

PCtyt: a Multifunction Information Appliance for Illiterate People

Mythology and Reality of the Digital Divide Problem

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CMU Initiatives for Scalable and Sustainable Development (SSD)

- Connectivity: Fiber to the Village
 - AP Broadband Project
- Computer Access: Information Appliance
 - PCtv – PC, TV, PVR, Video Phone and IP phone
- Capacity Building: eLearning for the Masses
 - Software for use by illiterate people in rural communities
- Content
 - Million Book Digital Library
 - eLearning modules for rural enterprises
 - Village Google

The Role IT in Emerging Economies

- Economic Development
 - Price discovery
 - Marketing assistance using eBay like auction exchanges
 - Find jobs e.g. monster.com
- Social Development
 - Free flow of information and democratization of knowledge
 - Increased transparency of Governmental Operations
 - Disaster management and logistics support for cyclones and floods
- Personal Development
 - Life-long learning, independent of the limitations of language, distance, age and physical disabilities
 - Access to entertainment – watch any movie, TV show when desired
 - Telemedicine, providing links to doctors and treatment at a distance
 - Access to information about hygiene and safe water, helping to reduce infant mortality

Barriers to Entry: Digital Divide Issues

- Connectivity Divide
 - Access to free Internet for basic services?
- Computer Access Divide
 - Accessibility: Less than 5 minute walk?
 - Affordability: Costing less than a cup of coffee per day?
- Digital Literacy Divide
 - Language Divide
 - Literacy Divide
- Content Divide
 - Access to information and knowledge
 - Access to health care
 - Access to education and learning
 - Access to jobs
 - Access to entertainment
 - Access to improved quality of life

Accessibility and Affordability of IT

- Almost Free Access to Internet
 - Basic services free
 - up to 10 email and web exchanges per day
 - Value added services at affordable rates
 - access to movies
- Clear Value Proposition
 - To an illiterate person in a village, the need for a PC is not obvious
 - A TV and/or a telephone represent a better value proposition: a PCtv, 5 in 1 multi-function information appliance?
- Accessible
 - No more than a 5 minute walk from home?
- Affordable
 - No more than the price of a cup of coffee
- Trustable and Tamper Proof
 - Preserve privacy and anonymity
 - Secure and reliable repository of house deeds and land records

Connectivity

- Current cost of connectivity of \$10+/-month line charges for telephone and \$40+/-month for broadband too high
- Even 10% of that cost would be too high
- Usage based charging with basic services provided free may represent a long-term sustainable model

Brewer's Conjecture

- Providing traditional enabling infrastructure, like building out roads, rail, the electrical grid and providing piped water is very expensive and can only really be economically justified for high density, relatively affluent communities.
- Network infrastructure, on the other hand, is inexpensive enough to deploy economically to rural areas and can be used to build the economic base that then justifies investing in roads, rail, electricity and water grids later.

Eric Brewer, UC Berkeley

Jan 2004, ITSD Workshop, Bangalore

Computer Access: PCtv

PC, TV, Video Recorder, Telephone

- “Entertainment, communication and education must be made affordable and accessible to the 4 billion people living below the poverty line”
- A Multifunction Information Appliance: PCtv
 - PCtv: TV, PVR, Video Phone, IP Phone and PC
- PCs for consumption, not creation
 - For most people in a village, entertainment and communication are of greater importance than PC functionality
- Low cost PC: Target by 2007 of less than \$250
- Total cost of ownership less than 10% of income
 - Per Capita Income in India is currently less than \$500 per annum
- Shared community access to the PCtv for the economically deprived classes



Info services

Multilingual Chat



vifi



Television



Video Mail



Video Phone



News and Virtual Dharshan

PC_{tv} UI Design for Use by Illiterate Persons

- An Illiterate person needs a more powerful PC than a Microsoft employee
 - If not e-mail, use voice-mail
 - Replace Text Help by Video Help
- Radically simple design
 - One minute learning time
 - Two click model
 - Three modes of communication: Video, Audio and Text
 - Both Synchronous and Asynchronous
- All-Iconic interfaces
- Multiple input modalities
 - TV-remote, Speech I/O, Keyboard, Mouse or Cell phone



PCtvt Benefits

- Poverty and illiteracy are no longer a barrier to using and benefiting from Technology.
- Empowers illiterate people by giving more importance to voice and video communication rather than reading & writing
- Economic development through :
 - Price discovery – Access to current prices
 - Telemedicine – Video access to a Doctor
 - Job exchange
 - Access to Information – Instant access
 - Education and e-learning– Be a part of a virtual classroom
 - e-governance – Pay taxes and bills
- Simplified and easy to use communication within the village and rest of the world



