BALL STATE UNIVERSITY
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health by design

an experimental interdisciplinary curriculum at Ball State University'

Ball State University
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2003/04 Graduate Assistant Tülay Güneş, Professor Stephen Kendall
'Health by Design: An Experimental Interdisciplinary Curriculum at Ball State University'

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Fig. 1.1: (a) Ball Memorial Hospital; (b) American Suburbia; (c) Public Walking Promenade.

1. Introduction

> *"The quality and character of the designed environment can be a powerful factor for improving and strengthening health processes. In the past century, design for health care has focused principally on supporting functional fitness and accommodating new technologies, on achieving maximum economic efficiency in health care, not on the patients themselves. Largely neglected were the environmental qualities of health care facilities affecting health outcomes..." ([1]) (International Academy for Health and Design)*
>
> *"From elevators and drive-thru restaurants to cul-de-sac suburbs and strip malls, we have become increasingly sedentary. Currently, over one in four Americans get no activity at all in an average day. Not surprisingly, rates of obesity and related health problems have skyrocketed…" ([2]) (Active Living Foundation, supported by the Robert Wood Johnson Foundation)*

In recent years many public conferences have been held, increasing numbers of articles in professional and academic journals have appeared, and research on a

([1]) International Academy for Design and Health, located in Stockholm, Sweden: http://www.designandhealth.com/

([2]) The Active Living Network, supported by the Robert Wood Johnson Foundation, promotes active communities, which are places wherein people can integrate physical activity into daily routines. http://www.activeliving.org/index.php/Why_Active_Living/75

variety of health related topic have been published. Also, private corporations have developed employee “wellness” incentives, new organizations have been formed and public policies developed to address the relationship between health and the designed environment. The design and planning professions as well as other professions such as sociology, communications, and economics have become directly involved in the discourse about the relationship between the built environment, public policy and health, on a wide range of environmental scales.

Yet, framing the definition of what exactly the connection between health and design means is evidently not a trivial task. What exactly is meant by the words ‘health’ and ‘design’? Who is seen as ‘not healthy’ and what are the criteria for that? If an individual is considered as ‘being not healthy’, what are the consequences of that in terms of the professions to be consulted? What is ‘design’ in relation to health? Is development of a health care policy just as much a matter of design as proposing a new nursing program or specifying how a walking park or a medical center should be designed?

1.1. Health by Design

Health and health care can have many definitions at different times and in different cultures. According to the first quoted statement of the International Academy for Health and Design, the dominant biomedical perspective on individual health in western cultures was that it could be controlled with the promotion of wellness strategies and the application of advanced technology. Clinical practices were the primary locus of treatment for disease. Thus, this perspective considered patients as ‘clinical material’ with ‘sick elements’ needing to be separated from the body. Although respecting the highly elaborated reactions and processes of the organism, clinical professionals narrowed the complexity of the human being and its disease to its functionality, positioning its psychological, social, and spiritual aspects as subsidiary issues. Therefore, health care environments were regarded as minor medical-technical supports for the physical needs of treatment.

Today, a different perspective has emerged. The modern concept of disease is no longer narrowly pathogenic; instead every disease is seen as complex with multiple levels, originating in a variety of ways, affecting socio-technical systems at every level from the biochemical to the psychological and social. Disease is not limited to ‘sick’ elements within the body, but extends more broadly.

Public health, as the science and practice of protecting and improving the health of a community, embraces the importance of both the physical and social environments as determinants of individual health, rather than seeing the individual’s behavior alone as the cause for disease. The concept of disease shifted from a medical-technical error to a deeper result of a psychological, social, or spiritual disorder, embedded in the built environment. Health is no longer the positive opposite of disease; rather it goes hand in hand with wellness, well-being, bodily soundness, fitness, etc. Since the connections between health and environments were made, thinking about how to create environments with healing or curative effects on its inhabitants came into currency.

The result of these paradigm shifts is that health is now shown to extend its meaning beyond traditional health care environments such as the hospital or the doctor's office. The connection between health and individual activity is now demonstrated in the research literature. Yet, the mere advertisement of the importance of activity is not enough to improve public health. This is evident in the high number of diseases originating from increased inactivity that some attribute to the information society. Now, healthy environments are being created in order to support and strengthen the state of health in the everyday life of individuals. Both the larger scale and the "near" built environments come into play. Today, focusing on health issues recalls not just professionals of the urban, rural planning and policy level of communities in regards to traditional health care facilities and their distribution throughout the regional landscapes. It also expands to the community level in regards to the issues of location and the design of landscapes, recreation areas, their accessibility to public transportation. Health issues also incorporate the architecture of medical buildings of all kinds and buildings in general and their interiors.

Consequently, many more professionals are now engaged in the discussion of health and health care than just the core, medically orientated disciplines. The design of health invites the fields of scientists, health care professionals and administrators, professional designers and managers of work environments. Fields such as architecture, interior design, landscape architecture, urban planning, the arts, medicine, nursing and other health care professions as well as the social sciences, political science, economics, finance, management, and anthropology among others are involved in a variety of ways.

1.2. The Report: An Interdisciplinary Experience

This report addresses the topic of creating an experimental, interdisciplinary curriculum, focused on exploring alternative health care futures and their possible means of implementation in East Central Indiana. Lessons from this experiment may have broader applicability to other locales and in other inherently interdisciplinary fields.

This report also seeks to define the potentials and difficulties of such an undertaking. Originally, this report was intended as a data-base for the planned academic "health by design" course. However, it rapidly transformed from a data basis to an analysis of the question of how to conduct interdisciplinary teaching and learning in regards to a study of alternative health care delivery models.

Due to the immediacy and importance of the topic of 'Health by Design', several professors at Ball State University initiated a proposal for an interdisciplinary course for the fall semester 2005, with the title 'Health by Design: An Experimental Interdisciplinary Curriculum at Ball State University'. The course would incorporate architecture, landscape architecture, urban planning, nursing, business, the BSU Wellness Institute, and many other departments.

This project was also timely in relation to events at the nearby Ball Memorial Hospital, neighboring the university campus. The executive staff of Cardinal Health

System (CHS), the parent organization of Ball Memorial Hospital (BMH), had recently begun a strategic planning process to restructure and extend this medical center. In spring 2004, Ball Memorial Hospital was presented with a 'detailed analysis and a set of master planning proposals for its evolution as a regional medical centre'. ([3]) From the point of view of several BSU professors who were observing this strategic planning process implementation, it was apparent that the hospital was not asking for – nor were they receiving - a range of delivery and planning scenarios from its consultants.

This observation brought to mind the idea that here lay an opportunity for an interdisciplinary learning and research experience. This experience could generate a variety of different approaches, from various perspectives, and also could take advantage of the real-time medical facilities planning process at CHS/ BMH. The observation that BMH was apparently missing the opportunity to analyze alternative health care futures for the community hospital formed the basis of this curricular project.

The task was enormous, considering the fact that the scope required an understanding of complex and dynamic interrelations, and the development of an adequate proposal for the opportunity offered by CHS to be 'observers and critics' of their master planning process. The question had to be answered: what does it mean to be observers and critics of a real-time development of a master planning proposal set for the advancement of a local hospital to become a regional medical centre for health care delivery? Facing this complexity, a single profession would not be able to provide a set of alternative scenario planning proposals in regards to a health care delivery institution. The interdependence of various professions and academic disciplines was evident.

Initially, the colleagues who met to discuss these ideas came from architecture, landscape architecture, urban planning, economics, management, nursing, and wellness and gerontology. The project that was initially discussed would seek to draw lessons from 'tracking' the master planning process. This 'lesson drawing' would form the ground for new, alternative, and promising proposals for a health care facility, understanding that health care facilities can go beyond the mere conventional facility of the doctor's office or the intensive care unit. Rather, the project's results could open new perspectives onto health care facilities incorporating a deep comprehension of health in relation to the generation of healthy environments with their medical, physical, psychological, social, or spiritual aspects.

This report, being prepared as part of the lead-up to this curricular project, challenged similar assumptions, yet focused more on the interdisciplinary nature of the curriculum: how can the subject of 'health by design' be framed? What are the various perspectives, statements and methodologies each discipline would bring to bear on such a broad subject? How is the communication between the professions facilitated in order to create a fertile learning and working environment?

To answer these questions a survey was conducted which gave first results and insights about the nature of teaching, studying and learning with other disciplines. Although anticipated, individual professors made statements, which

([3]) Quote taken from the HDR proposal service

hindered an easily imagined interdisciplinary project. The reality of working in an interdisciplinary way looked different in practice than imagined. The reason was the existence of professional 'silos' of knowledge, based on different and separate languages, methods, and prejudices about the work and value of other fields of studies and professions. Is that a reason why project managers in practice are hesitant to work with people from academia? It became evident that this project would not only be a learning experience for students, but also for their professors, and for people in academia and practice more generally.

