

**NPTEL  
NPTEL ONLINE CERTIFICATION COURSE**

**Course Name**

**Strategic Communication for  
Sustainable Development**

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**Lecture 22: Community Informatics**

Welcome back to the course titled strategic communication for sustainable development.

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My name is Aradhna Malik and I am helping you with this course and we were discussing information and communication technologies in the last class we will continue with this discussion in this class also.

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And so now there is another upcoming field.

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## Community informatics (McIver, 2003)

- "Community informatics is an interdisciplinary field concerned with the development, deployment & management of information systems designed with & by communities to solve their own problems"
- Principle issue areas in community informatics
  - Prioritizing social requirements
  - Accessibility, universal design & participatory design
  - Socio-technical geographies
  - Technology lifecycle constraints

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Of ICT's which is especially in the context of development and this field is called community informatics community informatics is an inter disciplinary field concerned with the development, deployment and management of information systems designed with and by communities to solve their own problems.

So, you know this in itself talks about the participation of communities in designing systems that are for them, by them, and that is exactly what, you know the whole concept of communication for sustainable development talks about no development effort can be sustainable, no development effort can last until and unless the community is involved. We can only go and do so much even professional social workers who, you know live, whose lives revolve around development efforts cannot keep doing the same thing for the community again and again.

Unless they are part of the community they want to serve unless they become a part if they are not already a part of the community they are serving, unless they become a part of that community and serve the community as insiders their efforts cannot last. Unless everybody around them understands what they are doing, unless, you know there is a relationship or there is

a coherence between what the people putting in development efforts field, and what the community feels about their efforts this, these efforts cannot last.

So community informatics is a beautiful field it is a wonderful application of ICT's of information and communication technologies to the field of development. And it is a stepping stone towards using ICT's for sustainable development especially sustainable development, development that goes on that is ongoing that does not stop at the end of a project okay. So the principal issue areas in community informatics our number one prioritizing social requirements.

We need to know what needs to be approached first, what needs to be addressed first and what needs to be addressed next. Then accessibility universal design, and participatory design. The design needs to be universal and it also needs to be participatory, accessibility, do people understand it, are people involved in the designing of this technology, it cannot be something only the specific, only to a community, but it has to be adaptable to that community.

so the design has to be universal and the applicability has to be participatory or be, it has to be universal as well as adapted to the needs of the community it hopes to serve socio-technical geographies how people feel about it, what are the social, what is the social structure there, what are the tech, the other technologies existing in this area of how the new ICT's can be put in that area and how they can be made a part of that system.

So that is the, these are the issue areas, then technology life cycle constraints procurement, management, maintenance, feedback. So, you know how the technology, acceptance of the technology then procurement then maintenance of that technology, so how are technologies becoming a part of the social structure and the existing infrastructure in that region. So these are some of the issue areas.

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Prioritizing social requirements how do we prioritize social requirements, the, some of the concerns here are the digital divide and access to ICT's in sustainable development efforts, digital divide is the psychological division that exists between the people who have access to technology and who do not have access to technology. My guide, my PhD dissertation supervisor professor Frank Dansis and a lot of work on the digital divide.

And you might want to look up the kind of work he has done, so the digital divide is a real issue especially with the implementation of ICT's in developing areas. Then prioritizing ICT's in relation to other social cultural and non-technical methods, we are going in with a new technology, the communities first reaction will be, we do not care, we do not want it, we are happy with whatever we have.

As it is our lives are so difficult and you want us to learn, how to use something new absolutely not the first point of resistance, it is something new, it will require more time and effort for us to understand how this works and why we need to use this. So we do not have that time, we do not have the energy to deal with it, we are much busier trying to live our lives, you know as comfortably as possible.

And lives can be very difficult in these rugged regions where people do not have enough to eat where there, you know there are a lot of the weather is unpredictable, so you have cyclones, and you have floods this and that, or, you know heavy snowfall and landslides. And I mean people are so busy just trying to survive and you expect them to accept a free internet, I mean what will they do with internet if they do not have a pot of water at home.