User Name

TV : DVD

Balance Amount: Rs xxx.xx



Recharg

Features

RESET

Channels



Exit





User Name

TV : DVD

Balance Amount: Rs xxx.xx



Recharge



Features



RESET



Channels



Exit





8/23/04

**U.S. Public Diplomacy
in the Middle East**

C-SPAN 2



Praveen

Information Centre

Balance Amount: Rs 675.50



Recharge



Features



RESET



Newspapers




To Classic PC



Exit





Money Transfers

ఈనాడు

THE HEART AND SOUL OF ANDHRA PRADESH

సీత, 25, సర్జన్,
బాస్కెట్ బాల్ ప్లేయర్.
అనుబంధమునీ విశ్వానం
పైనే ఆధారపడి ఉందని
నమ్మి యువతి.



- జాతీయ వార్తలు
- రాష్ట్ర వార్తలు
- సంపాదకీయం
- మీమాట
- వ్యాఖ్యానం
- రాజకీయాలు
- బిజినెస్
- స్పోర్ట్స్
- వసుంధర
- సినిమా
- కార్టూన్/ఫాటో
- ప్రతిభ
- సాహితీ సంపద
- అంతర్యామి
- గ్రహం అనుగ్రహం
- వాతావరణం
- ఉద్యోగ అవకాశాలు


ఫ్లాష్... ఫ్లాష్... ఫ్లాష్...

యుఎన్ ఓపెన్ టెన్నిస్ విజే త ఫెడె రర్

యుఎన్ ఓపెన్ టెన్నిస్-2005 మెన్స్ సింగిల్స్ గ్రాండ్ ష్లామ్ ను ప్రపంచ నెంబర్ వన్ రోజర్ ఫెడెరర్ (స్విట్జర్లాండ్) సొంతం చేసుకున్నారు. భారత కాలమాన ప్రకారం సోమవారం ఉదయం జరిగిన ఫైనల్ మ్యాచ్ లో అమెరికన్ వెటెరన్ ఆండ్రీ అగస్టీ(అమెరికా) ని ఫెడెరర్ 6-3, 2-6, 7-6, 6-1 తో మట్టి కరిపించాడు.

[Fullstory](#)

అదే 'మనీ' అడగకు



మున్సిపాల్స్ లోనూ కోట్లు కుమ్మరించడానికి అభ్యర్థులు, పార్టీలు జంకూ గొంకూ లేకుండా వ్యవహరిస్తున్నాయి. వివిధ వర్గాలు, కొందరు నేతలు, కార్యకర్తలు, అభ్యర్థులతో మాట్లాడి సేకరించిన సమాచారం, వరిశీలకుల విశ్లేషణలు ఐట్లీ లెక్కిస్తే...

[Full Story](#)

స్వతంత్ర వ్యూహం వై ఎన్ తంత్రం

రెండు రోజుల క్రితం... తూర్పుగోదావరి జిల్లాకు చెందిన ఓ ఎమ్మెల్యే ఇంట్లో

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BOOK **EENADU**



Praveen

Virtual Darshan

Balance Amount: Rs 675.50



Recharge

Features



RESET



Newspapers



Clip: Live Program

00



To Classic PC

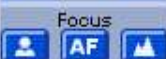
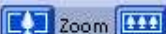


Exit





Pan / Tilt



Preset



Brightness



Resolution

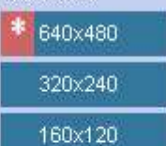


Image Quality

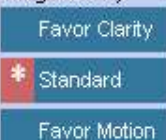


Image Size





Praveen

Voice Mail

Balance Amount: Rs 675.50



Recharge

Features

Contacts

To:

Subject:

Inbox - No Messages in your Inbox





Praveen

Video Mail

Balance Amount: Rs 675.50



Recharge

Features



RESET



Contacts





To:

Subject:





Send

Inbox - Checking for Messages

To Classic PC



Exit





Praveen

Video Conference

Balance Amount: Rs 675.50



Recharge

Features

Icons representing various features: a person, a folder with a phone, a group of people, a printer, a folder with a flag, a rotary phone, a newspaper, an envelope, and two people.

RESET

Icons representing a person and a question mark.

