A Framework for Improving Access Through Interactive Multimedia to Enhance the Awareness

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Abstract: The Current growth in the technology makes the Governments to share the information for creating awareness with the general public in various ways, e-governance is a good example which makes the peoples to actively participate in all activities and make use of the Government initiatives. Even though, there is a big gap to access the importance of the initiatives. Hence, the reachablity of government initiatives to the general public should be improved for the success and also for the access of those initiatives by all level of peoples. Some technology should be developed which makes the general public to aware, access and active participation to make all level peoples to convey issues of anxiety to the consideration of Governments. However, developing such technology to make reachable to all level of peoples within government systems is a confront that encompasses various legal and illegal issues. This can be done by developing a frame work using interactive multimedia which improves the access of the initiatives which guides as a data repository for the general peoples in all level.

Key words: Interactive multimedia · Awareness · Climate change

INTRODUCTION

There are many issues in the country and the state in which both the Government and the general public should involve for a permanent solution. The natural calamities such as climate change are the major issue that can't be predicted and solved without the participation of each individual. Even though, there are many principles and procedures implemented by the Government for protection. Demanding methodologies by the general public to protect nature as well as their livelihoods are in practice till dated. No proper mechanisms were imposed for the protection. Day by day the demands from the general public are increasing and also Governments are imposing many new procedures for tackling such hazards. However, the bottleneck is the reachablity of various principles to all level of peoples. This will results in non-practice of the procedure sometimes led to permanent failure due to lack of awareness about the procedure should be followed. In this paper we are going to see about various issues regarding climate change and how

the people were having awareness about climate change as an example. This paper also covers how the growth of the technology makes people to get proper awareness about the facts, which makes them to know about similar issues and to understand their role for the better and sustainable environment. The participation of the general public and creating awareness is the first stage which is more important to tackle the issue easily. The aim of awareness raising campaigns most often differs between contexts but generally includes increase concern, informing the targeted audience, creating a positive image and attempts to change their behavior [1].

Why an Interactive Multimedia System Is Needed?: Awareness rising is an important component of the adaptation process to manage the impacts, enhance adaptive capacity and reduce overall vulnerability in all issues. Environmental issues are best handled with the participation of all concerned citizens, at the relevant level [2]. Peoples usually says that 'A picture worth's thousand words' but I believe the original quote was actually 'A

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picture is worth ten thousand words' as said by Fred R. Barnard, of Printers' Ink. The rapid growth of the technology makes the people in all level for the need of an interactive multimedia system in which it should behave or work as per the demands and also it should contain all the needed information.
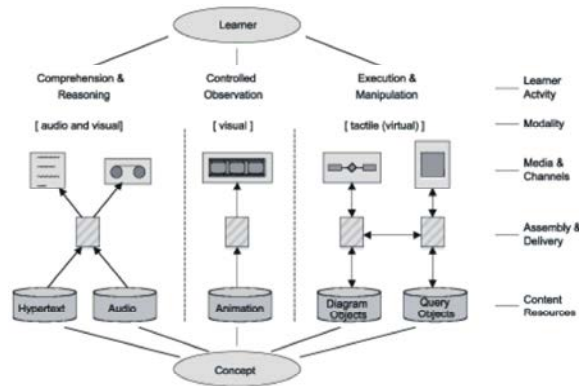

Fig. 1: An example of interactive multimedia in learning environment

Multimedia technology is an ideal platform to support advanced forms of learning and training. Active learning, for instance, requires a high degree of interactivity in different forms - for which multimedia technology provides an infrastructure solution [3]. Irrespective of the age, groups and subject the interactive multimedia learning environment provides the learners demand in all manner viz audio, visuals, animations etc. Therefore, interactive multimedia system makes all levels of peoples to know the core objective of the system in which it was developed for. As multimedia is the combination of various forms of data the output can also be as demanded by the user or the application. It can understand in any form and also it can provide data in any form. As envisaged by UNEP report all the awareness should be done through the interactive system for better reachablity among all levels of people communities which makes the fact reliable.

The following are the advantages of having interactive multimedia system:

- To encourage awareness and to sensitize the public with focus on remote and rural areas on government initiatives.
- To support to create and spread awareness about universal accessibility by creating an enabling and barrier-free environment.
- To promote individual quality
- Participation in national and international initiatives

- Coordinating and consolidating efforts made in the field by different departments, organizations.

