information of local relevance [3]. That study of the Akshaya data showed that countrary to the State' expectation that rural kiosks would be widely used for critical services like crop prices and e-governance, the typical kiosk user exhibited the same generalized web usage patterns as would a contemporary in the developed world.

B. Work on Telecenters

In terms of overall theory of telecenters, a lot of currently existing research is guideline oriented and aimed at

Manuscript received August 30, 2007.

This material is based upon work supported by the National Science Foundation under Grant No. 0326582.

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international agencies [4][5]; 'action oriented' research [6], telling an ethnographic story [7]; or using telecenters to build more general ICTD theory [8][9]. Although some scholarly studies of telecenters [10] have quantified specifics of how the populace at large benefits from kiosk projects, there remains a lot we still do not know about telecenter projects.

C. *E-literacy*

In terms of the e-literacy aspect of this study, there is little relevant prior scholarly work [11][12], partly because mass computer literacy projects have rarely been undertaken in the past, and even where they as in case of the traveling e-Tampere e-literacy bus [13] in Finland, the context has not been one tied to ICTD.

III. Key Contributions

Most scholarly work on kiosks and telecenters has started with the supply-side as the point of departure. In this case, the aim is to start at the community and take a demand-side perspective on how people perceive and use the services. This work is based on the largest household survey of families living around kiosks. The purpose of selecting random households around Akshaya e-Centers throughout the district instead of surveying people who were specifically Akshaya users was undertaken to understand from the public funding end of how the aggregated population is impacted. By using household data of actual usage, we ask whether Akshaya fulfilled the projected goal of providing widespread access, and uncover what lessons similar to subsequent implementations can gain from the Akshaya experience. The data presented in this paper reveals some hard facts that question the universal e-literacy claims of the project, and in doing so, broaches the idea of e-literacy or rural telecenters as a public spending. In addition, the data offers unique insights into the marketing channels used by entrepreneurs in publicizing the e-literacy course and the telecenters. Such research is valuable in giving a better idea of the effectiveness of outreach channels for rural populations.

IV. Methodology

Although our past work with Akshaya includes both qualitative and quantitative work, this paper discusses the outcomes of the stratified survey. The results presented here include tabulations of the data of 1750 households through the districts of Malappuram and Kozhikode in Kerala. Of these, 1250 interviews took place in Malappuram, the experiment district where the Akshaya project was conducted by the State government. 500 households were interviewed from the neighboring district of Kozhikode where the Akshaya project had not been implemented. The choice of Kozhikode[1] as a control group was to have a reasonably comparable ethnic and economic make up.

A. *Instrument Design*

A year of qualitative research in Kerala, speaking with stakeholders at the Akshaya project in 2004 formed the basis for the household survey presented here. A questionnaire for a household survey was prepared in early 2005 with about 30 initial interviews in two iterations held with respondents from rural Malappuram. Members of the Akshaya project team with the government of Kerala were consulted on finalizing locations for conducting the research.

B. *Sampling and Recruitment*

The selection of respondents in Malappuram was done using a hybrid method of selecting locations based on a stratified sampling based on urbanization, status of Akshaya center, and availability of Internet connectivity. In all, 25 locations were selected, for approximately 40 interviews each, aiming for a total of about 1000 respondents in the experimental group. One round of pre-testing of the survey instrument was done at each of the locations. Once the location was finalized, three survey takers started interviews by picking three random residential locations.