Contacts

Grid of contact photos:

- Row 1: [Red border], [Man], [Woman]
- Row 2: [Man], [Man], [Man]
- Row 3: [Man], [Man], [Man]

Large circular icon with a red border and a white center.

Navigation controls: [] (left), [] (right), and a vertical slider.

Video Conference Window

Top video feed: A man with a mustache, wearing a light blue shirt, sitting in a red chair.

Bottom video feed: A man with dark hair, wearing a light blue shirt, sitting in a red chair.

To Classic PC



Exit





Praveen

Email: Telugu

Balance Amount: Rs 675.50



Recharge

Features

RESET

Contacts

[]

◀ ▶

To :

kishore;praveen;

Sub :

హయ్
ప్రవీణ్
బాగున్నావా

hay
praviind-
baagunnaavaa

Bengali

Assamese

Telugu

Kannada

Tamil

Hindi

Malayalam

Marathi

Mapping Table

Send

Cancel

To Classic PC



Exit





Praveen

Email: Hindi

Balance Amount: Rs 675.50



Recharge

Features

RESET

?

Contacts

[]

To : kishore;praveen;

Sub :

हय्
प्रवीण्
बागुन्नावा

hay
praviind-
baagunnaavaa

Bengali Assamese Telugu Kannada
Tamil Hindi Malayalam Marathi

Mapping Table

Send Cancel

To Classic PC



Exit





Praveen

Email: Tamil

Balance Amount: Rs 675.50



Recharge

Features

RESET

?

Contacts

[]

To : kishore;praveen;

Sub :

ஹய்
ப்ரவீண்
பாகுன்னாவா

hay
praviind-
baagunnaavaa

Bengali Assamese Telugu Kannada
Tamil Hindi Malayalam Marathi

Mapping Table

Send Cancel

To Classic PC



Exit



Capacity Building

- Give man a fish and you will feed him for a day. Teach man to fish and you will feed him for life. (Old Chinese Proverb -- Lao Tzu)
- How to teach an illiterate villager who has never seen a computer to effectively use PCtvt?
 - Self-evident, intuitive interfaces
 - Two clicks to most applications
 - Learning time – less than five minutes to happiness
 - Short video clips for Just in Time learning
 - Instant access to information through vast video digital libraries in local languages
 - Teach the Teacher Programs
 - Intensive programs for educating the local expert, the Village Information Officer

Content — Day to Day Applications of Potential Use in a Village

- Entertainment and Amusement
- Synchronous Communications
 - Video Phone, IP Telephone, Instant Messaging
- Asynchronous Communications
 - Video Email, Voice Email, Text Email
- Access to Essential Information
 - Medical, Agriculture, FAQ indexed and searchable
- Access to Advice
 - Interactive access to Doctors, Rescue Personnel, Affinity Groups
- Lifelong Learning and Education
- Health and Hygiene
- Agricultural Information
 - Price discovery, crop disease information, weather prediction

Content — Day to Day Applications of Potential Use in a Village

- Access to Markets and Jobs
- Household Purchases and Shopping
- Payment of Utilities
- Tourism and Pilgrimage Information
- Societal Trends and Fashion News
- Political Discussion Groups
- Disaster Relief and Management
- Access to Newspapers and Magazines
- Access to 1,000 Radio Channels
- Access to 100 Video Channels

Disruptive Technology

- Many Businesses as we know them today will not exist in 10 to 20 years
 - Telecoms: POTS (plain old telephone service) replaced by video phones
 - Death of time and distance: Fixed fee for all services
 - Broadcasting Companies like CBS/NBC
 - Broadcasting goes to Unicasting
 - Each person with their own channel
 - Cable Companies
 - Video Rental Stores
 - Music Industry
- Need to Evolve New Business Models
 - Models for Compensating Copyright and Intellectual Property Owners
 - 25% of the Global Library Budget paid out as royalties to IP or Content Providers

Conclusions and Research Agenda

- Create and Demonstrate a Model for Free Internet
 - Less than 1% of the cost of building roads
- Create a Low Cost (less than the cost of TV) Multi-Function Information Appliance
 - Easy to Use Interface by Illiterate Users in Developing Economies
- Develop capacity building programs to make 100% of the population “eLiterate”
- Develop programs to overcome language barriers
 - Create multi-lingual interfaces, spoken language interfaces and multi-lingual translation systems
- Create the Infrastructure for Ubiquitous Access to Knowledge and Knowhow
 - Video Conference with experts on problems of health (Aids) or agriculture or other problems such pest control