It is important to overcome professional boundaries not just in order to engage in interdisciplinary teaching and learning. This report's authors found ample evidence that these boundaries needed to be crossed in professional practice and consulting work. This was required in order to plan, design and implement a healthy social and physical environment, involving physical, management and policy related issues, with the constructive contribution of various disciplines and professions.

Finding a common basis with a comprehensive language and common definitions was unavoidable and essential. Especially important was the fact that professors seemed unable to connect themselves to other professions, enforcing the protection and enhancement of professional boundaries. Was that what the student in the proposed interdisciplinary environmental design seminar and workshop would face? The result would certainly be that the interdisciplinary aspect of the student course would be challenging. These observations led to what follows in this report.

The need for definitions, principles and parameters to assess 'health by design' became evident and needed the professional contribution of the various faculty members. Methods to improve dialogue required the development of common definitions about health, design, and environment. This was followed by a listing of measurements or parameters needed by each discipline to evaluate a health supportive environment – physical or not. Case study analysis, post-occupancy analysis and 'building in use'-studies, cost-effectiveness- and cost-efficiency-studies, environmental "mapping", cultural and sociological analysis, environmental psychology assessment tools, and built-form and space capacity analysis were other tools to enable interdisciplinary work, among others.

Concluding this overview, it is essential for professors to begin to work together and make constructive contributions to each other in order to get sufficient results. These results include clarifying definitions and each profession's main interests, as well as other participants' interest in the project. In doing so, the various 'silos' could possibly be overcome through intense dialogue and collaboration, and movement toward a common target could occur. In other words, prior to any interdisciplinary project, connecting people of differing professions (academia or practice) is essential and needs careful attention, perhaps requiring almost as much time as the main project. Only with the development of a common ground consistent with a common language, knowledge, and methodologies would it be possible to mount such a cross-disciplinary learning experience.

Therefore this report is organized in three parts. The first part acknowledges the background of the interdisciplinary project, explaining how it was initiated, who the client is, what the connection to Ball State University was and what the supportive energy of the Discovery Group contributed. The second part attempts to

elaborate on the endeavor by defining the topic of health by design, then looks onto the circumstances when various professionals decide to work together and lastly identifies just a few possible tools for the interdisciplinary project. Finally, the conclusion sums up some of the potential of 'health by design' and comments on the multi-professional experience for students, professors and professionals at and around Ball State University in collaboration with Cardinal Heath Systems.

Fig. 2.1: Ball Memorial Hospital

2. Background

This chapter introduces the background of the academic curriculum. Knowing the interest groups, their methods and future interest will give the reader a basis for understanding why this curriculum should be implemented. The course 'Health by Design: An Experimental Interdisciplinary Curriculum at Ball State University' is seen as the result of general developments in the health care field, local changes and reactions towards health care needs, and academic approaches.

2.1. Background: Cardinal Health System's Interests, Emphasis, and Future Visions

Ball Memorial Hospital, one of the major facilities in the Cardinal Health System (a not-for-profit organization), is located in Muncie, Indiana. The hospital serves as a tertiary referral center and teaching hospital. BMH faces site constraints and potential for future growth and expansion is limited. As an important local health care provider, the hospital's strength and potential lies partly in its proximity to the neighboring infrastructure; several economic and health care enterprises, retail facilities, and the university are close proximity. Yet, simultaneously it has constraints for potential expansion plans in regards to vehicular and pedestrian accessibility, parking and the piece-meal growth pattern of its facilities plant.

CHS maintains health care facilities throughout Muncie and East Central Indiana. ([4]) The executive directors of BMH and CHS express their ambitions to establish, to structure, and to grow their health care facilities and services on various levels. However, BMH has been growing according to a master plan, which was completed in 1988. Therefore, CHS's interest is to update these plans based on current and future ideals in order to provide services and programs, which maintain and strengthen BMH's position as a leading regional medical center.

CHS and BMH have the goal to create a system of health care facilities that satisfies its responsibility towards the patients, the physicians, the employees, the community, and the business of health care. Although focusing on different tasks and needs, BMH and CHS executives work collaboratively for the same objectives: providing modern, up-to-date, highly qualified, educational, safe, accessible, and economical services and programs. The vision of CHS is therefore to promote wellness and to improve the health status of people living in and around East Central Indiana through patient care, health education, and medical research. In addition, CHS seeks to become East Central Indiana's premier provider of health care.

In its mission, CHS seeks to provide health care in an environment beyond 'the hospital' per se. The organization's efforts reach in many different directions to find new and innovative ways to realize the best possible health care for Indiana, rated according to national health care standards. ([5]) In their strategic plan for Ball Memorial Hospital for the coming years, CHS stated the following:

> *"Ball Memorial Hospital, as part of CHS, heads towards the celebration of its 75th Anniversary with a vision of becoming nationally recognized as a leading regional medical center offering excellence in patient care, education, and research. Ball Memorial Hospital Strategic Plan FY 2004 through FY 2006 establishes that 'excellence' is no longer an ideal. Instead, quality, clinically and operationally, will be our competitive strategy, and we will distinguish ourselves through excellence. Ball Memorial Hospital's Strategic Plan is a plan built upon this objective, one patient at a time, one interaction at a time. When implemented, this plan will measurably elevate the quality of our patient care, improve access to services for the community, and make BMH a safer place to give and receive care. " ([6])*

With these objectives, CHS aims at more than simply providing health care in a hospital. 'Excellence in patient care, education, and research' exceeds the boundaries of the classical, clinical approach to health. According to the 'Consolidated Strategic Plan' of Cardinal Health System, Inc, there are six main objectives: ([7])

([4]) CHS facilities are with under located in Albany IN, Marion IN, Muncie IN, Portland IN, Upland IN, Gas City IN and Yorktown, IN: http://www.cardinalhealthsystem.org/

([5]) CHS is active in community health care education aiming on healthier community. The organization reaches out to the community not just through support groups, education, and screenings, but also through offering medical education, medical research, and charitable donations. In: Cardinal Health System – Community Benefit Inventory: http://www.cardinalhealthsystem.org/CHSarea/2000-2001%20CBI%20Summary.pdf

([6]) *Ball Memorial Hospital Strategic Plan FY 2004 through FY 2006*

([7]) Consolidated Strategic Plan FY 2004 to 2006

1. *Delivering patient care services and programs that are of value to our multiple stakeholders (such as patients, physicians, employees, community, business).*
2. *Providing the community with the latest in proven and effective information and medical technology.*
3. *Creating a safe environment to work and care for the patient.*
4. *Striving for excellence by exceeding institutional and clinical quality and performance standards.*
5. *Increasing access to services and programs through outreach, education, and the creation of a seamless environment for the dissemination of information and delivery of patient care.*
6. *Creating and maintaining an organization that is fiscally sound and responsible to the community by meeting or exceeding financial rating agency standards for the hospitals.*

CHS emphasizes the importance of seeing the individual coming to a health care facility as more than somebody who is ill. Rather, this institution sees the individual as a person in direct relation to his or her specific environment and in relation to his or her family. The definition of health is not limited to the clinical body, but is extended to the health of the individual's body, mind and spirit. This strategic plan is not just for patients' care but also realizes its responsibility for other people involved in the health care facility. As a health care provider, educator, employer, and economic force for its adjacent business infrastructure, BHM maintains an essential community role. The concern is not only the patient and the patients' direct family coming to the hospital, but also physicians and employees working in the wider environment of health care facilities.

CHS perceives its regional role beyond the hospital and, as a care provider, over all the stages of disease. As an economic institution and local employer, CHS aims to think about the comfort and trust of the physicians and employees in regard to their working environment as well as to the business environment. In a region in which community members are increasingly enlightened about the broadest aspects of "health", CHS seeks to position itself as a leading provider of services in a competitive environment where health care options other than CHS and BHM are available.

2.2. Health Care Delivery Continuum

CHS approaches its role as health care provider on several levels. Their scheme for a health care continuum in the community makes this position clear. ([8]) Norene Pumphrey, Vice President of Affiliated Hospitals of CHS, explained this approach in an interview. In the hospital there is a wide range within which illness can be diminished, treated, and avoided, yet the hospital offers a differentiated and an individualized approach to health treatment.