Literature Review: As discussed in the previous chapter the need of the interactive system was surveyed and also the existing interactive systems examined and their efficiency was computed. In the field of education and training regarding knowledge delivery there have been many experiments and innovations were envisaged. From face-to-face to virtual education, different technologies have played great roles at different times. In the last two decades, due to the advent of computer technologies, information delivery has got new meaning. Development, access and transfer of text, sound and video data have given a unique face to classrooms, libraries and training and resource centers, in the form of interactive multimedia programs [4]. The following schemes/initiatives are reviewed:

- Village Knowledge Centres (VKC) and Village Resource Centres (VRC)
- Interactive Multimedia Compact Disc (IMCD)
- ICT based Technologies

Village Knowledge Centres (VKC) and Village Resource Centres (VRC): Both are the initiatives of M.S.Swaminathan Research Foundation (MSSRF). Village Resource Centers (VRCs) are located at the Block or District level managed by MSSRF where the subject experts such as Agriculture, Horticulture and Fisheries, Social Scientist and Computer Technical personnel provide Information, Knowledge and Linkage services to the Village Knowledge Centers (VKCs). This Hub-spokes model conceptualized and established by MSSRF in the States of Tamil Nadu, Pondicherry, Maharashtra, Odisha and Kerala are a decade and a half old which has been replicated by many National and International Organizations and the Government of India as Common Service Centers. All VRCs are linked through Broad Band connectivity for accessing information and knowledge in vernacular reposted in a centralized Knowledge Management System.

Interactive Multimedia Compact Disc (IMCD): Among the different software, available Microsoft Office 2000 Power Point was selected specifically for the study purpose. This software possesses number of unique features such as simple operation, create highly interactive multimedia presentation viz., possibility to add sound, video clippings, photo, picture, animation etc.,

play movies directly with in the power point, create simple hyperlinks, convert the presentation into web pages, pack and wizard have the advanced facility to compress and save our presentation across the multiple disc. Tamil language has been adopted for preparing the IMCD. The major criterion considered for the selection of farm technology was that it should be new and need based one. Accordingly, "Integrated packages for the Management of Coconut Eriophyid Mite" was selected. IMCD's prime aim is to transfer the advanced and complex technologies to the farmers in a simple presentation. Hence, for every slide / page of the IMCD, background voice was given. Varieties of pictures related to pest-affected nuts, trees, pest stages, nature of damage and yield losses were inserted while preparing IMCD. Three video clippings were inserted in IMCD such as symptoms and nature of eriophyid damage, application of nutrient and fertilizer for controlling of eriophyid mite and methods of application of Tamil Nadu Agricultural University (TNAU) Agro biocide chemical through root feeding. Finally all the interested text, pictures, photos; video clippings are hyper linked with the different action buttons for better usability with interactivity.

ICT Based Technologies: In Tamil Nadu many ICT based techniques are in practice. The Tamil Nadu State Climate Change Cell (www.tnsccc.in) formed under the Department of Environment, Government of Tamil Nadu has a dedicated website. Under the kids corner we propose to conduct online quiz. Such initiative has been already taken up by the ENVIS centre at Department of Environment, Government of Tamil Nadu (http://www.tnenvis.nic.in/ViewGeneralLatestNews.aspx?Id=1790&Year=2015). Some of the other examples for online quiz are

- http://environment.nationalgeographic.com/environment/freshwater/freshwater-quizclimate- change/
- http://www.abc.net.au/science/games/quizzes/2009/climatechange/.
- http://climate.nasa.gov/climate_resources/16/ etc.

Similarly quiz programmes and puzzle games shall be made part of science exhibitions

Deficiencies Faced: No doubt that there are wonderful schemes of the Governments; all built for progress of the poor. Most unfortunately these do not reach the poor but are siphoned away by miscreants who are middlemen and corrupt officials. It is a pity that these classes of people of our country are not served well at all despite the resolve of the Government towards these people.

A questionnaire based survey is made to evaluate the reachablity of existing systems in Coimbatore, Thiruppur and Erode districts of Tamil Nadu. About 5000 of various categories/levels (both genders) peoples were participated in the survey.

