Universal Service for the Hungry, the Poor and the Yuppie

Mr Arno Wirzenius, Consultant

Teleplanning A. Wirzenius Ltd., Finland

This paper aims at a description of (telecommunications) Universal Service and Universal Access from a **user point of view**, in particular for the poor one's in a developing country. Cambodia is used as a reference for the hungry and the poor[1]. About one third of the population is below the hunger line. The yuppie (yup – young, urban, professional), could be the author – if young.

Many of the numerous reports on Universal Service and Universal Access use a top-down approach, rarely analysing it from the user point of view. This paper tries to focus on what the hungry and the poor need, and what they can use.

1 Who Are They?

A summary of the poor and the yuppie is shown in Table 1. The poor is by definition poor. Much of his income is non-cash, from subsistence farming or similar. His household may earn up to some USD 100 per year in cash income. He will almost never spend money to save work, but he is happy to spend work and time to save money, money that the yuppie would call petty. One dollar in cash for a day of work could be a good salary. The hungry is still worse off.

The yuppie happily spends money on work saving gadgets, but spends perhaps more on fashion and entertainment.

The hungry and the poor are most likely rural farmers or at least work in agriculture. The poor may also be an urban dweller, perhaps unemployed, perhaps working occasionally. Nevertheless both are very busy with subsistence farming and other subsistence activities, and cannot spare much time for social activities and similar.

The yuppie is also busy, with high paid work. None of the three likes to spend time on unnecessary matters.

The poor is illiterate or barely literate, the hungry is probably illiterate. Neither is accustomed to understand written text, not to mention systematic searching, analysing, assessing and using written information. They may not be capable of writing even a simple letter. They live in a more or less complete oral society.

The yuppie lives in the middle of an information society, even multi-media society.

The Hungry	The Poor	The Yuppie
below the hunger line, one third of the population	poor by Cambodian standard	midde to high income (Western level)
rural farmer	rural farmer, urban temporary employed or unemployed	young, urban, professional (yup)
very busy with subsistence	very busy with subsistence	very busy with high paid work
illiterate	barely literate	information professional
oral society	oral society	multi-media society
very local contacts	mainly very local contacts	world-wide contacts

Table 1 – The Hungry, the Poor and the Yuppie.

The hungry and the poor are very local. They know their own village very well. They may have some contacts to neighbour villages and possibly a few very selected contacts to urban centres and urban markets.

The yuppie has a world-wide contact network, enhanced by Internet and other advanced communication means.

2 What Communication Services Do They Use?

The hungry and the poor live in an oral society. Their communication services have to be voice based. Even an illiterate person can speak on a phone. The yuppie can use any service, and the full range of services is available in his city.

2.1 In and out

All need outgoing as well as incoming calls. See Table 2 for procedure when a son in the capital calls his poor father in the village when the phone is far away.

The most likely outcome is that the father does not care about almost any incoming call. The mother would have still greater difficulties, as in many families the mother cannot leave the home as easily as the father. Slight discrimination by gender, but in many cases a reality.

The alternative to using a moto would be walking. With, say, a 5 km distance, the two minute incoming call would need one hour of walking in each direction, waiting time, and the time to set up the call and speak. Spending two to three hours on a single telephone call is absurd, for the hungry, the poor as well as for the yuppie. All are busy. Several hours could even mean that the family of the hungry does not get food that day.

With a mobile phone as PCO one more alternative would be that the mobile comes to the called person, instead of the person going to the phone. Walk-around PCO is possible, even so that the phone regularly visits village XYZ each Thursday morning.

Outgoing calls can be scheduled much more freely than an incoming call. Thus the phone used for outgoing calls can be more distant than for an incoming call. Incoming calls are practical only if the phone is very close, at shouting distance.

The poor prefers incoming calls to outgoing, incoming are free of charge, even if a small telephone usage fee could be charged at a call centre. The hungry may not be able to pay the small fee for an incoming call.

The yuppie remembers the disgusting time in his distant youth, ten years ago, when he did not have a mobile and had to walk ten metres to answer the phone.

