

PREREQUISITES FOR MODIFICATION OF BEHAVIOR

Niels Boye 19th of July 2011

This communication is trying to answer the questions provided for the first data-set in a “story telling format” – thus aiming at providing the foundation for the next overall uniting story in behavior modification in relation to health, whilst taking the potential possibilities in ICT (Information and Communication Technology) into consideration.

A fundamental persuasion here is that the raw material for the needed personal response ability and responsibility essential for behavioral change is “knowledge” that should be omnipresent available and possible integrated (by ICT) in any “micro-decision” taken in everyday life and thus support person specific trajectories towards “a better state of personal health” – the natural overall aim for behavioral change and lifestyle management. “A better state of health” is a personal issue and the trajectories towards it are multiple and also personal - but all decisions should have possibilities to be based on evidence.

“A better state of health” is a dynamic cultural phenomenon in a balance between sense and sensibility to e.g. advertising. It is not well-known that the iconic symbol of personal wellbeing “the Marlboro Man” launched in the late 50’ies died from lung cancer due to smoking Marlboros – and so did his horse from the passive smoking. An ubiquitous accessible “ICT-structure of evidence” in health could have potential to balance commercial puff and hence qualify advertising and personal choices.

ICT can relate “knowledge” through the amalgamated employment of technical, service, conceptual, and behavioral models and relate it to the personal overall aim (“the personal better state of health”) and visualized it using different technologies. ICT enables alternative ways of personalizing and communicating knowledge – hence enable new service models in health with a complementary (health-)focus compared to established healthcare. This potential, alternative market for health knowledge has prospective to be deregulated and have mainstream market characteristics.

CHANGE IN SERVICE-MODELS

Modification of behavior is usually attributed to the change of individual habits; however to make sound decisions more likely to happened on the individual level and to have the full effect of potential habit-changes, the “choice architectures” defined as embodying the regulations, policies, and incentives at societal and actual level – hence, the background for a decision taken – may also have to be modified. This also means that governance, the value propositions’ layout, and professionals (healthcare, governance, legal) roles’ and powers may have to be rebalanced to new situations. In summary a changed service-model for health related matters may be required.

Information and Communication Technology is approaching a maturity where it can be a part of the social and societal background for individual welfare and decisions. Health is a large part of individual welfare, which nowadays includes individual responsibilities and response abilities - also in health

related issues. The current level of maturity of ICT enables launching a shift from “technology push” to a “service push” into society of health solutions – which will also be augmented by the increasing awareness on health issues and self care on the individual person level. The target population of this “service push” is with huge diversity – from the Californian-health-freak and jogger on a very controlled diet to the elderly, digitally challenged, chronic-ill person, with cognitive and physical impairments. ICT will not be able to serve the whole range in a rewarding manner in the “first wave” of this “service-push” innovation; however it may enable a shift in resources that may produce benefits within the whole range of service-delivery – including also the levels of governance and in methods for “total” quality assurance of health activities – which also can take the patient/citizen behavior and contribution into account.

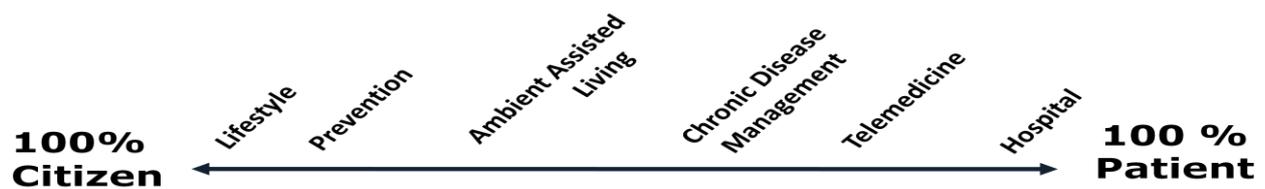
Coproduction of Health (CpH) is a service-model that means that health considerations and knowledge can be embedded and utilized in any activity in society. Synergies between professional healthcare, self care, informal care, and the commodity segment will be turned into “health added value” for the individual human being. Coproduction takes place in an “ecosystem”, which is cross-sectional to the formal organization of society.