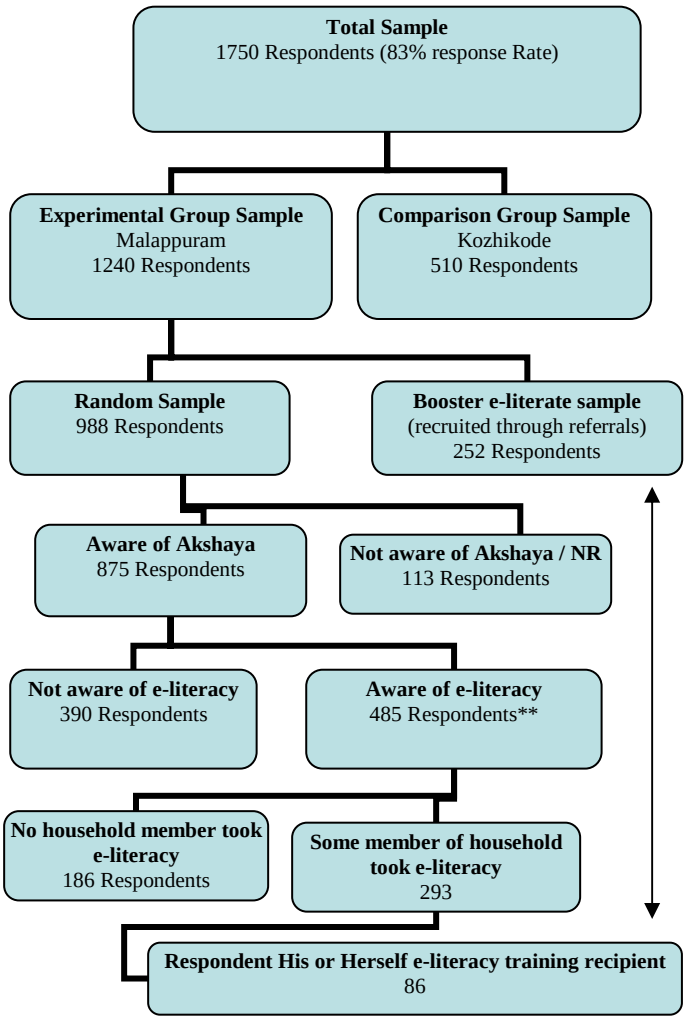

Fig. 1. Sample description

[1] We found later though that the comparatively higher urbanization, and resulting linkages to the urban economy in Kozhikode played a role in making some of the survey data difficult to collect/analyze.

*Vertical arrow connects the "e-literates" portion of the total respondent sample
** Some NR responses explain gaps in the data

Following the first location, the interviewers counted four houses, turned next right available – and so on in concentric circles heading outwards. This approach tends to exclude outlier homes, and where relevant, the interviewers met with respondents in second-storey homes. The first adult person available at the household was interviewed; we excluded any person below 16 years of age, which is the age of consent for survey purposes in India. At each location, we aimed for 25 surveys, with some variation in what we were able to achieve. The respondent clustering and recruiting techniques used were the same for Kozhikode, though only 12 locations were selected there with approximately the same number of respondents at each location. The location selection was based on urbanization of the area and availability of Internet at the e-Center selected. After the first round of survey with the experimental group of 988, we found that the number of respondents who had actually taken the e-literacy training was very small. Consequently, we added a booster sample of 252 e-literacy users at the end of the study using referrals from our earlier sample. This booster sample has been used primarily in making specific recommendations about learning outcomes from the program.

Finally, we also interviewed 18 e-Center entrepreneurs to triangulate the data from the survey respondents. The questionnaire for the e-Center entrepreneur was mainly on issues such as number of hours of training imparted.

C. *Interview Process*

A team of 6 interviewers conducted the research. This included 3 male and 3 female interviewers. All interviews were conducted in Malayalam, the local language, during daylight hours on working days and on weekends. Each interview typically was about 45 minutes in length and conducted by a single interviewer. All questions were hard-coded to pre-defined criteria, based on responses estimated from the 30 pre-survey trial interviews, but an 'other' response was provided wherever relevant. For most questions, the respondents were not prompted with the multiple choice options.

V. Findings

A. *Household participation in e-literacy*

The initial surprising find for us was that less than a third of the households surveyed in the initial sample had actually any member attend the e-literacy course. We took a lot of care to ensure that the sample was adequately representative through the entire geography of the district, but at no sampled location was the e-literacy much higher than 50%. General awareness of Akshaya was very high at 88.6%, only 49.1% of the total sample had heard of the e-literacy program, but from those that had heard of it, over 60% had availed of it. Summing up, only 29.7% of households had any member take the course. However, in contrast, the entrepreneurs from the same locations had reported that over 90% of the households had participated in the e-literacy course by sending at least one person to train on the e-literacy module for 15 hours at the e-Center. Several entrepreneurs reported 100% attendance, (including some from our sample), and had been paid by the State government for the same.

From the 25 locations selected, the highest percentage of households responding as having at least one member attend e-literacy was 52%, and the lowest was 7.7%. Assuming some error and variation (since the respondent and everyone else present at the house at the time of the survey could be collectively unaware of some other member of the household having taken part in e-literacy), it is still clear that the complete e-literacy claim staked by the State government (Akshaya.net) [14] is contradicted by this data.