Step	Son pays	Father pays
The son calls the phone shop and tells the shopkeeper that he wants to speak to his father in one hour's time	USD 0.13 – 0.30 (call)	
The shopkeeper hires a motorcycle taxi (moto) to the father for delivery of the message		
The father receives the message and pays the moto driver from USD 20 cents (<500 m distance) to USD 2.50 (10 km distance)		USD 0.20 – 2.50 (moto)
The father travels to the telephone shop by moto (same charge as for message)		USD 0.20 – 2.50 (moto)
The father calls the son's mobile handsets and closes before the answer. The calling number is shown in the son's handset.		USD 0.10 (call)
The son calls the shopkeeper and speaks to the father for a full two minutes	USD 0.26 – 0.60 (call)	
The father travels back to home by moto		USD 0.20 – 2.50 (moto)
Total	**USD 0.39 – 0.90**	**USD 0.70 – 7.60**

Source: Cambodia rural administration

Table 2 – Steps and cost for incoming call with messaging to villager

2.2 Own or shared phone?

An own phone is not a reality for the hungry. The poor has some friends with own mobiles. The poor collects the tariffs, and works out the minimum cost, see Table 3.

Table 3 needs an explanation. Mobile operators in Cambodia (as well as in many other countries with sufficient competition) allow prepaid mobile connections to receive incoming calls for a period after expiry of the prepaid amount. That period varies from 30 days to 184 days, depending on the operator. This period is fully utilised in the above Table, ensuring that incoming calls are possible any time. In fact the mobile minimum charges do include a few outgoing calls, maybe 1-2 minutes per dollar (see column pre-paid). The fixed rental does not include any call charges whatsoever.

The costs in Table 3 are certainly not the main focus of the operator, but the operator gets anyway paid for answered calls to the expired account. The operators have voluntarily set the tariffs in a competitive environment. The poor only cares about retail charges.

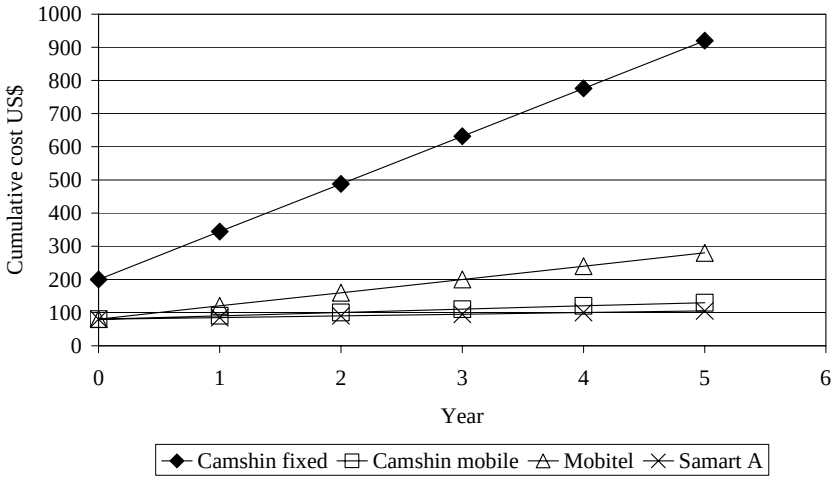
Expired pre-paid connections and similar connections are certainly not comparable to working, and medium to heavily used, post-paid connections and fixed network connections. Using number of connections without attention to the differences produces misleading results. Serious comparisons, policies and plans should not be based purely on connections but more on usage, total revenue or total number of call minutes. Difficulties to produce relevant statistics should not be the reason to use misleading statistics as the sole basis for decisions.

The data in Table 3 are shown as a graph in Figure 1.

Operator	Initial	Telephone	Rental/yr	Pre-paid/yr	One year average cost
Camshin (fixed)	200	0	144	n/a	**184**
Camshin (mobile)	15	65	n/a	10	**26**
Mobitel (mobile)	15	65	n/a	40	**56**
Samart A (mobile)	15	65	n/a	5	**21**

Source: Operator Internet pages and tariff sheets. For explanations see below. All tariffs USD.