The ecosystem(s) hosts “value networks” that share information resources and that can generate the “value propositions” which are the basis of the business models that fund the CpH-healthcare services delivered. Conventional healthcare systems and providers, the medical evidence in these systems and the specific information that healthcare holds about the individual in context plays a major role in the CpH ecosystems.

The term “eco-system” is usually attributed to biology-systems; however Moore has defined a business eco-system as: *“An economic community supported by a foundation of interacting organizations and individuals—the organisms of the business world. This economic community produces goods and services of value to customers, who are themselves members of the ecosystem.”*¹. In CpH the eco-systems are of two kinds – firstly, business ecosystems, as described by Moore around available services in context and secondly around the individual in context – the personal ecosystem involving mainly “the extended entourage” of this person. These two ecosystems can only exist and interact by the use of ICT. The personal ecosystems imply harnessing the knowledge, energy, and commitment of its users and those close to them, who really understand and care about the service. This means treating users and communities as assets, not obstacles. In this way, co-produced services can produce more of the outcomes that really matter to users; thus increasing the responsibility, response-ability, and individuality for the citizen in context.

Co-production of health is founded in the WHO definition of health (1946) as: *“a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”*. This definition is implicitly implying that you can be an otherwise healthy citizen with a health problem without being a patient, hence partial or fractional patient in the current healthcare-service’s persuasion. On the basis of this line of thinking, a digital health continuum can be constructed:

¹ http://en.wikipedia.org/wiki/Business_ecosystem



In Your life trajectory you may oscillate between different positions on the axis with the end-points of 100% healthy citizen and 100% patient. The current supply-service-models (in European terminology) are depicted on the figure. From a citizen, patient, or end-user perspective these are irrelevant, if the problems in context are addressed, solved or alleviated to a satisfactory extend. These service-models are ways of organizing the delivery of health and welfare, and not ways of “consuming” health or welfare. The organizations of the supply-models and the integration or coordination between those models are different in location and very different across the Atlantic; however these are organizational issues that could be solved, if accepting that health problems are universal to the welfare societies. It is the way to address them that may differ in different countries and systems.

“Telemedicine” and “Hospital” is in the professional range and subject to highly regulated marked with special and specific liability and rules of certification of personnel and equipment. This seems reasonable in the light of that the value proposition to the “customers” (here they are 100% patients) is based on “trust” in professionalism, special knowledge and dexterity – in healthcare organizations usually advertised by an accreditation certificates or similar.

In the figure - left of telemedicine -the care for health is ambient, but still mostly institutionalized and regulated. CpH offers a possibility to deregulate the health activities in the spirit of the WHO definition of health, and separate them legally and commercially from provisions aimed at diagnose, treat, cure or alleviate diseases – the professional healthcare marked. In a way this is revising the definition of healthcare to include more than disease oriented activities. CpH can sustain a complementary, deregulated, parallel – but still medical evidencebased – marked focused on health and with augmenting capabilities to conventional healthcare.

The key conceptual asset in CpH is knowledge - including medical evidence. CpH can be seen as a method to distribute, relate, fuse, and contextualize information and upgrade it to knowledge for the individual person, as a method to synchronize the activities and data-flows in this *person's eco-system* for a particular health purposes with *the business ecosystem*.

BEHAVIORAL CHANGE AND ICT

In the industrial society “*knowledge was power*”. In the information society “*information is a shared resource*” and power is ability to upgrade information to knowledge, connect it to previous knowledge in theory and practice, and make this fused knowledge operational – to use the knowledge in a proper context.

All relevant data and information access in the personal context based on *shared resource* is not yet fully implemented and data are not available in a digital form that can be utilized in a personal ICT system. There are two relevant trends in ICT utilization that eventual may achieve this access to data.

The trend of “open data” meaning wider access to “big data”, and also the trend in hardware towards more powerful and intuitive useable “lightweight technologies”- front ends (user terminals) with abilities to connect to the “big data” backend-systems. In CpH the “open data” concept has two levels (as the ecosystems) - one is on the general and public level with access to e.g food-composition, environmental, pharmaceutical, and choice architectures data-repositories. The other is on the personal level with access to your personal (and if in context - your relatives) medical and health data. This can be though a Personal Health Record (PHR) or directly from your health provider(s). Data from this shared ownership of two kinds of “open data” is in CpH fused with data from advanced sensors and enhanced with a model driven data-processing (simulation) and visualization capability, and with capabilities to “intelligent” communication within the personal ecosystem.