So, you know that is the kind of resistance that comes up and that is very fair. So we need to see where whatever we are proposing fits into their priorities and slowly by helping the communities understand the value of these technologies. The new technologies need to be pushed to the forefront. So that is prioritizing social requirements, exploring the scope of ICT's to get into a diversity of social problems and issues we cannot just plan things and we will talk about this, I have been repeating this again and again.

We cannot go and force a community to accept something new, because the rest of the world is doing it. That is not the way to do it we cannot just you say okay here are computers used and figure out how to use them know. The cell phone has found its way into the lives of people even in far-flung regions because of its use, because of its utility it is a tiny device. Even the basic cell phone has the option of receiving and sending messages.


And these basic cell phones have become a hot favorite even with vagabonds even with mobile communities. So we have the [indiscernible][00:07:54] for example in Himachal Pradesh these are the shepherds. And so they take their herds of sheep and they go up to the mountain in the winter and they come down the mountain in the, sorry they go up to the mountain in this summer and they come down the mountain in the winter fair enough.

But they are also using cell phones to stay in touch with each other, to call up somebody for help in case there is a landslide to ask, to stay in touch with their families who may be living in the villages. So, you know or I mean just to find out things, or just to store music, songs their own local songs. So that is one very tiny technology that has found its way into the lives of these

people that the government has built so many towers, so, you know we, I mean different companies there is availability of so many phone towers.

So signals are there, so people know how to use them and there are, you know the regions that they go many times these places have places where they can charge their cell phone, so they are using them. But the thing is that, you know something small like that has really found a lot of value, but having putting computers and villages that do not even have electricity for the most part of the day, I think is a little premature at this point. For the simple reason that people do not have the time or the energy there it just does not fit into their routine.

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**Prioritizing social requirements** (McIver, 2003)

- The digital divide and access to ICTs in sustainable development efforts
- Prioritizing ICTs in relation to other social, cultural and non-technical methods
- Exploring the scope of ICTs to cater to a diversity of social problems & issues

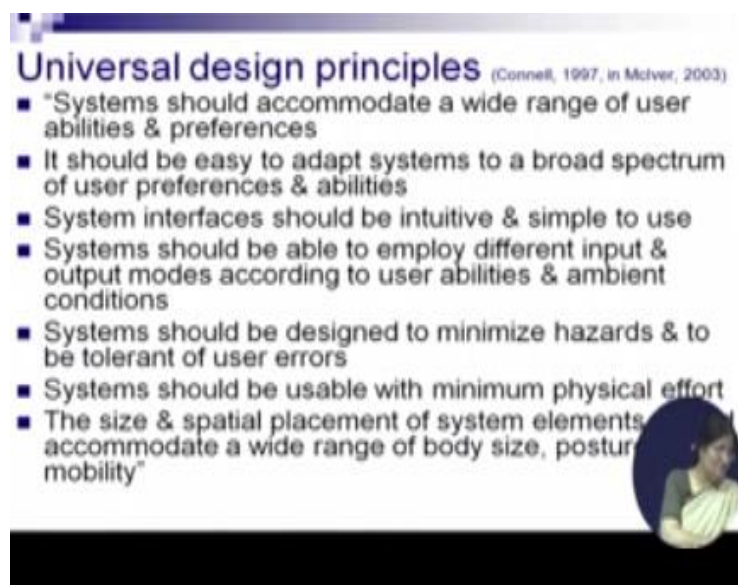
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So, you know one small technology that is usable, that is accessible, that is acceptable to the community can be the scope of this tiny technology, can be expanded to address the whole bunch of social problems instead of giving them new technologies. Accessibility universal design and participatory design, accessibility refers to the accessibility by people with special abilities and various disabilities that we might be dealing with could be visual disabilities, hearing disabilities, physical disabilities and cognitive and language disabilities.