Table 3 – Charges in rural areas in Cambodia



Source: Cambodian operator tariffs

Figure 1 – Cumulative minimum cost of a telephone connection with no outgoing calls in rural areas

The choice of the poor is clear. He can, perhaps, afford one of the mobile connections, but by no means the fixed connection. The poor may share the mobile phone with a few neighbours to make it more affordable, or perhaps even make some small money. He may even allow his hungry neighbour to receive some calls free of charge.

The yuppie does not care that much about cost. He is anyway on his mobile, and he uses Internet and e-mail a lot, substituting the phones.

2.3 Internet

The hungry and the poor cannot use Internet themselves. Illiterate or literate, but not used to written text.

Education experts state that Internet use is efficient only if the user is a reasonably experienced knowledge worker, corresponding to about 12 years of education. Basic literacy is not sufficient. In addition Internet needs regular use, a first time user cannot use it efficiently. Internet is so full of good-looking rubbish that even a seasoned knowledge worker needs time to systematically search, analyse and assess information. Just browsing is not efficient use.

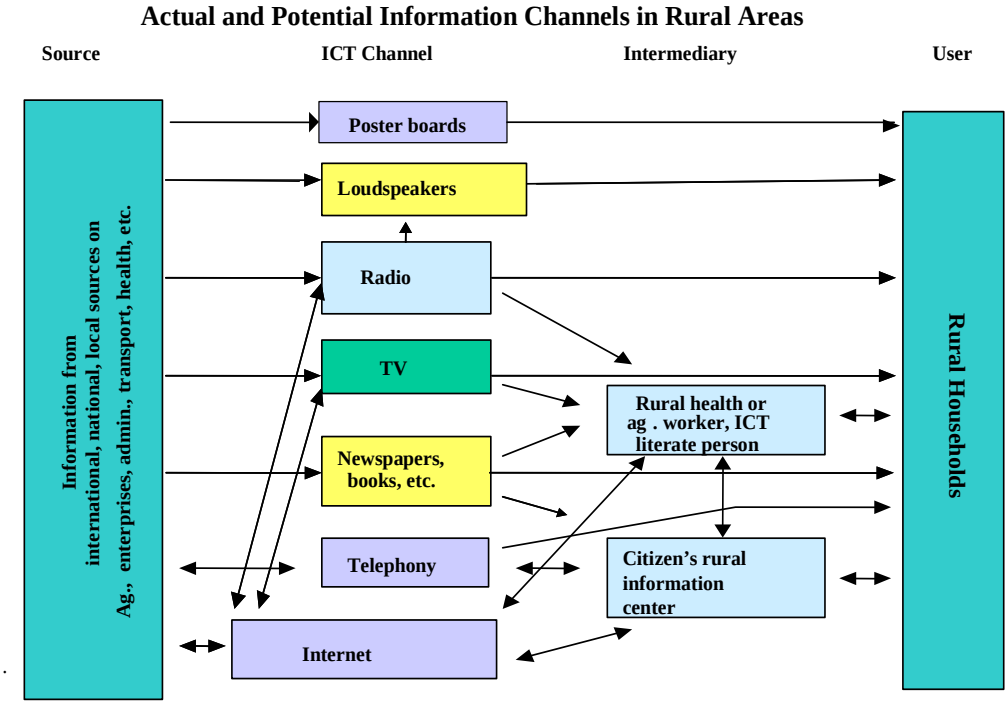
The yuppie uses Internet at work and at home, no problem. He just complains about lack of bandwidth and a few short outages.

However, even the illiterate hungry and poor may use Internet using a middleman. The benefits and the immense power of Internet should be utilised to the extent possible. One example of using middlemen is shown in Figure 2.

The middleman may be any Internet capable person with access to Internet. If organised access is arranged, the middleman may be a teacher, an agricultural worker, or somebody else.