Table 1: Sample survey

| Sl.No	Categorization of the participants	% Lack of Awareness	% Lack of Accessibility
1.	Literate young people's (Age between 17 and 30)	36	16
2.	Literate Mid aged people's (Age between 31 and 50)	42	39
3.	Literate old aged people's (age more than 51)	45	42
5.	Illiterate young people's (Age between 17 and 30)	47	48
6.	Illiterate Mid aged people's (Age between 31 and 50)	59	60
7.	Illiterate old aged people's (age more than 51)	79	86
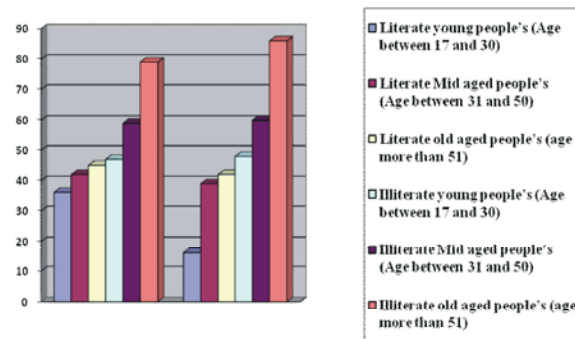
Fig. 2: Graph showing the lack of Accessibility and awareness

The study shows that both awareness and accessibility are directly proportional. Even though there are many schemes are implemented by the Government, the lack of awareness and accessibility made such schemes as a failure scheme. However, no survey or any study states 100% reachablity of any schemes to general public. The following are some major problems for reachablity:

- Dependant
- Application specific
- Real-time facts are not covered
- The system not acts accordingly to the demand
- Mainly lack of awareness

The major problem is that the regional level demands of the communities are not covered irrespective of their literate level. Thus, results in lack of participation of group of communities and stakeholders. However, the peoples in the lower level were affected due to lack of knowledge.

MATERIALDS AND METHODS

Nowadays technology brings everything in hands, so by using the technologies a framework should be developed assuring that all level of stakeholders and communities should benefit by the usage. A system should be developed for maximum rechablity by covering the demands of all categorizes of people. The interface or the system should advertise in such manner that it should improve or helps to have more participants. Once any scheme or principles is released then and there the system should advertise to all categories of peoples. A framework should be designed by involving the following participants:

- Various stakeholders
- All level of community peoples
- Government bodies
- Decision makers
- Legal authorities

Initial study should be done by collecting and collating information's from the participants. The knowledge and the bottle neck where each and every individual are having troubles should be identified and based on the pit falls the frame work should be designed. A survey with the same group of peoples discussed in previous section was done with other stake holders, community peoples , Government bodies, legal authorities and decision makers. The develop, discuss and settle strategy is used to design the framework, in which the each iteration in the framework is developed and the discussion made then and there with different level of peoples (stake holders, policy makers, community peoples, decision makers etc.,) and the iterations can be repeated till the requirements of the participants is reached.

The first step is to collect information about historical methods are in practice. The bottleneck discussed in the previous section can be identified by involving all the participants actively. The community peoples those who are the final receivers or utilisers of the schemes should given more importance. Only by evaluating the demands the inputs can be refined immediately which will increase the scope of the system. An example can be taken (in this frame work climate change is taken as a primitive example discussed in section B) and accordingly the inputs should be designed.
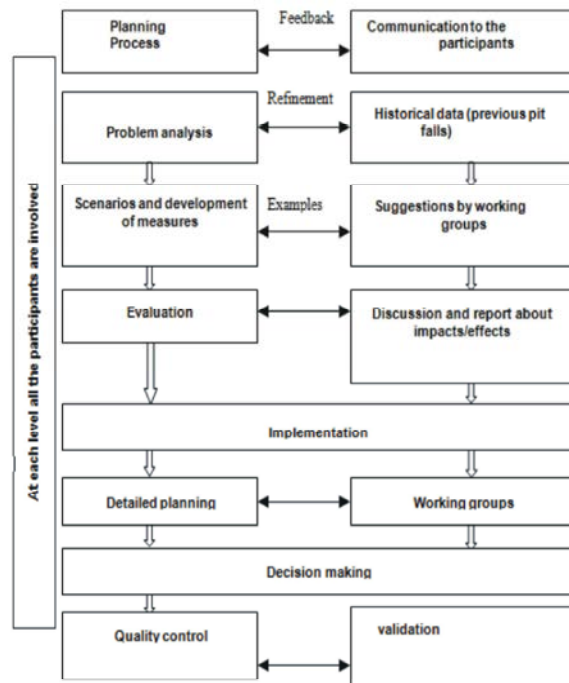

Fig. 3: Interactive Methodological framework

Process of Framework Analysis: The key part of the framework is the analysis phase in which all the existing systems were analyzed to fit in the framework and the inputs are designed accordingly. The participants are identified at each level and then the demands are collected and collated respectively. The analysis phase stands at the beginning of the process model in most processes. The following are the important things in the analysis phase of the framework:

- Formulation of objectives and goals
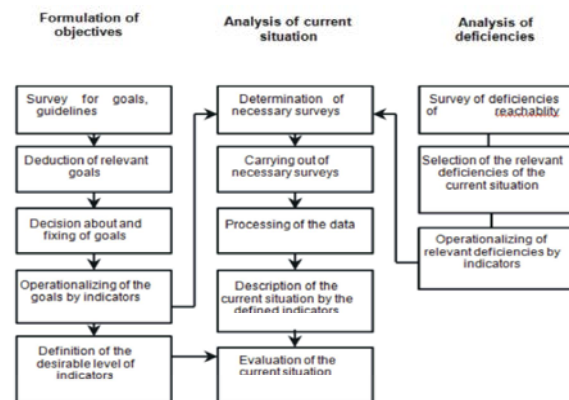- Analysis of the current situation
- Analysis of deficiencies

Fig. 4: Framework analysis

Initially the framework is designed with the historical data in which it has all the demands (requirements). While proceeding further the following methods are used to define the framework.

Correlation Analysis: The basic assertion should be computed to understand the process. The basic assertion for any exposure-response relationship is a simple correlation analysis. Karl Pearson's correlation was applied for the relationship. In statistics, the Pearson product-moment correlation coefficient (r) is a common measure of the correlation between two variables X and Y. Pearson's correlation reflects the degree of linear relationship between two variables. It ranges from +1 to -1. A correlation of +1 meant that there is a perfect positive linear relationship between variables. A correlation of -1 means that there is a perfect negative linear relationship between variables. A correlation of 0 means there is no linear relationship between the two variables. The mathematical formula for calculating the Pearson's correlation is shown in Equation (3.1).

$$r = \frac{N\sum xy - (\sum x)(\sum y)}{\sqrt{\left[N\sum x^2 - \left(\sum x\right)^2\right]\left[N\sum y^2 - \left(\sum y\right)^2\right]}} \tag{1}$$

where,

N   = number of pairs
Σxy = sum of the product of paired scores
Σx = sum of the x scores
Σy = sum of the y scores
$\Sigma x2$ = sum of squared x scores
$\Sigma y2$ = sum of squared y scores

The linear correlation coefficient is sometimes referred to as the Pearson product moment correlation coefficient in honor of its developer Karl Pearson.

It has been reviewed in the literature that a lagged correlation exists between variables and the occurrence, depending upon the time taken. Therefore the lagging correlation was also analyzed and used for further analysis. Statistical level of $p \leq 0.01$ or $p \leq 0.05$ was considered to be significant.

Regression Models: Regression analysis methods are ones in which the mean of a response (or dependent) variable is described in terms of a simple function of one or more predictors (or independent variables). The regression models are said to be linear because the

unknown parameters have a direct relationship with the known parameters. It is thus postulated that the conditional mean of a response variable Y depends linearly upon a random factor X. Suppose that we have n pairs of observations {(xi, yi): i = 1, ..., n} representing the realizations of a corresponding random variable pair (Xi, Yi), all pairs being independent and identically bi-variate normally distributed. The hypothesized relationship between the two variables is given by the Equation (2).

$$y_i = \alpha + \beta(x_i) + \varepsilon \tag{2}$$

where,

yi – dependant or the endogenous variable
xi – independent or explanatory or exogenous variable
α – a constant amount
β – an unknown vector or scalar factor
ε – the noise term reflecting other factors

The nature of simple regression analysis is to produce an estimate of the two unknown parameters α and β (ε, may or may not be observed in certain situation). The simple regression equation is the equation for a line-a line with an "intercept" of α on the vertical axis and a "slope" of β. Thus we consider a scatter plot the hypothesized relationship thus implies that somewhere on the diagram may be found a line with the equation above Equation (3.2). The task of estimating α and β is equivalent to the task of estimating where this line is located.