So, you know accessibility by people who may be having these disabilities motivating the use of universal design it is critical that universal design principles be applied from the inception of a project we cannot build technologies in isolation it takes money, it takes time, it takes energy. So we build a universal design and increase its adaptability across a variety of users. So the basis is the same, the base is the same, sorry and the add-ons are different for different users.

It is adaptable to a variety of situations. universal design benefits all people not just those who have disabilities or who have special needs, we do not even turn them as disabilities these days the special needs that people in the community may have.

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Universal design principles systems should accommodate a wide range of user abilities and preferences. So when we are building ICT's the design should have a wide range of abilities preferences people should be able to pick from a larger basket of options that they may need to use in different situations. It should be easy to adapt systems to a broad spectrum of user preferences and abilities, system interfaces should be intuitive and simple to use, people should be able to learn how to use these things.



It cannot be, I mean a complicated technology will not be acceptable by the community, people should be able to use technologies and these days especially, you know this is based on a paper written in 2003 and we are sitting in the year 2016. So by this time, you know in the past 13 years technologies have become so simple to use that some critics, some behavioral scientists are saying that technology, the new modern day very user-friendly extremely user friendly technologies are making us number because they do not challenge us enough.

We do not use our ability to learn the use of technology because it is so simple and so we are becoming more and more dumb, you know we are not exercising our brains as much. So that is the flip side that we are dealing within 2016. So, you know they should be simple to use but then the applicability of simple to use devices is very high or the acceptability is very high in regions where people can use them, it is new it is simple to use, it can help you.

It is not about learning something new or exercising your brain it is using the cell phone as is siren it is, you know as an emergency device you call up people when you are stuck. So you have these buttons instead of a smart phone where your finger or I mean, you know accidentally you touch something and then you have to figure out how to comeback I am a big fan of these phones that have buttons we cannot find them too, we cannot find too many such phones these days.

But then they were so useful the very, very basic I will, I am not allowed to take the names of companies here, but very basic, very rugged cell phones where you just press buttons to get things done and those were so helpful. So, you know simple technologies then system should be able to employ different input and output modes according to user abilities and ambient conditions.

So again we are talking about adaptability in terms of input adaptability in terms of output, we have various languages and cell phones these days. So you can send messages in any language that the receiver may be able to understand. So that is, you know another way of that is an example of adaptability. Then system should be designed to minimize hazard and to be tolerant of user errors I am talking about rugged cell phones there are some types of cell phones that, you know no harm comes to them.

And we teachers have these huge bags we put our books and food and purses, wallets and everything in the same pocket. And so if a cell phone is there one of these modern-day very delicate cell phones is there it will break, but the older type rugged cell phones you throw the phone in the bag and you put a ton of things on it nothing will happen to it, it is rugged, it falls on the ground nothing happens to it.

So, you know that kind of stuff I mean we are still big fans many of us are still big fans of those very basic cell phones. So because they are so rugged, because they are not very sensitive, because they are, you know they are tolerant of user errors and they should be designed to minimize hazards, then system should be usable with minimum physical effort we should not have to again, I think the movement from old type cell phones where you have to press one button three or four times and then it took you to a character of your choice led to the development of the modern day smart phones where you can do a billion things with it. But then, you know how much effort is required that is the question. It should be too sensitive and it should not require too much effort also.

So that delicate balance needs to be maintained the size and spatial place, but I mean if you for example, you know let us take the example, as far as physical effort is concerned, let us take the example of, you know installing devices that require several switches to be turned on several knobs to be turned on, we will get confused but, everything happens, if everything happens at the click of a button at the switching on of a switch become easier for us.

Size and spatial placement of system elements should accommodate a wide range of body size, postures and mobility is the length of the wire attached to your or the wire that comes along with your with your cell phone charger for example. Some cell phone chargers have shorter wires others have longer wires. It should be long enough so that you know, if the plug is saved maybe three feet away from your table you should not need to put another table underneath.