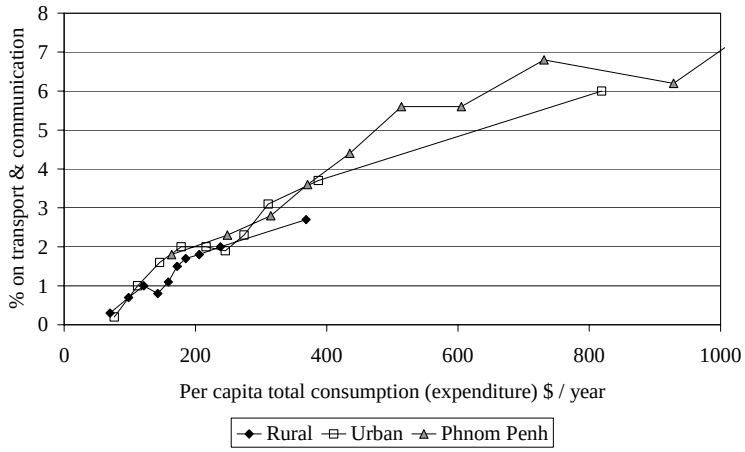
2.4 SMS

The hungry and the poor cannot use SMS messages (text messages) on a mobile. Even here a middleman may help. A phone shop attendant may learn to use such messages, write, send, receive and read messages on behalf of the poor. The yuppie does not need a middleman.



Source: The World Bank (not published document).

Figure 2 – ICT channels in a rural environment



Source: Socio-Economic Survey 1999 (Cambodia), Table H6, pages 127 to 130

Figure 3 – Spending on transport and communications as a function of total spending (consumption).

3 How Much Would They Spend?

Spending depends on available money. The really hungry spends most of his earnings on food and other necessities[2]. Communications is second or third priority. See Figure 3 for spending on transport and communications in Cambodia.

The poorest of the hungry, with an annual per capita total income of about USD 70, spend some 0.3% on transport and communication (USD 0.20). The richest rural decile, with annual per capita income of USD 360, spends some 2.8% on transport and communications (USD 10). Spending on communications is anyway low, because telecommunications is simply not available for the majority of the rural poor. No service available, no spending.

How large portion of the spending would be on telecommunications, if available? Nobody really knows, perhaps half. Based on Figure 3, with some further guesses, about 70% of the total spending potential would origin from households that could not afford an own connection. The bulk of the operators' earnings has to be collected in very, very small pieces from the poor, even from the hungry. The operator needs an effective retail system.

The yuppie's spending is not estimated here.

4 Card Phones or Public Call Offices?

Universal Service means service to most households. Universal Access means some kind of access to communications, within a reasonable distance. Definitions vary.

In many cases Universal Access is defined as access to a payphone, nowadays usually a card phone or a Public Call Office (PCO). The simplest PCO is a shared mobile handset. Such shared handsets are abundant in the streets of Phnom Penh, but also available in rural areas. Nobody knows how many. This unofficial Universal Access model just emerged, it was never planned, it is based entirely on private business, no subsidies were needed.

In fact any system of sharing a phone, fixed or mobile, is Universal Access. It need not be official, created for the purpose, subsidised, or run by the operator. Promoting call resale using any existing phone is perhaps the easiest way to improve Universal Access. For that reason the number of "official" card phones is not at all an appropriate yardstick for Universal Access.

Why are card phones (or coin phones) invented? The only reason is to avoid needing a person attending, cashing the calls made. That means automating, replacing expensive staff with cheap equipment.

This reason is appropriate for rich Western countries, but absurd in poor countries. Poor countries have staff but lack employment and money. A PCO in a rural area can be properly staffed for years at a fraction of the cost of a card telephone.

The two alternatives are presented from a user (or PCO owner) point of view inTable 4.

A Universal Access concept based on card phones usually means that only outgoing calls are possible. Card phones are too expensive for incoming calls. Strictly applied as the sole solution, the concept is absurd. The rich son in the capital cannot call his poor father, the father has to call, and pay the call. A villager cannot call the next village because both are only equipped for outgoing calls.