In real situation, there may be more than one independent variable on which the endogenous variables depend. In such cases like the one addressed in this research, a multivariate regression approach is applied, which is an extension of the simple regression equation. However it cannot be thought of the slope and the intercept of a line since other variables will not be accommodated in the XY plane to plot scatter plot. The equation for a multivariate regression is shown in the Equation (3.3).

$$y_i = \alpha + \beta(x_i) + \gamma(z_i) + \varepsilon \tag{3}$$

where,

zi – Another exogenous variable
γ – Unknown parameter of z on which the endogenous variable depends

Table 2: A sample analysis of climate change knowledge

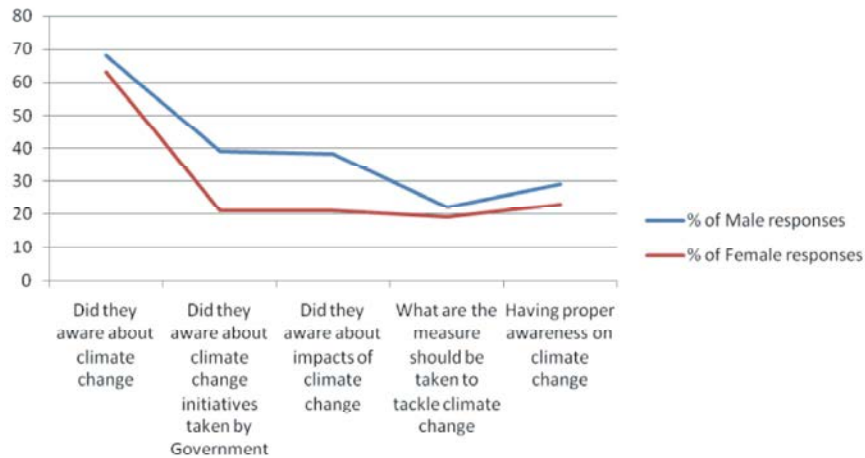| Sl no	Target questions	% of Male responses	% of Female responses
1.	Did they aware about climate change	68	63
2.	Did they aware about climate change initiatives taken by Government	39	21
3.	Did they aware about impacts of climate change	38	21
4.	What are the measure should be taken to tackle climate change	22	19
5.	Having proper awareness on climate change	29	23

Fig. 5: Comparison of responses for the questionnaire in Table 2

Multivariate models were thus formulated for each of the diseases studied and using the highly correlating lagged climate parameter. The models so developed were assessed for the goodness of fit using the R2 value called the coefficient of determination. The R2 is equal to one minus the ratio of the sum of squared estimated errors (the deviation of the actual value of the dependent variable from the regression line) to the sum of squared deviations about the mean of the dependent variable. The R2 statistic is a measure of the extent to which the total variation of the dependent variable is explained by the regression.

Intuitively, the sum of squared deviations about its mean is a measure of the total variation of the dependent variable and its values lie between zero and one.

An Example :- Climate Change Scenario: Human beings are at the interface of physical, geological and biological processes of the earth and any fundamental global environmental change, affecting these systems will have a drastic impact on human. Climate parameters play an influential role as one of the abiotic factors of the environment around us. The impact of a changing climate is a function of the nature and magnitude of the changes in environment and vulnerability of individual or population involved. Although awareness of the climate change issue among the general public is high, the importance of the problem is not recognized [19].

A questionnaire was administered to collect data on perception and assess the knowledge level of climate change issues among the public. Respondents to the questionnaire were selected through stratified random sampling technique . A pilot study was conducted among 200 peoples with various combinations like education level, age etc. and based on the feedback, the questionnaire was improved. The male respondents were 54% and female 46%.

Increasing the Awareness: Even though there are many awareness were followed to tackle climate change by Government bodies and other organizations the reachablity of the awareness to the general public is very less. Interactive multimedia framework will be very useful for collecting, collating and disseminating the data especially to fulfill the demands of the communities which helps to tackle from the impacts. The interactive system should meet the following demands for the reachablity:

- Awareness should in multilingual (Universal and regional languages are preferred) which covers all levels of peoples.
- Framework should be content specific and user friendly.
- The demands should be initially examined.
- At each level the feedbacks from the participants are collected.

- All level audience are covered
- Iterative process should be followed for further improvement
- Framework should collect, collate and disseminate information

Conclusion and Future Enhancement: This interactive multimedia framework will be very useful for collecting, collating and disseminating the data especially in creating awareness. The lacks of awareness among the level of community peoples, decision makers and also in policy makers results the awareness (Government schemes) idle. Nowadays Government, NGOs and some serviced based organizations are creating awareness among general public but the reachablity is not achieved. Hence, such awareness schemes are not succeeded. This paper envisages how the awareness can be done interactively to overcome the demands. It also describes about how the awareness can be improved in all levels by fulfilling the demands of the participants.

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