The respondents sampled here also did not complete the entire e-literacy course of 15 hours as prescribed. Only 14.5 % from the sample of 338 e-literacy recipients had used it for a full 15 hours. A greater proportion - 18.6% - of the respondents had received only one hour of e-literacy training, and the mean usage was 8.8 hrs of e-literacy training. Furthermore, from the sample of 338 e-literacy recipients, 61.2% reported never having touched the computers themselves.

From among those who knew about the e-literacy course but chose against availing it, there were a range of factors affecting their decision.

TABLE I
REASONS FOR NOT TAKING E-LITERACY COURSE

	N=199
Computers are of no use to us	27.0 %
Too busy to go for the training sessions	21.0 %
Conflict with e-Center	19.0 %
E-Center is too far	9.0 %
Neighborhood where e-Center is located is not good	2.0 %

* (α= 0.05) ** (α= 0.01)

The data shows some issues with generating demand for e-literacy. Almost 50% of those who declined taking the e-literacy course felt they had more relevant things to do with their time. In addition, practically a fifth of those who did take the course never went back after the first hour of training. The second issue that stands out in the reasons for not taking the course is that of accessibility. Approximately 19% of the respondents stated discomfort with using the e-Center because of issues with the location or the entrepreneur. Village communities are complex, running enterprises there is especially tied to community relationships, which makes it important to find good neutral spaces that are seen as welcoming to all.

B. *Short term impacts of e-literacy*

The 15-hour e-literacy module on an auto-run CD explains to the users certain basics about how the computer is set up and designed. This includes basic tutorials on the history of computers, the various parts of a computer, and some basic interactive tasks. The training is not geared towards making users able to use computer applications, rather it is meant to give people an introduction to computers so that they can decide later if they want to take a real computer course. Thus, computing competency is not a metric by which we judge e-literacy graduates. Instead the statistics shown on the table below are used to get an overall picture of what are the various areas where e-literacy has impacts, and to contrast some of its outcomes with other introductory computer courses. The data on computing competencies reflects a minimal overall average for Akshaya graduates. At 9.2% of the sample, using a word processor was the highest reported application that respondents used.

TABLE II
E-LITERACY RECIPIENTS' PERCEPTIONS OF TRAINING BENEFITS

	Malappuram e-literacy recipients N=338	Kozhikode computer literates∂ N=49
Lost fear of computers	95.6 %**	72.2%*
Understood what a computer is better	57.4 %	70.6%
Computer Knowledge increased respondent's respect in society	30.5 %	54.4%**
Decided to study further (school or college) after experience with e-literacy	16.9 %*	28.1%
Signed up a child in the household for computer class	9.2 %*	39.1%**
Took a subsequent course in computers	6.5%	32.8%**
Started communicating with relatives/friends using email	0.9%	19.6%**
Started using web for news and other information	1.8%	18.5%**
Saw job prospects increase due to computer knowledge	3.3 %	26.9%**
Started considering working abroad after learning computer use	1.8 %	9.7%
Responsibilities at current work situation changed due to training	0.6 %	10.6%*
Contemplated changing occupation after e-literacy course	0.0 %	2.8%
Thought of starting a new / additional occupation or business after e-literacy	0.0 %	0.6%

*α= 0.05; **α= 0.01 (all others samples too small / not significant)
∂ Kozhikode sample only includes those who got a "basic level" computer training at a private computer training institute

As we see here, the low instance of functional computer use is far from analogous to saying there was no impact of Akshaya, and seeking out immediately actionable economic impacts may be the wrong way of looking at Akshaya impacts. When the Kerala government first instituted the program, one of the key goals it had was to reduce peoples' fears of using technology, and we see from Table II above that there are in fact a range of outcomes. There is clearly a drop in fear of technology and we also find in users a greater propensity towards using computers – if not for themselves, then definitely for their succeeding generations. Two items on the data suggest this. First, 30.5% of the e-literacy users felt their prestige in the village had increased because of having become 'e-literate' having now become computer literate. This was the same for the control district where people paid to get computer trained. This ties in with ideas of the aspirational discourse surrounding computers [15][16]. The second item is that 9.2% of those who took e-literacy ended up signing up a child in the family for a computer class.