A card phone means that the user has to buy a card. A card is valid for several calls. The hungry (even the poor) does not like to invest in a card for several calls to be able to make one call. He wants to pay call by call. Sometimes he does not even have cash. Pay by chicken is not possible in a card phone, but may work in a PCO.

The card phones in the streets of Phnom Penh are fewer, and used much less, than the mobile handsets in manned PCO's. This is evidence that the choice of the poor is a manned PCO, not the card phone. Similar development can be seen elsewhere.

The price of a card phone depends on quality, etc. A card phone of reasonably quality may cost USD 2000, while the price for a basic mobile handset may be USD 50. A budget of, say, USD 1 million, suffices for either 500 card phones or 20,000 handsets. It is quite a difference, resulting in long or short distance to the nearest public phone.

If usage (number of calls) is independent of technology, one call per day per handset would correspond to 40 calls per day per card phone.

5 Which Technology?

Telephony can be supplied using either fixed or mobile technology. They are very different from a coverage point of view.

Fixed telephony has to be built to each and every site, usually using copper cables, sometimes also using wireless technologies. Typical cost for this technology can be calculated using cost per connected user. In rural areas a few thousand USD per user. Thus the connection cost is also correspondingly high, even if the entire investment cost is not charged as connection fee. The rental is also high, covering maintenance and part of the access network investment. On the other hand, usage charges (call charges) are low, which means that fixed is superior to mobile for a heavy user.

Card phone	Public Call Office
Works in fixed and mobile network	Works in fixed and mobile network
Investment some USD 1000-2000 in the card phone and USD 200-300 in the fixed connection (or USD 15 for a SIM card)	Investment some USD 100 in mobile handset + connection or USD 200-300 in the fixed connection
No local employment (perhaps guarding)	Employment in PCO
Mainly for outgoing calls, too expensive equipment for incoming calls	For outgoing and incoming calls
No incoming messaging service	Incoming messaging service
Better privacy	Less privacy
Guarding needed, expensive phone	Guarding automatic, owner takes care
Probably run by telecom operator	Run by villager
Maintenance problematic, needs professional on-site	Maintenance easy for a mobile handset, easy to replace handset
Poor people have to invest in a card for several calls	Payment per call

Table 4 – Comparison between card phone and PCO, from a user/PCO owner point of view

The operator calculates revenue per connection. Subsidies (e.g. competitive tenders) are also calculated per connection.

Mobile cellular (also fixed cellular) is built one mast site a time. That mast covers an area of maybe 10 km radius, in a reasonably plain landscape. A very approximate area is 20 by 20 km. In this area the user may be located anywhere, no difference in operator cost. The cost per mast site (including microwave or similar connection to the switch) may be in the range of USD 0.13 – 0.2 million. Calculating cost per user is not a relevant method. Once the mast is up and working, the marginal cost per added user is insignificant. This is also the reason for low connection charges in mobile services, USD 15 in Cambodia for a prepaid account with any operators.

The operator calculates revenue per mast, thus revenue per square km is a relevant measure. Subsidies (e.g. competitive tenders) can also be calculated per mast.

Mobile reach can be extended from some 10 km to some 35 km using user antennas. The cheapest antennas are of the order of USD 100, and do not need any electricity. They do need a pole or similar, line-of-sight to the antenna mast, and a semi-skilled person to install the antenna and its cable to the handset.

Fixed antennas of course prevent mobility. The most important issue from the operator point of view is that the revenue base per mast increases with increased coverage area. An increase from 10 km to 35 km coverage radius means twelve times larger coverage area. In a hilly geography the increase may be significantly less. See Figure 4.

The differences are essential. With fixed technology good coverage (all villages) in rural areas is very expensive, and it is not realistic to cover small villages. With cellular technology any village in the coverage area is automatically covered, with no difference, and any user can be served at low initial cost. However, call charges are high.

