Persuasive technology for shaping social beliefs of rural women: *Development of group based health information kiosk*

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Abstract. This paper presents, the Group Based Information Kiosk (GIK), which was designed to influence health behaviours of rural women. The objective of the kiosk is to offer health information to rural women to increase their awareness about menses and maternal health. The design and development process of a GIK followed social cues of persuasive technology to increase perceived behaviour control of rural women. In order to measure user's level of engagement, a comparative study between the GIK and conventional health information system was conducted. The results of the interactive sessions with women of different age group and literacy level showed that, the GIK motivated women to challenge existing social beliefs and practices, thereby motivating them to follow correct health practices. In this paper, design process of GIK, preliminary results of the initial study, and future research plans are discussed.

1 INTRODUCTION

The delivery of relevant personal health information to improve the well being of rural population is still recognized as a large challenge for government and private sectors in rural India [9, 10, 11]. Despite several outreach programmes run by the government, non government organisations, and private sectors, there is still an alarming rate of deaths in rural area due to lack of primary health information [6, 8].

Recent studies have shown that one of the factors restricting the information exchange within the rural populace can be attributed to the social set-ups and orthodox social beliefs related to healthcare [4]. A study by Spector (1995) indicates that ignorance of these culturally divergent beliefs and traditional health care practices may lead to failure of health information system. However the existing health care approaches using both traditional and ICT medias do not consider the social beliefs while disseminating health care information. Additionally, the ICT based information systems disseminate general health care information and do not address domain specific information needs. Due to high percentage of illiteracy in rural areas user are highly dependant on community health worker to access health information.

Currently, persuasive technology has strongly emerged as a strategy for changing people's social attitudes [5]. Application of persuasive technology varies from persuading users to reduce energy consumption [2], assisting patients to remember their pills [13] and persuading young girls to avoid early pregnancy [5]. However, there is little evidence on how persuasive technology could be used in rural areas of developing countries, to addresses socio-cultural issues related to healthcare.

This paper aims to explore persuasive technologies that can be employed to improve the information content and interaction to disseminate health care information among rural populace. In our previous research [14], we identified social beliefs and practices related to maternal health and menstrual cycle among women. Based on these findings we developed a group based health information kiosk for rural women to persuade them to change their existing health practices. The kiosk includes audio visual aid to facilitate interaction between the literate and semi illiterate rural women. We incorporated the social beliefs and practices related to the health care issues, as stated by [14] in designing the information content of the kiosk. Additionally, we developed a persuasive environment by incorporating the group behaviour of rural woman in designing the system interaction.

We conducted a study to compare the level of engagement of the rural woman with the proposed group based systems to the conventional health information The comparison was done between two systems in terms of revisits, and users' capacity to challenge the social beliefs after the interactive session. Conventional kiosks offer general health information via a PC computer. The results of the study indicate that women interacting with the Group Based Information Kiosk (GIK) were persuaded positively about their incorrect health practices and were encouraged to challenge the existing social beliefs. The following sections describe the persuasive strategies applied in design of (GIK), and finally we conclude by discussing relevance of persuasive technology in planning information content for the rural context.

2 GROUP BASED INFORMATION KIOSK

Group Based Information Kiosk (see figure 1) is designed to offer personal health information related to maternal health and menses to rural women. This was developed to encourage them to challenge the existing social beliefs and to persuade them to change their incorrect health practices. The PC based system set up of GIK includes a monitor, a customised icon based keyboard

with 9 keys and a trackball. The information is presented by audio video aid in local language using PowerPoint, which can be accessed by the iconic keyboard using the 9 keys. PowerPoint platform was selected for information presentation due to its flexible and simple interface [7]. Power point was also selected because the content had to be easily updatable by the GIK operators, who were computer literate.

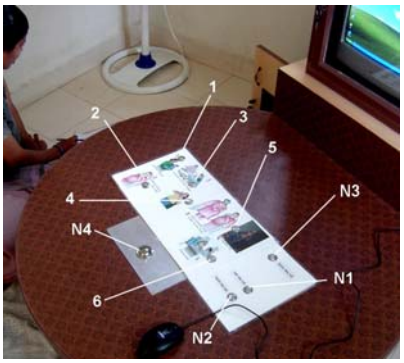

Figure-1 depicts design platform and layout

Figure-2 depicts explanation of each key

The healthcare content in GIK was designed by incorporating the social beliefs related to maternal health and menses found by [14]. The social beliefs related to maternal health included issues such as child delivery should only be done at home, pregnant mother should be given less food and pregnant ladies should not take any medical injections. The social beliefs related to menses included issues such as, only cotton clothes should be used during menses, during menses girl should not be allowed in the kitchen and menses is a punishment from God.