The comparative data with the control district of Kozhikode, shows a higher incidence of signing up children for computer classes, or even the users themselves doing another course. This is due to the respondents there being self-selectors as well as the paid computer courses being more intense than the typical Akshaya training. This supports the idea that if the users are more informed about technology and self-select to take such courses, they in fact do make decisions that continues some form of technology education in the household. Thus, Akshaya could be said to be a positive step in this direction.

C. *Outreach strategies*

A key contribution of the Akshaya project to other work in telecenters or rural technology adoption is its experience with outreach, since the e-literacy component technically tied the entrepreneur's income with outreach to every single household. The data here suggests that informal networks are an effective means of reaching potential users in rural areas. In questions around peoples' meeting spaces, we found that even in a fairly male dominated public domain, women also visited public spaces on a daily basis. Across both groups, bus stands (32.4%) were the most frequented locations, and men were more likely to visit tea shops (22.4%), more frequently. Places of religion were also an important point of congregation, though this had gender dimensions, as Muslim females were less likely to be around mosques than Hindu females were around temples.

We find here that direct marketing is by a large margin the most effective outreach strategy for Akshaya. Akshaya entrepreneurs were proactive about going door to door, and this had a good pay off. The data shows that home visits are significantly more effective with a multiplier of 150% (45.8% of the total sample first heard of the project through an entrepreneur, whereas within the sub-sample of those families that ended up taking the course, the rate was 68.7%). The only other strategy with a 'conversion rate' of over 75% was village council meetings. While personal networks such as neighbours and friends played an important role, and clearly talking about the project mattered, the actual decision to take part in the project has strongest relationship with the visit from the entrepreneur.

TABLE III
RESPONDENTS' FIRST SOURCE OF AWARENESS OF THE AKSHAYA PROJECT

	All Randomly selected homes in Malappuram N=875	All Households with at least one e-literacy participant N=531
Village Council	13.6 %	10.4%
Neighbors	16.8 %	8.1%
Children (from household)	3.2 %	1.5%
Friends	4.7 %	3.6%
Relatives/other family members	1.8 %	1.7%
Akshaya e-Center operator	45.8 %	68.7%
Government official	3.9 %	2.4%
TV/Radio	1.5 %	0.4%
Hoarding	2.1 %	0.6%
Noticed Akshaya E-Center	2.9 %	1.1%
Others	3.0 %	0.4%

* (α= 0.05) ** (α= 0.01)
Data excludes all NR

While the data on word of mouth promotion of Akshaya has relevance for rural market research, we also find an interesting policy angle to the household-level decisions on projects where only one aid recipient must be chosen. The first recipient of information was not always the one who took or declined the e-literacy course. The data shows that in most cases, the decision to take part in e-literacy was one that was discussed with other household members by those who found out about the course, and in only 1.6% of the cases did one householder find out about the course and take it without consulting other householders about it. As we see in Table IV below, the most important determinants of participation in the program are inclination and availability of an individual in the household.

TABLE IV
HOUSEHOLD'S CHOICE ON WHICH MEMBER WOULD AVAIL E-LITERACY

	N=193
Only person with time to do the course	35.8 %
Person most interested in doing it	32.1 %
Because they are the smartest person at home	16.1 %
Because he is the man of the house	4.1 %
Senior-most person at home	1.6 %
First or only person to hear about the course	1.6 %

* (α= 0.05) ** (α= 0.01)

This data is supported by the profile of users in the e-literacy courses. The median age of 16 years suggest that it is the school children and young adults that are most likely to use public computers in rural areas, and not adults. We could construe this information as slightly discouraging to the goals of the project to reach the most excluded citizens. Thus the utopian vision of the elderly and of women excluded from the work force [12] using e-literacy is slightly weakened, but overall, it is clear that even though the users were primarily youngsters, they nonetheless had fairly low computer skills to begin with, and that e-literacy served to be as much of an introduction to computers for them as it would perhaps for seniors.

D. Access Issues

One of the clear benefits of the Akshaya project is that a vast majority of the respondents who used the computer centers at Akshaya would otherwise never have had close access to a computer. The data shows that the 338 Akshaya users, including those in the booster, match almost perfectly, the economic and occupational profile of the random sample of 988 respondents. Table I specified some of the reasons behind people choosing not to take e-literacy and key among those was strained relationships with the kiosk owners, but other than that, there is no evidence of any exclusion of interested and needy parties from access to e-literacy. Outside of that, looking at what the points of access for people are, we find that Akshaya is in fact playing a critical role for first access for a sizeable population in Malappuram.