Universal Service and Universal Access should take advantage of both technologies. Fixed is definitely best for high usage but costly for low usage. Cellular (mobile) is best for low users, if the operator can get sufficient revenue per mast site. Fixed technology offers economic access in population centres, while mobile offers access anywhere in its coverage area (note geography, hills etc.). Both technologies need medium to high population density (in fact population density does not matter, revenue per square km is much more relevant).

Mobile telephony in **remote** areas would benefit from a system working in a lower frequency band than the present main systems. Such systems have larger reach.

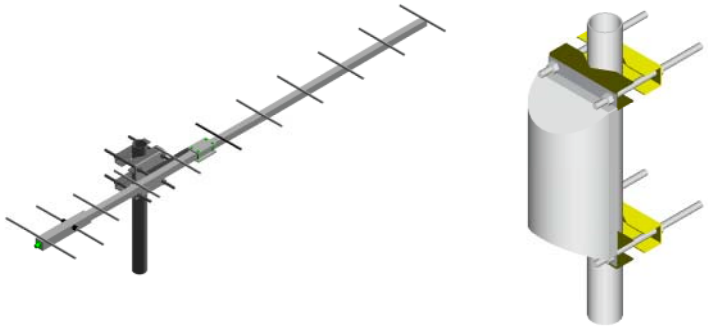


Figure 4 – Two rather low gain (14 dBi, 9 dBi, read: cheap) sample antennas suitable for the purpose of PCO or subscriber usage. Pictures with permission from antenna manufacturer Aerial, http://www.aerial.fi.

GSM 400, a GSM technology in 400 MHz range, has been standardised. The technology is told to cover to some 120 km radius from the mast (with user antennas, line-of-sight, low traffic). One mast would cover an area of some 40,000 km^2. The maximum coverage area is tenfold compared to GSM 900 (calculated using radii 35 km and 120 km). The technology was developed, field tested, and ready for production, including multi-band handsets and initially two manufacturers. The demand was not sufficient, so production never took off. The production could perhaps still be started, if sufficient demand arises. Also other other mobile technologies in the 400 MHz range (CDMA2000?) are under work, but not yet known to be widely used. Maybe the exhibition can give answers.

The technology discussion is relevant for the rural poor. There is no need to discuss technology for the yuppie, as he has all technologies available in his city anyway.

The possibility to use mobile for rural services (Universal Service or Universal Access) can be easily prevented by auctioning the spectrum at maximum prices. Rural services need subsidies rather than extraordinary taxation.

6 What Are The Lessons?

A very brief summary of the above:

- outgoing and incoming calls are both important;
- messaging service is needed;
- promote call resale from any phone;
- Internet for the poor needs an intermediary, the poor himself cannot use it;
- be technology neutral, do not specify e.g. fixed or mobile, both are needed;
- many phones are important so that the user has a short distance to the phone;
- for incoming calls shouting distance is practical, longer distance needs a new call;
- mobile may offer affordable Universal Service when fixed is not affordable;
- mobile as PCO can be a walk-around-PCO;
- forget expensive card phones, spend the money on phones and PCO staff; and
- do not use the number of “official” card phones as a yardstick for Universal Service.

Using the number of connections, in particular when many connections are expired pre-paid accounts and similar, as the sole yardstick for service provision produces significantly misleading results. A more important yardstick is total revenue and number of call minutes. Several yardsticks give the best result.

Using the number of “official” cardphones as the sole yardstick for Universal Access gives skewed results. Statistical difficulties should not be a reason for focussing policies on marginal issues.

Other lessons could be to avoid spectrum auctions, and follow development of mobile technologies in the 400 MHz range. Another possibility could be to re-allocate some spectrum from television usage to mobile usage.

Notes

1 Cambodia is working on an Universal Service project, which to a large extent is based on the point of view in this paper. The project would increase access coverage to some 90% of the population.

2 Cambodia’s lowest income decile (10% of the population, rural) spent a total of some USD 5.8 monthly per person, of which 80% on food, 20% on non-food items, and 0.3% on transport and communications. Source: Socio-Economic Survey 1999 (Cambodia), Table H6, page 127.