CpH can be perceived as a way – a modality - to deliver personal health in a positive-psychology framework (health vs. disease) with the same characteristics of other modalities (“tools”) in evidence-based medicine, such as surgery, irradiation, or pharmacological treatment. The knowledge operationalized in these disease-treatment modalities is sampled by statistical, epidemiological methods and by employing randomized controlled clinical trials for generating the purest grade of evidence. This sampling and structuring of the “tacit” health knowledge “hidden in society” is taking place on (controlled) group level, and the results of investigations are recommendations displayed on group level with a statistical probability attached. In the tangible (professional) healthcare delivery-act these recommendations are individualized and personalized by the healthcare professional.

In CpH the responsibility and the response ability of citizen in health matters is based on contextualized results from a digital simulation based on “group evidence” combined with parameterized personal inputs, and hence the individual will be able to – with the assistance of ICT – to “personalize” evidence obtained on group level sampling similar to the professional health care delivery act and the modalities and tools in fighting disease; however this is ICT based health-advice and not a professional healthcare activity.

An analogy could be the GPS for navigation. An (analogue) problem of getting from A to B can be entered in an ICT-device, that simulates the route digitally - and present suggestions for the user in an analogue format (e.g. maps) - as the basis for a decision to be taken. Sometimes the GPS is wrong due to incomplete data or models, but the user is still in full control and can take the advice or not. The same relation will exist in *Virtual Individual Model* (VIM) framework used for CpH-delivery – it will occasional display incomplete or wrong information, due to faults in the data-foundation; however this is not different from the analogue situations that the citizens have to cope with nowadays. An element of the “value-proposition” to the health-customer of digital products will be their “fit” to analogue reality. The *Virtual Individual Model* that will be the core in the “personalized health simulations” should also contain a sub-model for upgrading data to information and further on to knowledge and for visualizing this knowledge in a behavioral (and personal) context.

Simulations visualized in Virtual Reality has been extensively used for restructuring thinking of pilots and soldiers in catastrophic situations, both proactively in training and also reactively in treatment of phobias in e.g. post-traumatic stress-syndrome. In the treatment of this disorder “exposure” to the phobic elements or environment – such as a combat zone – is often used and this can be achieved by

Virtual Reality technology and computer-simulation in connection with other psycho-educative techniques.

Behavioral change demands to some extent restructuring of thinking; however not targeted on catastrophic situations as the Virtual Reality simulations mentioned above. In the everyday coping with a chronic disease the needed restructuring of thinking is probably better based on visualizing **the personal and actual context** of a “micro-decision”. Contexts can to some extent be visualized for training purposes using “gamefication” – the use of gaming mechanics (simulation, trial, error, rewards and punishment in a storytelling format, where the user is simulated part of the scenario). Games as “serious games” and “exergames” (games and exercise combined) are coming on to the marked and may be a part of “behavioral-ICT” in the future; however serious gaming risks of being as boring as pamphlets and campaigns of healthy living from authorities compared to literature that you choose and fancy yourself.

IN SUMMERY

Relevant evidence-based models for motivation and behavioral change can be implemented in and supported by pervasive and social ICT. Gaming and Virtual Reality may be part of the picture, but most important is that relevant data founding the personal response ability and responsibility is made available and is accessible in digital formats, where they can be used to populate and parameterize ICT modeling frameworks assisting the user in every decision on health in a personalized context.

It is however also important to “rethink” the service models, responsibilities and the value-propositions layout. Healthcare is at present a highly specialized and regulated market, defended in the present form by strong interests and stakeholders that may use “the patient” as a “hostage” in future discussions on this subject. It is important to realize that CpH is complementary and parallel to the contemporary healthcare industry, thus realizing digital potentials and activation of medical evidence in support of activities already mostly in the public domain.