> *"The hospital is related to this health care delivery continuum in various ways. It has an inpatient and an outpatient population. We have programs that people can come into for a specific service such as therapy, a visit of some kind, or in general*

([8]) Interview with Norene Pumphrey; appendix

> *something that does not require for them to be in a bed. So these are the walk-ins. The in-patients are those who are actually in a bed for a brief period of time, receiving a variety of services (therapy, surgery, etc.). Their illness is such that they can not be at home. However, the whole notion of health, wellness, and sickness is very broad. You can have a variety of ambulatory surgery centers; there are many kinds of programs. The hospital is just one of them. It has layers; it can be very intensive, but also minor (routine test, blood work). Also, you can actually have programs within wellness to keep you healthy (education, services at your doctor's office, etc.). All these parts become a delivery system."*

In this view, the hospital itself needs to be perceived as a place with many diverse and specific treatments against illness and injuries. Health care is more than treating an illness at the hospital or the doctor's office. If disease is defined as a stage of being 'not at ease' - considering a person with all his or her psychological, physiological and spiritual complexities, the variety of places where the condition of being healthy and maintaining health can be supported is almost limitless. The health care delivery continuum comes into play.

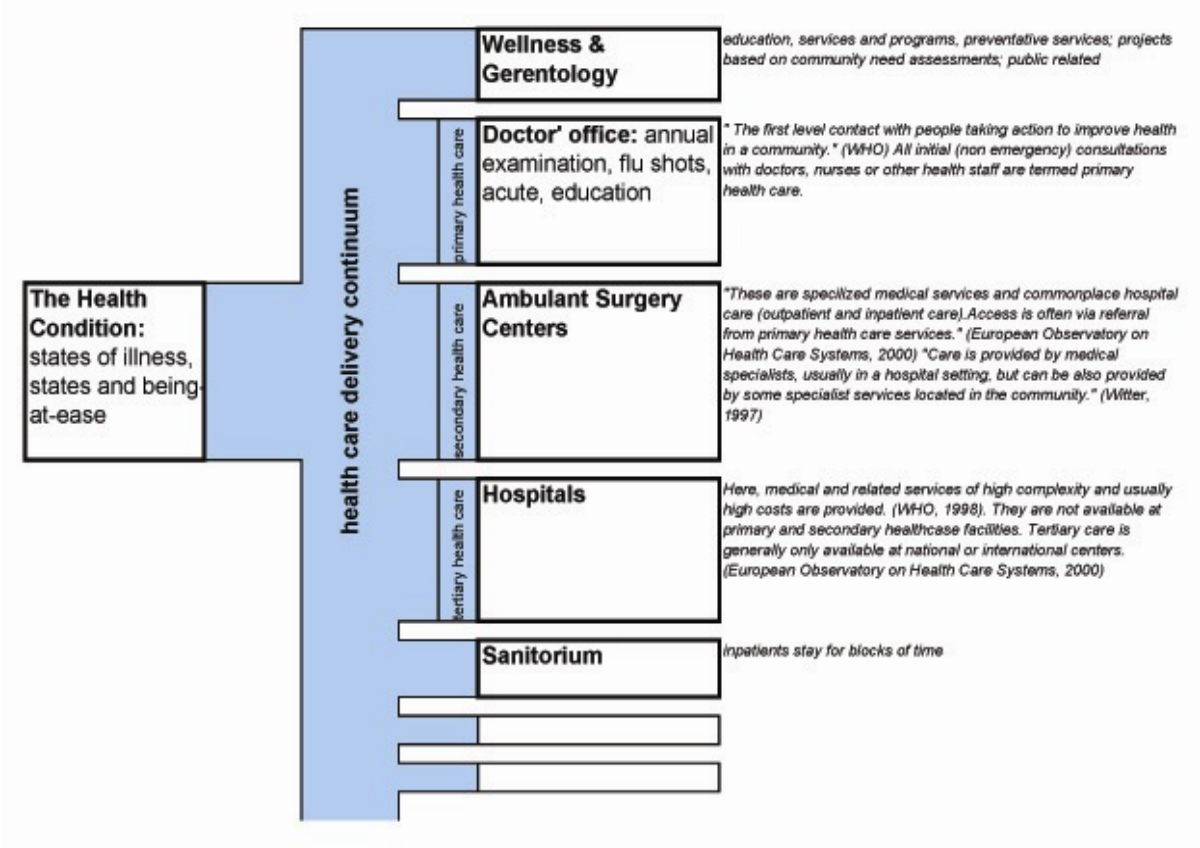
> *"Basically, it is a variety of models in terms of how to deliver health services, whether it will be an in-patient or an out-patient. How do you deliver those services to individuals? Do they come to you? Do you go to them? In addition, we research whether there are new models where people can stay in their own home, either through computer support, through certain diagnostic categories, or perhaps through telephone communications. So there is a variety of ways to delivery health care and we would like to consider them a continuum. So you can be treated in your home, doctor's office all the way through hospitals, nursing homes, etc. …"*

The term health care delivery continuum describes an entire environment that is potentially a health caring environment, whether it is the hospital with its many different services or not. Health care services can be provided outside of the traditional hospital environment. Depending on the grade of the illness and the care needed, it is possible to use modern technology in fields beyond medicine, including telecommunications, transportation, etc. In this way people can stay at their homes, in their known environments, which are often the place offering the most comfort, security and sense of personal confidence.

CHS reaches out to the community with many programs and services beyond the hospital. Programs are diverse such as charity care, cash in-kind donations to the community, health fairs, community cancer education, indigent patient assistance for prescriptions, smoking cessation education, local college and high school students doing job shadowing and internships, support groups (wellness, asthma, dialysis, alcoholics, depression, nicotine dependency, cancer), screening for skin cancer, blood pressure or cholesterol, athletic training outreach to area schools, etc. ([9])

([9]) (Cardinal Health System – Community Benefit Inventory: http://www.cardinalhealthsystem.org/CHSarea/2000-2001%20CBI%20Summary.pdf)

Fig. 2.2: Basic Health Care Delivery Continuum Scheme. The scheme shows a basic organization of exemplary health delivery facilities regardless of their possible spatial articulation and related professions. However, the scheme tries to map some of the needs and the services available from specific facilities. In reality, the distinctions between the various services are not distinctive; rather several services can be provided in the same facility (such as polyclinics, etc.) The health care system has the general idea of providing services to be delivered to people in various settings (homes, educational institutions, workplaces, public places, communities hospitals, clinics, etc.)



If the definition of health expands in this broad sense - over the individual's state of being sick - the other parts of the everyday life will come into play. How can an unhealthy person be treated? Which stages of disease need to be treated? Is it possible to avoid becoming sick? All these questions lead to a differentiated view of the issue of 'health by design', since each stage of illness can be treated in a specific environment, not necessarily in a hospital.

The health care delivery continuum supports the idea of acknowledging that according to the specific stage of the individual's health, a variety of needs must be considered. Services and programs change. During a person's health continuum, wellness is an essential part of staying healthy. Here the avoidance of hazardous effects needs to be achieved through education, regular physical activity and a general consciousness about health issues. Information about how to live in an environment that ensures health is required, particularly in regard to social issues, domestic violence, public health, nutrition, work and living places, and social comfort. The doctor's office also supports these objectives. Ambulatory surgery centers are

now becoming part of the hierarchy of medical centers. Hospitals are now seen as one of a number of ways to deliver health care services and are becoming very specific in treating diseases.

The time period during which people are actually in the hospital environment is being shortened for many reasons. Short stays in hospitals are due to the advancement of technology and medical research, which enables faster treatments and more rapid recovery of serious diseases. Another reason for shorter clinical stays is telecommunications, which helps to look after people with moderate health problems to be treated at home via computer or phone. Lastly, an administrative and political change in reimbursement and insurance policies helps to encourage a fast and efficient stay at the hospital. However, access to health care services with its appropriate functional and spatial organizations in regards to inpatient and outpatient flow from and to sites of service delivery becomes important. Therefore, the functional, organizational and spatial layout of health care services with their accessibility drives new models of thinking into conventional definitions of health care facilities.

The stages within the health care delivery continuum can be subdivided and differentiated according to the specific tasks. The spatial realization and connection of these health care places demand appropriate care also, since each stage needs to satisfy different expectations. The reason is simple. The first impression of people coming into a health providing facility is significant, because people want to feel comfortable, secure and welcomed during difficult experiences of poor health.

The health care continuum underlines many aspects beyond conventional places of health care delivery. The planning of this spectrum between the patient's home and the outpatient or inpatient health care delivery facility suggests a modification of conventional thinking. The flow between and accessibility of various delivery settings, their security and appearance underscores a necessary restructuring of health care delivery systems within an undifferentiated approach to patient, health, and care. Contemporary realities in technology and science enhance different approaches to in-house hospital stays, waiting times, and home-focused care based on web-based delivery. Embracing these realities and future operating environments leads to updating known management structures. Yet, CHS realizes also that incorporating new and untested knowledge of educational and research institutions embody another layer for regional and national leadership and excellence.