The GIK content is divided into six categories as depicted in (figure -2). Next to each input key, an icon is given to assist rural women in understanding the function of the concerned key. The system has flexibility to offer information sharing environment at individual or group level. Three local girls with knowledge of Microsoft office has been appointed as operators. Their responsibility is to assist rural women in interactive sessions, and update the kiosk content. The GIK is physically located in the community hall at a pilot village site in western India.

3 PERSUASIVE STRATEGIES IN GIK

(Table-1) depicts six information categories and corresponding persuasive strategies suggested by [5] that are employed to design the information content and physical form.

GIK components	
Content ***Input keys: Information detail***	**Persuasion strategies applied on the GIK**
Key-1: information about menses and maternal health.	Psychological clues*, Language*, Story telling technique, Audio-visual feedback in presentation.
Key-2: information about problems related to menses and maternal health.	Graphics depicting worst health condition of a women during maternal health, Story telling technique, Audio-visual feedback in presentation, Language, Psychological clues
Key-3: what are the good practices related to menses and maternal health.	Story telling technique, Audio-visual feedback in presentation, Language, Psychological clues
Key-4: how women in developed countries or urban areas deal with similar problems	Story telling technique, Audio-visual feedback in presentation, Language, Psychological clues
Key-5: screening health related videos	Social roles*, Using traditional folk songs, puppet shows, Story telling technique, Audio-visual feedback in presentation, Language, Psychological clues
Key-6: video recorded speech of local health expert and leader to motivate women.	Social roles, Story telling technique, Audio-visual feedback in presentation
Physical form	
Physical environment	Physical*, Social dynamics*, Social role
GIK form design	Social dynamics

Table-1 depicts six information categories and persuasive strategies applied in designing content and physical form

Physical clues*: According to [5], computing technology can convey social presence through physical characteristic. Furthermore, physical attractiveness has a significant impact on social presence. In GIK, due to low height, rural women an easily sit on the floor to interact with the system. The sitting

position is culturally acceptable among rural women because it's a standard interaction posture among rural women, thus persuading women to sit for long hrs.

Psychological clues*:* According to [5], computing product can lead people to infer, often subconsciously, that the product has emotions, preferences, motivations, and personality. In GIK, the following three animations of local personas were used to deliver the content: a) teenage girl for discussing menses issues, b) married woman for discussing maternal issues, and c) a doctor for answering their queries. Additionally, folk music, and puppet shows were used to denote the stories weaved around the personas. In all the 6 categories, the three personas presented existing beliefs and discussed its effects rationally. Due to similarity between the screen character and rural women, women could emotionally relate to beliefs and problems being discussed. As a consequence, women were persuaded to discuss beliefs among them selves.

Language*:* According to [5], computing products can also use written or spoken language to convey social presence and to persuade. In GIK, during interactive sessions, each section of information item concluded with a provocative message, which persuaded rural women to press next input key and access additional information. A critical issue of varied literacy level was addressed by offering health information in local regional language.

Social dynamics* :* According to [5], most cultures have set patterns for how people interact with each other such as, rituals for meeting people, taking turns, or forming lines. These rituals indicate the social dynamics. In GIK design process, current pattern of accessing information in public or private places, rituals of meeting people and community sensitive needs of rural areas were considered. GIK physical design offers flexibility to have individual or group based interaction with a rural women. Inviting women in groups includes family members such as sister in law, mother in law, and close friends of the rural women. This leads to interesting discussions in the sessions due to social dynamics.

Social role* :* According to [5], human play authority roles, computers can also act in these roles, and when they do, they gain the automatic influence that comes with being in a position of authority. In rural areas, local doctors and village leaders are seen as authority and influential people. The word from these authorities has high value among rural women. In GIK, recorded videos speech of these authorities has been shown to persuade rural women towards following healthy practices during menses and maternal health.