TABLE V
FIRST USE OF COMPUTERS AMONG THOSE AT LEAST ONCE USED A COMPUTER

	Malappuram e-literacy recipients (N-336)	Malappuram non e-literacy recipients (N-42)	Kozhikode Control group (N-52)
At home	2.7%	16.7%*	2.8%
At school	1.2%	19.0%**	22.4%*
At work	0.9%	7.1%	2.4%
At friend's home	1.8%	4.8%	10.6%
At Akshaya center	89.6%**	4.8%	--
At a computer centre	1.5%	21.4%**	41.1%**
NR	2.4%	23.8%	20.7%

*α= 0.05; **α= 0.01 (all others samples too small / not significant)

In terms of overall access to computer literacy, we find that the two districts are fairly similar – there were about 29.1% households with at least one person with some past access to computers and in Kozhikode, the proportion was slightly lower, at 26.7% households. However, in the latter, the typical user had much higher actual computer proficiency. This can be attributed to the fact that the Kozhikode users took professional computer training courses or other forms of self-instruction which went into greater depth on skill building issues.

The data on Table V shows very significant results but for a small fragment with home computer access, the majority of people start and continue to use computers at public spaces.

Three pieces of data support this. First that Akshaya is the first starting point for almost 90% of the users. Second, in the comparison group where Akshaya is not available, people still do not have home access and need to resort to other forms of public access (paid computer centers or schools). Third, those that did not avail of the e-literacy course in Malappuram tended to have much better access to computers (home, school, friends). All of these suggest that, but for Akshaya, a very large portion of the population would be denied the 'first access' to computers. To take this a step further, we can speculate that but for Akshaya, a good part of Malappuram's households would have never had their first encounter with PCs in the near future.

This raises the question of whether telecenters are by themselves a necessary public spending where home or office access does not exist. While this is not central to the goals of this paper's enquiry, it is useful to state here that in any event, providing free public computer access is not something that the Akshaya project is doing.

E. The Issue of Credibility of the e-Center Manager

One of the residual social goals of the Akshaya project was creating jobs by encouraging local youth and unemployed returnees from the Middle East migrant labor market to set up and manage e-Centers.[17] Wherever possible, locals were appointed and approved by the village Panchayats (councils) to run the e-Centers. They were not necessarily people with technical backgrounds, and several of the e-Center entrepreneurs interviewed in the course of this research were fairly new to computer use themselves. Nevertheless, in many of the Akshaya project's villages, the e-Center entrepreneur is often the first person in the village to learn the use of computers. Several of the entrepreneurs reported having found new place of pride in their communities as a result of Akshaya. To look closer at this, we included in our research design, questions as to whom the local residents turned to for technical questions.

Extensive work by Kuriyan [2] has focused on the effects of State branding, as well as outreach efforts on the Akshaya telecenter entrepreneur's effectiveness as well as peoples' perceptions of them. In attempting to extend this work, our pre-survey research included interviews of both the entrepreneurs and residents of Malappuram on issues of 'technical credibility' of Akshaya. From the data here, we assessed that the combination of the non-market approach to choosing the e-Center, the entrepreneur and the consequent State branding of the project seem to have all played a part in impacting the credibility of the e-Center entrepreneur.

While the Akshaya entrepreneur in some places became a 'new authority' on computers in the villages, doubling up the e-Center business with a computer sales business on the side, in others, the e-Center had to contend with comparison to an existing and well respected computer training center. We asked people who they turned to for advice on things like taking computer classes or buying computers.

TABLE VI
RESPONDENTS' FIRST SOURCE OF INFORMATION ON TECHNOLOGY ISSUES

	Malappuram N=531	Kozhikode N=136
School Teacher	29.6%**	15.1 %*
Akshaya Manager / Other Telecenter Manager	10.2%*	41.7 %**
Friend	31.8%**	3.2 %
Other Computer-related worker / business	14.3%	12.9 %
Consult nobody	7.1%**	0.7 %

*α= 0.05; **α= 0.01 (all others samples too small / not significant)
N=every respondent household with at least one computer trained person
Only top 5 responses showed here