Because CHS sets high goals for its health care performance through education and research, CHS is reaching out to Ball State University as an institution where future partnerships can occur. Pumphrey explains:

> *"… CHS is reaching out to different specialists or professions at Ball State University. I see the hospital being a place where the different students can come together. Students not just from nursing but also from architecture, landscape design and urban planning can find a place within the hospitals. Moreover, I think, there can be a place for us at Ball State University through real life experiences that students don't get just solely from professors. I think that theory is great and I spend a lot of time in graduate programs. However, it just doesn't beat the real thing. (…) It's going to mean a lot more to me as a student because it is real. (…) We can help give the practical side to the architect. Come on in, spend a day in a hospital and see what it*

feels like, walk through the halls of a hospital with a dietician, nurse, or maintenance worker, and see how your physical plant works. I think that it is more fun learning and students get more out of it."

CHS and BMH see its communal responsibility adjacent to Ball State University as an opportunity. The logical step is indeed seeking possible future partners and researchers in the field of health care delivery. CHS acknowledges the fact that their expertise could attract many young people to learn about the complex interplay between the physical environment, the individual, and the community. This broad interest encourages many different solutions in which CHS is obviously interested. This interest in interdisciplinary solutions is based on experiences as a health care provider with many different facilities. Besides medical professionals such as nurses, physicians, therapists, psychologists, etc, urban planners, architects, economists, landscape architects, sociologies, etc are equally interesting and necessary in order to plan and implement an agile health care delivery system.

Today's health care approaches are enjoying an evolutionary development. We are redefining and elaborating the definition of 'being sick', 'being diseased', or 'having an illness' to the larger questions of what is health, how to stay healthy, and what puts health in jeopardy beyond mere biological reasons. These larger questions create many different solutions in providing health care solutions in a variety of environments. The surroundings in which people are medically treated become as important as avoiding hazardous environments where people live, work, or play. CHS has noticed and understood this reality; and now CHS appears to be willing to implement it into its functional, spatial, and philosophical organization.

2.3. Ball Memorial Hospital and Ball State University

The university is an institution in which existing knowledge is transmitted to students who will become professionals in many different fields. Also, new knowledge and innovations can be cultivated in the university, through focused research, scholarship and relentless questioning. The local community can thus benefit from a university located in close proximity.

The vision of CHS recognizes these university capacities. In accordance to their 'Consolidated Strategic Plan' it is therefore not surprising that Robert Curtis, President and CEO of Cardinal Health Care System, invited professors from Ball State University to be active observers and critics of the master planning process for BMH. One part of maintaining constant excellence in health care services is keeping pace with technology and further developments in many fields related to healthy environments. Constantly changing needs of complex medical facilities do not easily match fixed physical buildings, facilities, and locations. The leadership of CHS saw the problem of coping with constant change within health care facilities, and the importance of therapeutic and curative environments. Several faculty members in the College of Architecture and Planning were knowledgeable about these subjects, including Professors Martha Hunt in Landscape Architecture, Professor Stephen Kendall in Architecture, Joseph Bilello, Dean of the College, and Professor Bruce Frankel in Urban Planning, among others. Recognizing these interests, Mr. Curtis

extended an invitation to BSU faculty and students to monitor the master planning process being led by a nationally recognized medical planning and architecture firm Henningson, Durham and Richardson (HDR). ([10]) HDR is an architectural, engineering and consulting firm that focuses on complex projects and solving challenges for clients.

HDR sees healthcare delivery master planning as a market-driven and consumer-oriented service. To be successful, a hospital must plan and design with current and future markets in mind. Therefore, the master plan is seen as

> *"… the foundation on which the entire design process is based. It combines forecasts of future activities, services, and strategic planning with the organized development of physical facilities. The result is a solid basis for hospital decisions concerning major capital expenditures." ([11])*

According to the company's philosophy, the master plan is an essential tool for mapping the desirable growth of a health care institution. It tries to foresee future demands and tries to implement plans based on current needs and prognostics based on the statements of professionals. HDR approaches the work within the health care delivery field as follows:

> *"HDR's architects, planners and programmers use a process that requires the entire planning team (user, owner and architect) to address both immediate and long-term issues. To evaluate whether the master plan addresses the goals set by the team, our planning process takes a broad approach, resulting in the most effective zoning of key functions and the maximization of flexibility for future expansions. The master plan also provides an opportunity to redefine a campus or building's architectural design to reflect the client's and the community's future needs and culture, while still complementing current operations… ([12])*

Therefore, HDR follows a holistic approach to master planning, incorporating the perspectives and priorities of different collaborating groups, which include the users (patients, physicians, and employees), the planners and professionals, and the client (BMH/ CHS). This diverse partnership is the foundation for a master plan, able to predict future needs, maintain its dominant regional position and remain a market-oriented company.

In regards to the master plan project of BMH, HDR had been selected to program and design a cancer center addition. This remodeling and expansion program would enable the hospital to reach its vision of providing comprehensive, integrated, state-of-the-art cancer services in a patient-focused regional referral centre. ([13]) However, HDR's responsibility reached beyond this specialized medical annex. In spring 2004, Ball Memorial Hospital was presented by HDR with a 'detailed analysis and a set of proposals for the long term planning reflecting CHS's

([10]) HDR was founded in 1917 and concentrated its work focus in the Midwest.
([11]) HDR about master planning of health care facilities: http://www.hdrinc.com/architecture/health/mp.htm
([12])HDR about master planning of health care facilities: http://www.hdrinc.com/architecture/health/mp.htm
([13]) HDR homepage information about their project with BMH in Muncie, Indiana: http://www.hdrinc.com/information/search.asp?PageID=1609

commitment to BMH's continued evolution as a regional medical centre.' ([14]) The required master plan incorporates a number of issues: a)campus access and security, b) the development of a business plan for cancer and cardiology services, c) the improvement of waiting times, d) the initiation and development of specified and complementary services and programs, e) the evaluation and analysis of existing services and organizational structures, f) the evaluation of service and program location delivered in the appropriate optimal setting and geographical location, g) the analysis of inpatient and outpatient flow and access of services, h) the exploration of home based and web-based systems for delivery, and finally I) the redesign of the health care delivery system. HDR's master plan identifies five goals:

> *a) Find a solution for BMH campus service delivery problems.*
> *b) Develop a master plan which suites Cardinal Health System, Inc. and Ball Memorial Hospital.*
> *c) Identify services and programs, which can be located off campus.*
> *d) Develop a short term and a long-term vision for the BMH's site and facilities, and finally.*
> *e) Develop a master plan which can be implemented in a timely fashion and which offers enough flexibility to absorb future unknown directions in hospital-based care delivery. ([15])*

However, while the master planning process and the plan itself was thoughtful and thorough, it was very focused on the current BMH campus and lacked alternative future scenarios for Ball Memorial Hospital. While analyzing the draft work plan of HDR, it became evident that the focus of the master plan is the plans, statements and priorities of the Steering Team members consisting of HDR and BMH executives, a working method favored by HDR.

> *Our integrated planning approach is the new paradigm of planning. We partner with clients to integrate their strategic planning with clinical and operational, facility and technology planning to achieve sustainable integrated healthcare solutions. ([16])*

This approach is client orientated. Influences and statements of the administrative directors of BMH via interviews are incorporated, as well as the experience of HDR's 85 years of practice in planning projects. However, this approach seems to leave out potentials inherent in the active incorporation of patients, physicians, and community members into the master planning procedure. This failure to involve a wider spectrum of stakeholders and to address alternative futures (BMH did not ask for nor did HDR provide such scenarios) provided the starting point and a kind of "hook" for Ball State University faculty.

The critical analysis of the master plan led to the idea of charting alternative futures by means of an interdisciplinary curriculum. That led eventually into questions of a broader sort, namely on the nature of silo-based education mentioned in the introduction of this report. The goal of this interdisciplinary course with a

([14]) Quote taken from the HDR proposal service
([15]) HDR's draft work plan from July, 2003
([16]) HDR's integrated planning approach: http://www.hdrinc.com/architecture/consulting/consultingservices.htm

diverse group of professionals and students would be to develop alternative health care futures for BMH and CHS, since such large scale endeavors of creating a multifaceted healthy environment demand many different solutions developed in a cross disciplinary group.

These conversations between CHS and BSU resulted in a series of meetings with interested faculty, leading eventually to a decision to submit a proposal to the Discovery Fund grants program at BSU.