The plug it should reach, wherever it has to go I am not talking about long, very long wires but then I mean some adaptability computers for example, you know the screens these days the

screens you can turn the screens they are flatter so, they can be accommodated in a smaller place we remember times with these big screens with this big thing jutting out at the back so televisions we had televisions now.

Nowadays you can hang your television on the wall and your television can double up as a screen for your computer also. So I mean that is what we mean by adaptability spatial placement, where do you put it, they get into a wide range of possibilities we have these televisions that have a stand so, you can actually put it in one corner if you do not want to hang it on the wall you can put it in one place you can also hang it on the wall so that is adaptability.

It is just two holes I mean, you know there is a bracket that holds the television, but these are sturdy things. So this is an example of adaptability. Cell phones again, very small cell phone give you cramps in your hands. So the size should not be too big, it should be too small, it should be just right so you can have long conversations without feeling uncomfortable. We also get these attachments for phones that you can put on your shoulder and you can talk on the phone with and you can still write.

So, you know these things, this is what we are talking about technologies different technologies and how you use these technologies.

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Then factors, user centered and participatory design, factors impacting usefulness and usability of ICT's in development efforts. Some factors that impact usability are hardware and software limitations, unreliable systems, you know. So what kind of hardware can be installed indifferent regions what kind of software will require the least amount of training or we would be more acceptable to people if it is an language that people understand then it will be easier for people to use it.

So that is the reason why, when we use computers the, the Indian fonts have now been introduced in the, or, you know we have the ability to install Indian fonts I think the sum of them are already included in the operating systems and you can download the others are not too difficult to download from the internet. So it becomes easy, you have keyboards with different, with fonts of different languages on them, so it is, you know once you learn how to use it you can use your own language.

So limitations of the software, so hardware limitations again, you know how do you plug in things these days the plugs you do not have to figure out which plug goes where, I mean we all remember a time when the plug of the mouse used to have these tiny very fine pins, and we used

to have so much of trouble trying to fit it to the socket at the back of the computer. And if one pin bended then it would become a problem, so we still have one of those things at home.

And but these days it is so easy, it would not go in till you put it in the right way, so that the plug in socket are so well matched that things just go and do not want go in till did, you know till it is placed correctly.

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So that's the user friendliness that we are talking about unreliable systems things that, you know sometimes your cell phones freeze, sometimes your cell phones hang, or many times in very, in places that get a lot of storms your devices do not work as well you know, there is a storm and because of the severe voltage fluctuation some device gets spoiled etc. So I mean things need to be rugged especially considering the topography of the region the power supply in those regions etc.

So incompatible systems and data types is another issue negative ergonomic and social impacts of computer systems I mean for those of us who sit at computers for a long time we get spondylitis and we get carpal tunnel syndrome and all of those problems occur, but then we


cannot expect, I mean people who have never worked on the computer will feel, you know sitting at the computer for even half an hour very cumbersome, so they will start getting pain in their eyes, and there is a time and we had anti glare screens for our computers.

I think that is now part of the way the screen is made these days. So, you know social impacts of computer systems are another issue. What you can and cannot access on the computer, what is available on the computer, what the computer, the kind of information that comes up when you search for something on the computer. Geographical barriers in the provision of services and access to local knowledge especially in treacherous terrain.

It is not only about us being able to, you know put our communication technologies in different regions, it is also gaining the knowledge of the communities. Sometimes we are able to find out things from the community, sometimes we are not able to find out things. So and sometimes the terrain is so treacherous that community needs assessment becomes a problem. It is very difficult to get hold of the right people in the community who can advise us as to what the community needs.

So geographical barriers are there, so, you know they come to know who we are, and we come to know who they are, but meeting them in and being constantly in touch with them becomes a problem so that can be very difficult. Then managing technology lifecycle constraints is another issue here.