While in Kozhikode, the local computer training institute manager is clearly the most important contributor to decisions around computer training courses or decisions to purchase computers, the same is not true for Malappuram where there is less than a fourth of what we see in Kozhikode in terms of faith invested in the Akshaya entrepreneur for such decisions. The key local authority for such decisions remains the school teacher, as seen in other ICTD research [18], and a fairly large class of persons in both locations turned to teachers for advice. Personal networks such as friends played a much less important role in consultation in Kozhikode than in Malappuram, where a fairly sizeable population felt there was really nobody they could consult on such decisions. On the whole, the data showed that the typical Akshaya entrepreneur supports strong ethnographic research that being a 'State appointee' rather than a self-made businessman with technical credentials had a negative impact on the credibility of these entrepreneurs. In all, 12 of the 18 e-Center entrepreneurs interviewed had no computer use experience before Akshaya, and 3 others were able to use office applications. However, there was no clear correspondence between prior computer use experience and an entrepreneur's success.

On the issue of credibility of the e-Center entrepreneur, the data shows a fairly wide gap between what the entrepreneurs reported as their e-literacy achievements and what the data from the respondents in those geographical areas suggested. The data used here is the entrepreneurs' responses for what proportion of local households they trained for e-literacy (and got paid for by the government), vis-à-vis the corresponding data from the responses from households.

TABLE V
CONTRAST OF HOUSEHOLD AND ENTREPRENEUR REPORTING OF E-LITERACY

	Survey Respondents' Figures		Entrepreneur's Figures *	
e-Center Code (n)	e-literacy awareness	e-literacy taken	e-literacy taken	Data discrepancy
2205 (40)	47.5%	45.0%	68.3%	23.3%
2204 (40)	62.5%	40.0%	66.7%	26.7%
1105 (40)	70.0%	22.5%	65.2%	42.7%
3218 (40)	27.5%	15.0%	58.9%	43.9%
2102 (52)	53.8%	28.9%	74.2%	45.3%
3104 (28)	78.6%	42.9%	88.7%	45.8%
2203 (40)	57.5%	27.5%	74.3%	46.8%
1103 (41)	41.5%	12.2%	58.8%	46.6%
2103 (40)	65.0%	50.0%	100.0%	50.0%
2202 (40)	47.5%	25.0%	76.0%	51.0%
3105 (41)	51.2%	31.7%	83.5%	51.8%
1207 (40)	60.0%	27.5%	83.3%	55.8%
1204 (40)	50.0%	42.5%	100.0%	57.5%
2206 (40)	42.5%	15.0%	76.0%	61.0%
1206 (39)	20.5%	20.5%	89.6%	69.1%
3207 (26)	26.9%	7.7%	80.0%	72.3%
3224 (40)	82.5%	27.5%	100.0%	72.5%
2207 (33)	30.3%	18.2%	100.0%	81.8%

* Figures as reported to us during our survey, not as per claims filed with the IT mission at the government of Kerala

The most surprising facet of this data is that from the 6 cases of entrepreneurs who shut shop after the e-literacy completion, 5 are those with the highest discrepancies (codes 2206, 1206, 3207, 3224 and 2207) between their claim of how many people trained for e-literacy at their e-Centers, and what proportion of the households responded as having participated in the scheme. While this is not conclusive evidence, there is clear cause for further examination of the practices of many of the entrepreneurs with regard to e-literacy provision.

VI. Analysis

As a preface to the analysis of the tables presented above, it is useful to run through the current status of the Akshaya project. The Kerala government has started rolling out the project in seven districts of the State. To the credit of the State, it has been proactive about learning from the pilot phase in Malappuram and has changed several features of the second phase accordingly. The first and most important change has been slimming down the program from roughly one e-Center per 1000 households to about one per 3000, significantly reducing its costs. In 2007, about 1600 Akshaya centers are operational in eight districts of Kerala, and another 1173 e-Centers have been finalized for further deployment in the next seven districts earmarked in Kerala. The beneficiary household's contribution to the e-literacy course has been doubled, to increase the e-Centers answerability directly to the people. The project now has a number of functional services including e-vidya for computer training, e-pay for bill payment.[2]

A. E-literacy delivery and fixed asset investment for telecenters

Despite the gaps in universalization of e-literacy, it is clear that but for the Akshaya project, a large portion of the population would never have had close quarters experiences with technology. The question then becomes, if e-literacy is the goal, is the setting up of fixed infrastructure of telecenters the best means of delivery?