2.4. The Discovery Grant at Ball State University

Discovery is a women's collaborative philanthropic group established to support projects and programs at Ball State University. Discovery members are volunteers who pool annual contributions and work with university administrators to select the projects they will support. The group has members in Indianapolis, Muncie and northeast Indiana.

Discovery focuses on university curricular development in which students and faculty engage in challenging and seminal academic work. It funds projects that involve innovative undergraduate and graduate programs, opportunities to support out-of-classroom experiences that contribute to student leadership development, and offer the chance to foster campus programs geared toward a civil and just climate. The group is interested in projects that significantly impact Ball State students and/or community members.

In 2004, the Discovery group reviewed a number of project proposals. A $35,000 grant was given to the 'Health by Design' discussed in this report. Its collaborative engagement with Cardinal Health System and its experimental effort in interdisciplinary higher education and community outreach were given as reasons for the award.

According to the course description, this academic endeavor sees its ambitions within the triangle of academia, practice and community:

> *"The course is a learning-centered, problem-framing and solving experience that examines a rubric of issues associated with community health in the CHS service area of east central Indiana. Our pedagogical approach seeks discovery of alternative health by design strategies, followed by formulation of implementation strategies and delivery mechanisms…" ([17])*

The 'health by design' program is an opportunity for students, faculty and community health service providers to reveal and study the complexity, change, constant negotiations, agreements and physical settings of 'health by design'. This problem setting becomes even more heterogeneous when leaving any one singular disciplinary perspective.

It is remarkable how many disciplines expressed an interest and responsibility towards health and health care issues linked to "design": at Ball State University 28 disciplines identified their interest in taking part in what is now a two year

([17]) Course Advertisement by the end of spring term 2004

undertaking. These are Family and Consumer Sciences, Interior Design, Nursing, Physical Education, Wellness & Gerontology, Architecture, Landscape Architecture, Urban Planning, Economics, Finance & Insurance, ISOM (Information Systems Operation Management), Marketing & Management, Communication Studies, CICS (College of Information and Communication Sciences, Telecommunications, Art, Music, Theatre & Dance, Anthropology, History, CME (Continuing Medical Education), NREM (Natural Resources and Environmental Management), Physiology & Health Sciences, Political Science, Psychological Science, Social Work, Sociology, Counseling Psychology & Guidance Services, Teaching & Learning Advancement, and Teaching & Learning Advancement. ([18])

This grant will enable a two-year program beginning in the academic year 2004-05. During the first year, a number of events are planned including a major symposium on the subject – to be held in March 2005. This will be an opportunity for faculty and students to report on research projects, design and planning studies and for faculty and students to deliver papers that will be published in the symposium proceedings. Community health service providers and consultants will be able to report on successes and failures of policies and programs. Student and professional debate teams will be coached and will offer public debates on important topics. Nationally recognized experts will also be invited to speak.

In the second year, an interdisciplinary course will be offered to upper level undergraduate and graduate students. The course, two semesters in duration, will be conducted by one primary faculty member but will utilize the support of "tutors" from a range of disciplines.

References

Ball Memorial Hospital Strategic Plan FY 2004 through FY 2006
Interview with Norene Pumphrey; appendix
Course Advertisement by the end of spring term 2004

([18]) Course Advertisement by the end of spring term 2004

3. Issues of 'Health by Design'

This chapter investigates the scope, the definition, and the issues of the topic 'health by design'. In part, this report connects to the master planning process of Ball Memorial Hospital. However, the planned interdisciplinary curriculum of Ball State University is focused on thinking about alternative health care futures for health care delivery in general, not only Ball Memorial Hospital. Therefore, it is worth approaching the topic of 'health by design' with a broader scope. In doing so, conventional presumptions and assumptions about the definition of health, about the people who engage with health issues, about health delivering places, and about their organizations and planning will make place for a broader view. Today, growing interest in health issues in many parts of society has extended the traditional understanding of health and the state of being healthy across many disciplines. Health care is promoted by many disciplines to many people within society. This new perspective constitutes a cultural change.

3.1. The Scope

> *"Today, 64% of American adults are overweight or obese… There are nearly twice as many overweight children and almost three times as many overweight adolescents as there were in 1980." (Active Living Programs, 2003)*
>
> *"More than 11 million Americans have heart disease… Diagnosed diabetes among American adults increased 49% between 1990 and 2000." (Active Living Programs, 2003)*
>
> *"Obesity- related diseases cause more than 300,000 preventable deaths in the Unites States each year, second only to tobacco use." (Active Living Programs, 2003)*

According to many research centers and scholars ([19]I[20]I[21]) diseases such as obesity, heart disease, high blood pressure, diabetes, and cancer have reached epidemic proportions across age, race / ethnic, and socio economic groups. Taking into consideration that Ball Memorial Hospital – like many similar comprehensive medical centers - is planning to incorporate cancer and cardiology business plans, plus an expansion of the clinical scope and regional coverage of chronic disease management services, the focus of this study is timely.

([19]) Active Living Programs, supported by The Robert Wood Johnson Foundation. The health fact source is the Centres for Disease Control and Prevention, located in Atlanta, Georgia. http://www-cdc-gov/nccdphp/sgr/mm.htm

([20]) The Oral HCG protocol for weight loss Research Center published the many aspects of obesity. This information center identifies obesity as a worldwide epidemic: http://www.hcgobesity.org/obesity/obreview.htm

([21]) Reid Ewig, Tom Schmid, Richard Killingsworth, Amy Zlot, Stephen Raudenbush. "Relationship between Urban Sprawl and physical Activity, Obesity, and Morbidity." In *The American Journal of Health Promotion.* September/ October 2003, Volume 18, No. 1. pp. 47-57.

3.1.1. Health and Physical Activity

Although health care delivery institutions such as BMH are preparing for increases in contemporary disease, the diseases noted above are of a special kind. They may be related to many causes, but one in particular is lack of physical activity. The Surgeon General's report in 1996 described that link. It provided the funding for many studies analyzing this fact. ([22]) This link was already commonly known. But it is increasingly clear that physical inactivity contributes to many chronicle diseases and conditions, including obesity, high blood pressure, diabetes, cancer, arthritis, osteoporosis, and heart disease.

However, the reality is that more than three quarters of U.S. adults do not get enough physical activity, and the numbers are still increasing. This is in strong contrast to the findings and conclusions of the National Center for Chronic Disease Prevention and Health Promotion.

> *"Regular physical activity that is performed on most days of the week reduces the risk of developing or dying from most of the leading causes of illness and death in the United States. Regular physical activity improves health in the following ways: reduces the risk of dying prematurely; reduces the risk of developing diabetes; reduces the risk of developing high blood pressure; helps reduce blood pressure in people who really have high blood pressure; reduces the risk of developing colon cancer; reduces feelings of depression and anxiety; helps to control weight; helps build and maintain healthy bones, muscles, and joints; helps older adults become stringer and better able to more about without falling; and promotes psychological well-being…*
> *Millions of Americans suffer from illness that can be prevented or improved through regular physical activity: 13.5 million people have coronary heart disease; 1.5 million people suffer from heart attack in a given year; 8 million people have adult-onset (non-insulin-dependant) diabetes; 95,000 people are newly diagnosed with colon cancer each year; 250,000 people suffer from hip fractures each year; 50 million people have high blood pressure; and over 60 million people (a third of the population) are overweight. ([23])*

In searching for solutions for this massive disease – appearing not just in the USA but also in other industrialized countries - questions about who is responsible need to be asked. Is the individual responsible for his or her own well being through information and self control? Or are there other factors – including public policy - which contribute to the exponential increase of the diseases mentioned?

The previous statistics represent numbers, which cannot be justified with the individual's health-related negative habits, lack of discipline or information, lack of economic opportunities, or behavioral disorder. Rather, many professionals, especially in the public health sector, are increasingly convinced about the relation between the individual and the physical environment. Contemporary health issues

([22]) US Dept of Health and Human Services. Physical Activity and Health: A Report of the Surgeon General. Atlanta, Georgia: Centres for Disease Control and Prevention; 1996. www.cdc.gov/nccdphp/sgr/pdf/execsumm.pdf

([23]) U.S. Department of Health and Human Services; Centres for Disease Control and Prevention; National Centres for Chronic Disease Prevention and Health Promotion: http://www.cdc.gov/nccdphp/sgr/mm.htm

are not just an individual problem, but are located in the cultural, social, and physical environment – that is the common sphere.

> *"There is a growing interest in how physical inactivity, obesity, and related chronic health problems are affected by environmental factors. Public health researchers expanding their horizons, moving beyond individual models of behavior to more inclusive ecologic models, that recognize the importance of both physical and social environments as determinants of health." ([24])*

According to the authors, health issues can be related to the physical, social, and psychological environment.