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## Managing technology lifecycle constraints

(McIver, 2003)

- **Primary processes:**
  - Acquisition
    - Identification of system requirements
    - Analysis & design of the prospective systems
    - Identification & acquisition of its components or services necessary to develop the components
  - Supply: Delivery of system components intended to satisfy system requirements
  - Development: Production of a new system suited to the needs of the community and the work that is going to be done there
  - Maintenance:
    - Correction of faults in an operational system
    - Enhancement in order to realize new requirements
  - Operation: Setting a system into a functioning state (a state where users can begin to realize its benefits)
- **Organizational processes:** Management, infrastructure improvement & training

Primary processes, in technology lifecycle constraints are, the first one is acquisition and acquisition deals with identification of system requirements, how do we acquire the system, how do we acquire the equipment that we are going to use, how do we get it, what kind of system requirements do we have, analysis and design of the prospective systems is another issue and acquisition identification, acquisition of its components or services necessary to develop the components.

So that are going to be able to cater to the needs of the community that this particular piece of equipment is going to be designed to serve, supply acquiring is one thing we make the payment, supply delivery of system components intended to satisfy system requirements. Then so, we find out, we pay attention to it, we then actually physically getting the system there where, we are going to use it.

Development production of a new system suited to the needs of the community and the work that is going to be done there. So once the system comes then through regular feedback from the community we should be able to adapt to the community needs also, that is another issue maintenance, something goes wrong in the equipment who is going to fix it, where is the person

going to come from, how is the person going to deal with it, enhancement in order to realize new requirements you are sitting in a region a lot of money has been spent getting things in place.

Now some new requirement comes up how are we going to deal with it, operation setting a system into a functioning state, a state where the users can begin to realize its benefits. So, yes you have a computer with internet connection. Okay now what are you going to do with it, so that is the operation part. So what do you do, you switch on the computer, you connect to the internet.

Now what, so, you know that is the operation phase how do you empower the community, equip the community to use things in such a way, so that they gain maximum benefit out of these technologies. And you have given people cell phones they have cell phones, they have learned how to use the cell phones now what, they do not need to call up each other say if they are half a mile away we just go and visit people who they want to talk to with the cell phone maybe you know.

But then you have these applications on the cell phones that they can download now what, so it is the actual operation stage. Organizational processes the management infrastructure improvement and training, you know within the within the service that is being provided. So all that is a part of managing technology life cycle constraints. And then the other part that is not mentioned here is knowing when to stop using the particular technology. The technology has come you've used it you came to benefit out of it when is it, time to move on even that becomes a part of these constraints.



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**Issues in community informatics** (McIver, 2003)

- **Potential of existing & emerging technology frameworks:**
  - Media & data convergence through "interactive, participatory, horizontal & multiway communication"
  - Wireless data communications – Wi-fi – advantages:
    - Overcomes challenges of laying land lines in rugged terrains
    - Lower cost as compared to land line in the same regions
    - Building an evolving network
  - Open source & public domain development e.g. MOOC course
  - Low cost hardware

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Issues in computer, community informatics, the potential of existing and emerging technology framework some issues, some concerns are that, you know how do the technology frameworks, how do we deal with them, media and data convergence through interactive participatory horizontal and multi way communication. So we do not only need to bring in new data we do not only need to generate new data and process it, we also need to be able to integrate the data we have with the existing data.

We also need to integrate the new knowledge that we find by using these ICT's, by using these technologies, by using something new in the community, we also need to be able to link it with the existing information, the existing knowledge of the community. So converging of this data through interactive talking to people participatory which is the other way, it is one-way communication from the other side, interactive would be co-construction of meaning, co-construction of reality, horizontal, talking to peers, and multi-way communication, multi-channel communication, wireless data communications is another issue.

Advantages of wireless data communications are it overcomes the challenges of laying landlines in rugged terrain. So cell phones are being used, they can be used even in places where we do not

have the physical fires going to everybody's house. So these towers are there, and we can use the wireless data communications, we can use mobile phones, but again that is one big benefit lower costs as compared to landline in the same regions building and evolving network.