4 INITIAL STUDY

A study was conducted to compare the GIK with the conventional health system to measure their level of engagement with the rural woman in terms of revisits to the system, and encouragement received to challenge the social beliefs. The study was conducted at the deployment site of GIK in villages in western India in two villages. In village A, the data was shown to (N=50) semiliterate and literate rural women on a conventional health information system. The content of the system was based on the available information related to menses and maternal health in the local hospital. In village B, the data was shown to (N=50) semiliterate and literate rural women through the proposed GIK. The content of the GIK was based upon existing social beliefs; furthermore, GIK offered flexibility to have interactive session in groups. The sessions were monitored by the researcher and the appointed local girls. In total, 100 rural women participated in the study. Participants were from 12-60 age groups. Both the villages were observed for two months. Local doctors were responsible for content verification and providing answers to participant queries related to menses and maternal health.

Figure-3 depicts Village-A participant in interactive session

Figure-4 depicts Village-B participants in interactive session

5 RESULTS

The results show that the Village B participants who interacted with the GIK were twice as much engaged in confronting the social issues as compared to participants from village A . Participant's engagement with the system was measured by two indicators, first amount and type of questions asked in the session, and second, number of re-visits to the health system after the first session. In total 23 questions from village-A and 58 questions from village-B was received from the interactive sessions. Received questions from the participants were categorised using affinity technique [3]. The following 6 categories were identified as prominent: questions related to practices, beliefs, challenging existing beliefs, data-addition, personal problems requiring privacy, and non-health related question. Based on frequency analysis, participant response on each category is depicted in table-2. and number of re-visits to their respected health system is depicted in table-3.

Questions asked	**Village- A** **N= 50 women N (%)**	**Village- B** **N=50 women N (%)**
1. Existing practices	5(10)	12(24)
2. Existing beliefs	3(6)	11(22)
3.Challenging existing beliefs	2(4)	7(14)

4. Data addition	8(16)	15(30)
5. Personal questions	2(4)	9(18)
6.Non health related questions	3(6)	4(8)

Table-2 provides details of the questions asked by the Village-A 23(100) and Village-B 58(100)

Number of re-visits	**Village- A**	**Village- B**
	N= 50 women N (%)	**N=50 women N (%)**
Participants	17 (34)	36 (72)

Table-3 provides details of the participants who re-visted the given health system after the first session

1. According to this study, participants from Village- B were twice as much engaged in confronting social issues than participants from Village- A. This could be attributed to the content design based on social beliefs and group based participation which led to interactive sessions in Village-B. This created peer pressure among similar background participants, also known as normative influence [5], which motivated participants to ask questions during the sessions.
2. Questions reported by Village-B regarding practices and challenging existing beliefs were slightly over twice than the response received from Village-A. In village-B, issues about existing beliefs and practices were openly discussed by the participants during the session. Many participants discussed their personal beliefs and practices to confirm their knowledge about maternal health.
3. Questions involving personal health and privacy were reported high in Village-B, 9(18%) sessions than Village-A, 2(4%). This implies that, issues which were considered private came out during group discussion. Group based sessions enabled women to share personal health issues in public.
4. In Village-B, 36 (72%) participants re-visited the GIK after their first session. Whereas, only 17(34%) participant re-visited the conventional health system from Village-A. The qualitative findings show that, participants from Village-A found information items relevant, but were not able to discuss with women of similar background during the sessions. Many participants also reported receiving too much information in one session and lack of discussion has led to less engagement. Therefore they are not keen on coming back. The strategy of inviting women in group in Village-B resulted in higher motivation and discussions between the participants.

6 CONCLUSIONS

The paper presented an exploration of persuasive technologies employed to improve the information content and interaction to dissemination of health care information among rural populace. Based on previously identified social beliefs and practices related to maternal health and menstrual cycle among women, a group based health information kiosk for rural women was developed. The results of the comparison study between the group based systems vs. a convention one indicate the benefits of deploying persuasive technologies to assist the rural women to confront their existing health practices. However, understanding and shaping beliefs doesn't guarantee change in health behaviour, unless intention of user to perform certain behaviour is not actually implemented [1]. In the next stage, longitudinal studies are planned to observe the changes in the user behaviour in relation to issues concerning maternal health and menses.

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