The original idea behind having the fixed infrastructure of telecenters was to create a network of access – such that after the initial exposure to e-literacy, citizens could turn to a location near their homes to use computer centers either to get further computer training or access the internet. However, the data shows that the typical 'e-literacy' recipient is not the one using the Akshaya centers on a continuous basis. The typical continuing Akshaya user tends to be a young college student learning software applications or surfing the web. As far as service delivery for this segment goes – the Akshaya e-Centers do not really provide web surfing services at rates much lower than that of the open market. With regard to the other major use of kiosks, that of training, the typical Akshaya entrepreneur tends to be less technically trained than a typical self-starter entrepreneur running a computer center as we saw in our own sample. Thus, the Akshaya entrepreneur stands at a disadvantage against the self selecting computer training entrepreneur. Once the e-literacy phase is done, the e-Center is really thrown to market forces, with perhaps just the slight advantage of free connectivity courtesy of the government, and some subsidies in capital expenditure. Thus the challenges of open market competition are clearly evidenced in the fact that most of the best performing e-Centers tend to be those that were already independent computer centers before the Akshaya project started, and joined the fold to take part in the e-literacy and avail of the branding benefits. Not surprisingly, very few of those Akshaya centers that shut down were pre-existing computer centers, and a large number of casualties were those that were unable to compete after the e-literacy phase with government-subsidy was over. From our own sample, 6 out of the 18 entrepreneurs had shut shop but were willing to speak, though the remaining 7 from a sample of 25 were in varying stages of scaling back their businesses. Another 3 of the 6 cases that had shut shop competed with another computer center in the immediate vicinity.

Therefore, if providing e-literacy is the main goal for the government, delivery through newly established e-Centers is unnecessarily expensive and self-defeating. It is possible to examine several other models attempted in the past. One is the Finnish eTampere case; another could be is the use of school buildings with makeshift computer centers.

B. Target group demography

This makes a strong case for orienting rural telecenters towards providing services for rural children and youth rather than for adults. There is evidence that content tailor-made for rural adults is not used, that orienting rural telecenters around crop price and other agriculture oriented projects tend to work only around supply chain relationships [10], that e-governance by itself is not adequate to make rural kiosks work and finally that bringing outdated urban technology into rural low-income spaces plays a role in creating resentment and possibly alienating potential users [19]. Children do not have to be sold on the idea of using a technology (for instance, the highest reason for not taking e-literacy was 'no use of computers' a response that came only from adults in their 30s and above). Children also tend not to feel threatened by using technology unlike adults, who often need a concrete use for technology before agreeing to be users. The data shows that one of the strong positive impacts of Akshaya has been that over 50% of the recipients of e-literacy talk about their experiences using computers with members of their households. It is worth starting discussions on whether this can be leveraged positively by creating assignments for school students to train household members or by using college students to do barefoot campaigns.

On the issue of students there is also some access data to support the fanciful ideas of kids being e-literacy trainers for parents. Overall access to computers in the immediate vicinities of most respondents was highest through schools.

[2] At the time of this survey, e-pay was not fully functional, therefore the data collected here gives a skewed view of the project

For the random component of the survey, 73.2% of all households had at least one child with access to computers in school (higher than the figures for the neighbouring district of Kozhikode at 64.5). In this scenario, the issue may be one less of building new infrastructure, but one of thinking of new ways of using existing ones.

C. Political considerations

Declaring a village or block e-literate has come to symbolize a form of technology-led development in Kerala. Periodically, such proclamations of 100% e-literacy for a village are done in the presence of political dignitaries, and such events receive a lot of press coverage. Data collected in the survey on peoples' participation on the political discussions over funding Akshaya presents an interesting perspective on the participative nature of decision making in Akshaya. It is no coincidence that the Malappuram district was the home constituency of the Information Technology Minister P.Kunhalikutty at the time of Akshaya's original deployment in the early 2000s.

The Akshaya project was frequently touted as being a bottom-up project since the funding for it came from the village councils. However, our data shows that only 1.7% of the households interviewed were aware of Panchayat meetings for funding Akshaya and council funds being used for e-literacy. While such a lack of local level control is frequently true for state-level spending, Panchayat funding tends to be closer monitored. The Akshaya project also was structured around a few charismatic and competent project champions [1], and this as a pattern is seen in a number of telecenter projects [20]. The aspect of declaring places 'e-literate' has become an important proxy for development. That said, the involvement of Kunhalikutty played a charismatic role in getting the project off the ground, moving quickly past a complicated political and bureaucratic structure (including the transfer as collector to Malappuram a leading officer and visionary in the Kerala IT mission), and it is quite likely that without his strong support, the e-Centers may never have been deployed, certainly not on the express speed with which they made it to the market. Kuriyan rightly finds important political considerations around the establishment and day-to-day running of the Akshaya project, and this alongside the idea of political currency from ICTD projects is certainly an angle that needs more examination in the future. [2]