So we have these towers, so, you know the necessity of having these telephone poles and then the supply going to everybody's house is minimized. And I do not know how many of you are aware but in rugged terrains and far-flung regions there is also a problem of theft of wires from these towers, you know you have these long wires going from pole to pole, and I do not know how people do it.


But people have been known to steal the electric wires and telephone wires. So between poles in very far-flung regions I do not know how they deal with the power going through these wires, but then I am sure they have a mechanism to do that. So all those problems are countered, then open source and public domain development. For example, the MOOC course, this course is such a fine example of using existing and emerging technology framework.

So, you know we develop open source and public domain information that is available to a larger community through open source and the public domain. The helper in our house is able to view these courses register for these courses and understand these courses. So, you know it is amazing anybody and everybody is able to deal with these things. So I mean, or understand or take advantage of these things wherever they are it is open it is in the public domain and we develop newer ways of knowing the world around us.

Low-cost hardware so the hard ware is, you know is not as expensive, you know in the emerging technology frameworks we are working towards bringing down the cost of this hardware.

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## Issues in community informatics (Contd.)

(McIver, 2003)

- Public involvement in information society governance: Policy issues regarding design & deployment of ICTs
- Role of international organizations in addressing rights & governance of ICTs



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So these are some of the issues here, but some more our public involvement in information society governance policy issues regarding design and deployment of ICT's there are policy issues who gets what, how do we cater to the needs of a larger community, how do we ensure that there is, you know the content transmitted through ICT's is not, does not appear to be, it does not feel to be discriminatory in any way.

It does not disadvantage any community per se, so these are some of the issues then role of international organizing organizations in addressing rights and governance of ICT's are some more issues here in community informatics. So all of these considered ICT's are a brilliant way of teaching out to people.

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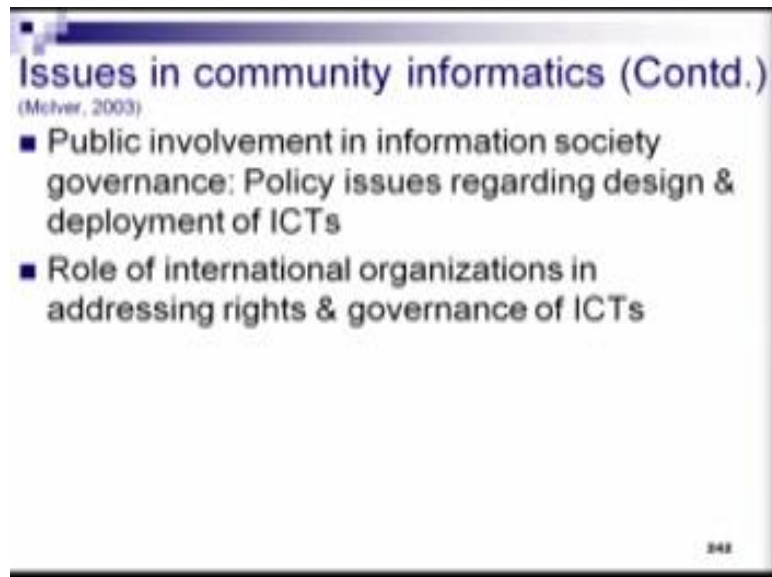
**Challenges to the implementation of ICTs in rural areas** (Dagron, 2003)

- The dream: Using the latest technology will facilitate solutions to age old problems
- The vision:
  - "Going beyond connectivity
  - Promoting enabling environments
  - Minimizing threats & risks
  - Maximizing positive results"
- The concern: Can the Internet really contribute to development? How do we know that it will and will contribute to development?



Then some challenges to the implementation of ICT's in rural areas, the dream here is using the latest technology will facilitate solutions to age-old problems. So, you know the dream is that when we use the latest technology it will help us solve age old problems.

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So, you know these are some of the issues in community informatics. And this is all we have time for in this lecture. So we will take the discussion from here in the next lecture in which we will discuss the challenges of challenges to the implementation of ICT's in rural areas. But, we will start with the challenges in the next lecture. So thank you very much for listening.