3.1.2. The Complexity of the Relation between Health and Environment

On this assumption, Ewig, Schmid, Killingsworth, Zlot, and Raudenbush prepared a study about the relationship between urban form and health. By comparing metropolitan and county structures, they argue that people in sprawling counties are more likely to be obese and face consequential disease because of the lack of physical activity than those living in compact and dense places. Therefore, urban form affects health and health – related behavior. The authors conclude that based on these insights, which combined research from public health and urban planning, health practitioners can improve public health by including urban form variables into their investigations and advocating more compact development patterns. The positive effects of sidewalks, denser interconnected streets, and a mix of business and residential uses, the accessibility and quality of parks and other recreational areas, green zones, or bike trails are suddenly convincing not just for the planner, urban and landscape designer, or architect, but also for those in the public sector concerned with the health state of a community.

Furthermore, the same authors theorized about the character of physical activity. They argue that the relationship between the environment, physical activity and health is so complex that a further analysis of what exactly is physical activity and where one can exercise are important to include in future analysis. Physical activities can be related to four major aspects of community living: leisure time, occupation, household, and transportation. These four properties of physical activity can be measured and designed into urban form with differentiating effects on health conditions.

Other studies, illuminating the connection between the environment and health are 'health and housing' ([25]I[26]I[27]), 'health and work place' ([28]), 'health and

([24]) Reid Ewig, Tom Schmid, Richard Killingsworth, Amy Zlot, Stephen Raudenbush. "Relationship Between Urban Sprawl and physical Activity, Obesity, and Morbidity." In *The American Journal of Health Promotion.* September/ October 2003, Volume 18, No. 1. pp. 47-57.

([25]) Roderick J. Lawrence and Terry Hartig. „Health, Housing and Urban Environments: Updating the Agenda for Research and Practice". In *Open House International*. Vol. 26 no. 2, 2001, pp. 3-7

([26]) Roderick J. Lawrence. Introduction: The Residential Context of Health. In *Journal of Social Issues*, Vol. 59, No. 3, 2003, pp. 445-493

([27]) Roderick J. Lawrence. Housing, Health and Aesthetics: Reconnecting the Senses. In Aesthetics, Well-being and Health: Essays within architecture and environmental aesthetics. Edited by Birgit Cold. Ashgate, 2001

transportation' ([29]), 'health and policies' ([30]I[31]), 'health and global environment' ([32]), etc. These studies also provide dynamic investigations and solutions for alternative environments that promote health solutions for ordinary people. They support the importance of broadening the health discussion to the community level and starting to engage various professions, all with the same goal of promoting health.

3.1.3. Health and Collective Health Promotion

The result of a collective engagement in health care issues is the sustainable planning of the community on various levels. No profession can act alone as the responsible planner and organizer of a healthy community. It is rather a collective effort dealing with a multitude of questions from many different viewpoints. In *Increasing the Health Promotive Capacity of Human Environments,* Stokols, Grzywacz, McMahan, and Phillips develop the idea of how to grow community potential and differentiate the two main perspectives on health promotion on the community level. ([33])

One is the stress on research and the cultivation of the community capacities (collaborative coalitions, participatory decision-making, health education strategies). The other approach is strengthening health supportive environments (built environment, natural resources, technological infrastructure). With this approach the authors propose a concept that deals with health related considerations on several levels. They present tools and assessment methods to evaluate and foster community design including the environment, and encourage social education as part of public health issues.

In regard to the interdisciplinary curriculum program planned by Ball State University with the collaboration of CHS and Ball Memorial Hospital, it can be assumed that the efforts to incorporate Ball State University capacities into the development of the master plan of BMH can be part of the 'community capacity' stream. Here, research can prosper and health education can be formed. Alternative

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([28]) Graham S. Lowe, Grant Schellenberg, Harry S. Shannon. Correlates of Employees' Perceptions of Healthy Work Environments. In *American Journal of Health Promotion*. July/ August 2003, Vol. 17, No. 6. pp. 39-47

([29]) Ewing R., Cervero R. Travel and the built environment. In Transportation Research Record. 2001, pp. 1780: 87-114.

([30]) Roderick J. Lawrence. *Urban Environment, Health and Economy: Cues for conceptual clarification and more effective policy implementation.* In Our Cities, Our Future: Policies and Action Plans for Health and Sustainable Development. Edited by Charles Price and Agis Tsouros. 1996

([31]) Rogan Kersh and James Morone. The Politics of Obesity: Seven Steps to Government Action. In *Health Affaires*. Volume 21, No., November/ December 2002, pp. 142-153.

([32]) The Center for Health and Global Environment at Harvard Medical School offered an interdisciplinary course in this field. The noted homepages offers online-video-recordings of the lectures about this topic which presents global linkages to people located in regional areas affected by the global climate change and international politics. http://www.med.harvard.edu/chge/course/introduction/why/why.htm. See also: http://www.med.harvard.edu/chge/course/schedule.htm

([33])Stokols, Grzywacz, McMahan, and Phillips. Increasing the Health Promotive Capacity of Human Environments. In *American Journal of Health Promotion*. September/ October 2003, Volume 18, No. 1. pp. 4-12.

approaches can be developed and "tested" in simulation exercises, in order to initiate the design of 'health supportive environments' where physical materialization of health care concepts can be realized.

As described earlier, the complexity of 'health by design' and the kind of actions that might need to taken is obvious. The scope and the definition of health are broadened and extend beyond the limits of the individual's world to the social entity within a particular physical surrounding. Not only are a variety of independent professionals needed. It is also important to approach such a multi-layered project with many implications on multiple levels. Some of these environmental levels of understanding, investigation, and intervention are the following: the near environment level (interior space), the building level (architecture and landscape architecture), and the community level (landscape architecture and urban planning).

The value of acting on several fronts is evident; levels of intervention and professions of different fields suddenly come together and coordinate efforts to produce a better, sustainable environment for people. The importance of the proximity to CHS' health care delivery model is obvious. It may be that the CHS health care delivery model is able to absorb several more aspects. The model – including wellness, fitness and gerontology, the doctor's office, the ambulatory units, the hospital itself, and the sanatorium may not be complete.

3.1.4. Systems Theory and Worldviews

The goal of a comprehensive "health-by-design" model needs an extension of the conventional view on health and disease. Such promising developments that can be observed take time to exert their influence, however, in the face of conventional thinking.

Recently, health promoters have introduced new concepts in understanding conventional models of health. In *'World Views, Systems Theory, and Health Promotion'*, Nicholas and Gobble depart from traditional, limited worldviews, such as those suggested by the formal and the mechanical philosophies. ([34]) Thus, "Formism" directs our thinking more in categories, classes, or types. Mechanical thinking pushes us in a linear or cause and effect approach. However, these authors suggest an organic world view that focuses on holistic and circular causes and effects, with roots in the metaphor of the living organism, a dynamic entity, understandable only in its context, relation, and in its wholeness. In this way, the worldview changes towards system theory, where the climate, the surroundings, the environment is incorporated in an integrated, organizational ecology. The authors argue that by doing so the health promoting tendencies would advance to a professional discipline.

Yet, in addition to the change in peoples' views, there is another important task: cultural change. ([35]I[36]) As earlier stated, being unhealthy is not just the problem

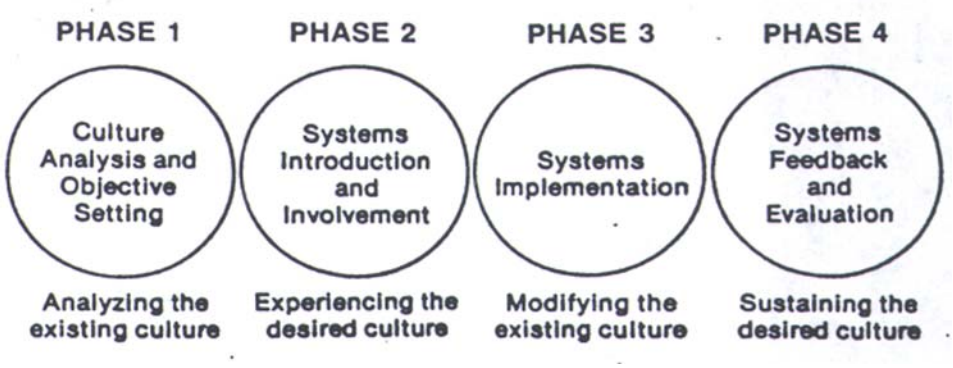
([34]) Donald R. Nicholas, David C. Gobble. World Views, Systems Theory, and Health Promotion. In The American Journal of Health Promotion. September/ October 1991, Volume 6, No. 1. pp. 30-34.