D. Sustainability and the question of privatization

The data indicates that the overall use of computer center facilities is itself on the low side. Only 2.7% of the randomly selected respondents knew of the e-Centers being used in the past week. Of these, 2.4% had used the e-Center for bill payment rather than for any internet or training facility. Surprisingly, there was little evidence of use of international communications services using VoIP calls or instant messaging, one of the major assumed uses of the e-Centers. The data suggests that in several parts of Malappuram, running a profitable cybercafé or computer training business could be difficult, regardless of the existence of migrants in households and the corresponding needs for communication. In short, the conversion from a State-supported Akshaya model to a sustainable private business can present significant challenges.

The question of sustainability has always been a complex one for Akshaya. Proponents of the economic sustainability view find that success or failure of an Akshaya e-Center depends on an individual entrepreneur's ability to keep the center alive as a business after the initial push by the government. On the other hand, it is clear that in a large number of locations, the e-Centers are highly unlikely to be economically viable given the lack of local capacity to support them. The State government's phasing out of 'unsustainable' business is reflected in the scaling down of the project to about 1 center to 3000 families. The experience from Malappuram is adequate evidence to either uncouple the sustainability-public service mix, or invent new business models to ensure viable businesses while protecting consumers.

E. Checks and Balances

If a large number of people have not received training, how has the government paid entrepreneurs? The issue is two-fold. First, at the supply end, more thought needs to be put into whether the current means of delivery adequately ensures that people who are meant to get the service actually do get it. There are technological ways of doing this [3] as well as means of creating social responsibility around entrepreneurs. The more desirable approach would be if people themselves felt vested in the e-literacy as they do perhaps for issues like mid-day meals or free uniforms in various parts of the State, where one would contend with a riot should the pledged public service not be provided. In Malappuram, it is clear that a large number of people knew that their 'e-literacy' was not being provided, and irrespective of whether they felt the entrepreneur should benefit from it, there is little doubt that few were outraged enough to demand it as a right. For this to happen, the demand for e-literacy has to truly come from below.

VII. Conclusion

In the paper, certain benefits of the project have been highlighted, which are hard to quantify in economic terms. As noted, for many, Akshaya has been a savior and a first stop towards a technology from which they would otherwise be excluded. While our data analysis shows results counter to the goals of Akshaya's mission, overall, on the issue of 'continued use' of telecenters by citizens, it is clear that even the slightly lower prices often offered by Akshaya centers for computer training courses are highly valued even if respondents were not necessarily overly enthusiastic about enrolling for such classes. For a simple statistic, we found that 28.7% of the sample were aware of some private computer center in their immediate vicinity other than Akshaya, but only 11.4% of the sample felt these were affordably priced. Indeed, for a lot of people, Akshaya has provided the hope of internet in inaccessible

places as well as the scope to train themselves in the use of computers through subsidized computer courses.

The key recommendations here are that the content and delivery of e-literacy should be changed significantly. While the Kerala government's initial goal of removing the fear of computers is very successful, we must ask what next – people have to stay interested in the course for the entire 15 hours once they pay for it. After the completion of e-literacy, the typical users should be able to do at least some basic tasks on their own.

On the issue of service delivery, this is identified by the data as Akshaya's main concern. Clearly, creating and monitoring a project the size of Akshaya is a gargantuan task and it is extremely difficult to monitor every aspect of the project. But a greater effort has to be made to ensure that the service delivery is either done through existing State agencies with experience in public spending projects, or through groups with good field credibility doing grassroots work.

Finally, if it is agreed that e-literacy qualifies as a public good, the data from Akshaya presents strong evidence to uncouple it from telecenters.

ACKNOWLEDGMENT

Thanks to Eric Brewer for consistent support of this project. Special thanks to G.R. Kiran for input on intellectual and policy questions around this work. Thanks also to Lalitha, R. Ashok, and Praveena of Kaybase Chennai, M.S. Vinod, Rahman, Sergiu Nedevschi, Rabin Patra, Kentaro Toyama and Renee Kuriyan for discussions around the issue.

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