([35]) Judd Allen, and Robert F. Allen. Achieving Health Promotion Objectives through Cultural Change Systems. In *American Journal of Health Promotion*. Summer 1996, pp. 42-49

of the individual but also of the culture. Planning for sustained cultural change is now needed more than ever. According to Judd Allen's and Robert Allen's article, health promotion needs to understand the power of cultural norms - behaviours expected, accepted or supported by a group. In the views of these authors, a "norm system" change can be implemented with three normative systems strategies:

1. A strategy according to humanistic principles: (participatory decision making, non-blame-placing, equal beneficial solutions, clear goals, integration of people's concern, specific and particular strategy development, adapting a multi–level change strategy, create a community sense through shared purpose and relationship building)
2. A focus on changing undesirable norms: (establish guidelines for individual everyday behaviour within the social context, clearly identify norms that are difficult to recognize, analyzing the complex normative fabric that should be partly governing, maintaining, and suggesting change; changing only undesirable behaviours; create new norms consistent with humanistic principles)
3. An emphasis on implementing system change strategy: (new norm maintenance modification).

Fig. 3.2: Normative Systems Model for Organizational Change; source: Judd Allen, and Robert F. Allen. Achieving Health Promotion Objectives through Cultural Change Systems. In American Journal of Health Promotion.



The authors suggest a cultural change strategy model with four phases (see above). They advocate a strategy "without illusions" to change individual behaviour and community action toward health according to a systematic culture-based approach. The result would be a lasting change that reinforces health, empowers groups and transforms cooperation.

The work of these authors confirms that the scope of health is not easy to frame, because it is dealing with the environment in which we live and work. The shared objective of most of the leading thinkers is to achieve sustainable health for

([36]) Judd Allen, and Robert F. Allen. From Short Term Compliance to Long Term Freedom: Culture-Based Health Promotion by Professionals. In *American Journal of Health Promotion*. Fall 1996, pp. 39-47

an entire society through a holistic approach and to achieve an improvement in the public health situation of the industrialized cultures. ([37])

The issues of our public health are being transformed from a reactive posture to being more proactive. Health and well-being issues are no longer distant issues for those who are healthy. Rather, a health condition is becoming a sensitive and easily disputable state of being that needs to be protected, maintained, strengthened, and promoted. Health promotion inevitably becomes cross-disciplinary, having the same aim in all disciplines: promoting and maintaining health and hastening recovery. It is indeed a change of a worldview and a cultural change, which suggests collective, collaborative engagement, interest and passion from many, keeping health care always in mind, considering it in all actions. The result might be possible: fewer diseases, less suffering, fewer preventable deaths, and physically, socially, and spiritually balanced lives.

3.2. The Definition

The definition of health seems to be more than the absence of disease symptoms or functional limitations. Rather, it deals the wholeness of the environment, in trying to avoid stress, depression and improving the quality of life, happiness, etc. The World Health Organization defined health as the following:

> *"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." (World Health Organization, 1946, 1948) ([38])*

From the individual's point of view health is experienced as Bistrup tries to describe:

> *"Health can be defined as the ability of an individual to achieve her or his potential and to respond positively to the challenges of daily life." (Bistrup, 1991) ([39])*

Both quotations point to the link between the individual and its environment, influencing and affecting each other. The U.S government acknowledges this fact and has developed an objective plan in order to improve the health situation in this country:

([37]) Roderick Lawrence and Terry Hartig. „Health, Housing and Urban Environments: Updating the Agenda for Research and Practice". In *Open House International*. Vol. 26 no. 2, 2001, pp. 3-7. "By dealing with inadequate housing and living conditions, urban planning measures helped to reduce the spread of infectious disease such as cholera and tuberculosis in industrialised countries. Today, however, such diseases are no longer the main cause of ill-health and mortality in such countries. Instead, non-communicable disease such as heart disease, cancers, and mental disorders present the main challenges for public health." In their article, both authors distinguish this phenomenon apparent in the industrialized countries. How the situation in other countries is worth to investigate in order to find out other success and failures in a different culture which is different than the industrialized countries.

([38]) World Health Organization, 1946, 1948: http://www.who.int/en/

([39]) Bistrup, M. L. *Housing and community environments: How they support health*. Copenhagen, Denmark: National Board of Health. 1991

> *"As the leading public health agency in the United States, The Centers for Disease Control and Prevention (CDC) scientifically considers all factors that affect the health on the nation. As we embark the 21st central, the interaction between people and their environments, natural as well as human-made, continues to emerge as a major issue concerning public health… A healthy community as described by the U.S. Department if Health and Human Services 'Healthy People 2010' report is one that continuously creates and improves both its physical and social environments, helping people to support one another in aspects of daily life and to develop to their fullest potential. Healthy places are those design and built to improve the quality of life for all people who live, work, worship, learn, and play within their borders – where every person of free to make choices amid a variety of healthy, available, accessible, and affordable options."([40])*

Based on these quotations, it is easy to understand that today's definition of health conditions incorporates the larger environment. CDC recognizes several significant health issues that are related to land use, including: physical activity, respiratory health and air pollution, children's health & built environment, injury, mental health, social health, accessibility, elders' health & built environment and water quality.

The American Journal of Health Promotion shares Bistrup's definition of health promotion, and suggests five environmental spheres:

> *"Health promotion is the science and art of helping people change their lifestyle to move toward a state of optimal health. Optimal health is defined as a balance of physical, emotional, social, spiritual, and intellectual health. Lifestyle change can be facilitated through a combination of efforts to enhance awareness, change behaviour and create environments that support good health practices. Of the three, supportive environments will probably have the greatest impact in producing lasting change". (American Journal of Health Promotion, 1989) ([41])*

Given these findings, three areas of efforts are important: enhancing awareness, changing behaviour, and creating health supportive environments. These efforts need to be incorporated into the five areas of intervention mentioned above.

Fig. 3.3: Areas of health promotion for a health promoting lifestyle.

The physical part of our "environment" considers aspects of fitness, nutrition, medical self-care, and control of substance abuse. From an emotional perspective, the care for emotional crises, and stress management need to be mentioned. Next, the social surrounding consists of communities and social groups, the family, and friends. The intellectual side of lifestyle is made up by one's education,

([40]) National Center for Chronic Disease Prevention and Health Promotion; Chronic Disease Prevention; Atlanta, Georgia: www.cdc.doc/nccdphp/publicat.htm

([41])American Journal of Health Promotion, 1989: http://www.healthpromotionjournal.com/

achievements, and career development. Lastly, spiritual health combines with love, hope and charity.

3.3. The Issues

Several universities are introducing the topic of health care delivery systems and environmental design in interdisciplinary curricula. These include Clemson University with their research project *"Exploring the Relationship between Architectural Environments and Health"* ([42]), and Ball State University *"Health by Design: An Experimental Interdisciplinary Curriculum at Ball State University".* ([43])In the process of preparing a database for the planned curriculum, the question of how to frame the broad topic of 'Health by design' rapidly arose. Attempts to define it led to preliminary definitions of 'health' & 'design', development of principles of a healing and curative environment based on a general health bibliography, and search for parameters, checklists, and a " metric" which could enable assessment of a healthy environment.

To aid in framing issues across disciplines, a survey of members of different disciplines was prepared. In this survey, the aim was relatively clear: how the professions relate themselves to health and how they might approach the theme of 'health by design' in view of the upcoming curriculum. The survey should also help each profession see how the others frame the same issues. Survey participants would be given the opportunity to read the other's contributions, in order to understand and appreciate the other points of view and develop a constructive working understanding of the planned interdisciplinary curriculum. Extending and overcoming personal professional focus was the aim.

As expected, different perspectives on the definition of health by design became visible. The professions made independent and profession-focused definitions and contrasting approaches to solve health issues. The common goal was not in jeopardy. Rather, it was interesting to observe the different professional languages that were used. How was it then possible to get to a satisfying health-supporting environment when the goal was perceived so differently? The fact of professional languages, boundaries and silos was revealed. This circumstance reveals issues in the practical conversion of health-promotive strategies in the everyday life of professionals.

The survey provided glimpses of what to expect within an interdisciplinary curriculum concerned with issues of health. Therefore, it offered a way in observing and understanding the differences in professional philosophies, worldviews, statements, assumptions, research areas, methodologies, and solution finding. The result is that it becomes possible to observe possible and potential links and intersections between disciplines. Also, each discipline can fill up its place in the broad picture of the topic, so the topic of health by design becomes intellectually and professionally richer.

([42]) Clemson University; College of Health, Education, and Human Development: http://www.clemson.edu/reports/research/2000/14.htm
([43]) Ball State University: http://www.bsu.edu/univ_adv/giving/article/0,,16416--,00.html

References

Active Living Programs, supported by The Robert Wood Johnson Foundation. The health fact source is the Centres for Disease Control and Prevention, located in Atlanta, Georgia. http://www-cdc-gov/nccdphp/sgr/mm.htm

Allen, Judd; Allen, Robert F. "Achieving Health Promotion Objectives through Cultural Change Systems". In *American Journal of Health Promotion*. Summer 1996, pp. 42-49.

Allen, Judd; Allen, Robert F. "From Short Term Compliance to Long Term Freedom: Culture-Based Health Promotion by Professionals". In *American Journal of Health Promotion*. Fall 1996, pp. 39-47.

American Journal of Health Promotion: http://www.healthpromotionjournal.com/

Bistrup, Marie Louise. *Housing and community environments: How they support health*. Copenhagen, Denmark: National Board of Health. 1991.

Clemson University; College of Health, Education, and Human Development: http://www.clemson.edu/reports/research/2000/14.htm

Ball State University: http://www.bsu.edu/univ_adv/giving/article/0,,16416--,00.html

Ewing Reid, Cervero Robert Burke. "Travel and the built environment." In *Transportation Research Record.* 2001; 1780: 87-114.

Ewing, Reid; Tom Schmid; Killingsworth, Richard; Zlot, Amy; Raudenbush, Stephen. "Relationship between Urban Sprawl and physical Activity, Obesity, and Morbidity". In *The American Journal of Health Promotion.* September/ October 2003, Volume 18, No. 1. pp. 47-57.

Kersh, Rogan; Morone, James. "The Politics of Obesity: Seven Steps to Government Action". In *Health Affaires*. Volume 21, No., November/ December 2002. pp. 142-153.

Lawrence, Roderick J.; Hartig, Terry. "Health, Housing and Urban Environments: Updating the Agenda for Research and Practice". In *Open House International*. Vol. 26 no. 2, 2001, pp. 3-7

Lawrence, Roderick J. "Introduction: The Residential Context of Health". In *Journal of Social Issues*, Vol. 59, No. 3, 2003, pp. 445-493.

Lawrence, Roderick J. "Housing, Health and Aesthetics: Reconnecting the Senses". In *Aesthetics, Well-being and Health: Essays within architecture and environmental aesthetics*. Edited by Birgit Cold. Ashgate, 2001.

Lawrence, Roderick J."Urban Environment, Health and Economy: Cues for conceptual clarification and more effective policy implementation." In *Our Cities, Our Future: Policies and Action Plans for Health and Sustainable Development*. Edited by Charles Price and Agis Tsouros. 1996.

Lowe, Graham S.; Schellenberg, Grant; Shannon, Harry S.. "Correlates of Employees: Perceptions of Healthy Work Environments". In *American Journal of Health Promotion*. July/ August 2003, Vol. 17, No. 6. pp. 39-47

Nicholas, Donald R.; Gobble, David C. "World Views, Systems Theory, and Health Promotion". In *The American Journal of Health Promotion*. September/ October 1991, Volume 6, No. 1. pp. 30-34.

Stokols, Daniel; Grzywacz; McMahan; Phillips. "Increasing the Health Promotive Capacity of Human Environments". In *American Journal of Health Promotion*. September/ October 2003, Volume 18, No. 1. pp. 4-12.

The Center for Health and Global Environment at Harvard Medical School offered an interdisciplinary course in this field. The noted homepages offers online-video-recordings of the lectures about this topic which presents global linkages to people located in regional areas affected by the global climate change and international politics. http://www.med.harvard.edu/chge/course/introduction/why/why.htm. See also: http://www.med.harvard.edu/chge/course/schedule.htm.

National Center for Chronic Disease Prevention and Health Promotion; Chronic Disease Prevention; Atlanta, Georgia: http://www.cdc.doc/nccdphp/publicat.htm

The Oral hCG protocol for weight loss Research Center published the many aspects of obesity. This information center identifies obesity as a worldwide epidemic: http://www.hcgobesity.org/obesity/obreview.htm

The World Health Organization: http://www.who.int/en/

US Dept of Health and Human Services. Physical Activity and Health: A Report of the Surgeon General. Atlanta, Georgia: Centres for Disease Control and Prevention; 1996. www.cdc.gov/nccdphp/sgr/pdf/execsumm.pdf

U.S. Department of Health and Human Services; Centres for Disease Control and Prevention; National Centres for Chronic Disease Prevention and Health Promotion: http://www.cdc.gov/nccdphp/sgr/mm.htm

4. The Problem of Silos at BSU, and the Potential of Interdisciplinary Studies

> *"Interdisciplinary understanding (i.e. the ability to integrate knowledge from two or more disciplines to create products, solve problems, or produce explanations) has become a hallmark of contemporary knowledge production and a primary challenge for contemporary educators."*

A Harvard School of Graduate Education Study, authored by Howard Gardner and Veronica Boix-Mansila, acknowledges the importance of interdisciplinary work. Harvard seeks to implement this principle by preparing future teachers and faculty for work going beyond disciplinary knowledge and specialization. It attempts to find 'strategies that experts use to cross disciplinary boundaries and negotiate epistemological differences'. ([44])

Yet, how do experts actually think about an interdisciplinary project? How do 'disciplinary boundaries and epistemological differences' reveal themselves? And how does interdisciplinary practice really work?

With these questions in mind, a survey was conducted with Ball State faculty and off-campus professionals interested in participating in the interdisciplinary curriculum focusing on 'health by design'. It revealed a reality worth studying: it became clear that not only does the combination of health and design demand a complex approach, but also the working process of large and mixed professional groups needs to be illuminated. The reason is obvious. Health related topics have a wide scope. Therefore, it is important to deal on many different levels within the contingent cultural and political organizations. Yet, different disciplines have dissimilar assumptions, definitions, and methods for the problem–solving process. The interdisciplinary project at Ball State University must answer the questions of how to bring various professionals together to work beyond their disciplinary boundaries. The need of cross disciplinary communication and working methods becomes evident.

4.1. Definitions of "Disciplinarity" and "Interdisciplinarity"

This report attempts not just to analyze the scope of health by design, but also to investigate the disciplinary and interdisciplinary issues. Therefore, it needs to be asked what the 'discipline' taught at universities is about, and what does it mean to work in an interdisciplinary way on a specific project?

The very definition of a 'discipline' involves a system of academic learning and teaching. A discipline is a set of rules or methods. It is a branch of knowledge. ([45]) It is also a systematic method to obtain a certain professional knowledge, which has grown over time and has been cultivated by university departments in contact

([44]) The Harvard Graduate School of Study. The GoodWork Project: Interdisciplinary Study. http://www.pz.harvard.edu/Research/GoodWorkIS.htm & http://www.goodworkproject.org/papers.htm. Last update 2003. Accessed on July 09, 2004.

([45]) *The American Heritage Dictionary of the English Language, Fourth Edition*

with practice outside the university. Each discipline has its own set of specialists and sub-specialists, each is typically taught by one or another department within a university, and each deals with its own distinct subjects of "science" or knowledge. ([46]) Therefore, disciplines order scientific or other kinds of knowledge. The modern sciences, for example, in their efforts to explain phenomena in the world are divided into disciplines and disciplinary knowledge.

The term 'interdisciplinary' connects the words 'inter' and 'disciplinary'. 'Inter' means between, among, in the midst of, or mutual. Interdisciplinary means being of, related to, or involving two or more academic disciplines that are usually considered distinct. ([47])

The distinctions and relations between the two terms are manifold. One involves the idea of maps, on which the old academic disciplines stand as solidified (but evolving) entities, while interdisciplinary is about crossing borders, trading zones and the permeability of boundaries. Thus, professional experts combine specialized and interdisciplinary knowledge at the same time.

> *"There can be little doubt that analytical, disciplinary approaches with focused attention on discrete scientific problems can contribute to the development of technological responses. Nor can there be doubt that such techno-production or reductionist approaches have advanced human welfare appreciably, enhancing human comfort, lengthening life spans, and creating opportunities for exploring components of the earth system. However, it has also become apparent in the last half of the century that pressures in what scientists now call the biosphere and its embedded human systems call for synthesis as much as analysis, that the problems characteristic of a crowded high-tech world require the exploration of interactions among complex phenomena... Increasingly, science and society recognize that disciplinaritiy and interdisciplinarity are not mutually exclusive, but mutually reinforcing. ([48])*

In their essay, Frodeman, Mitcham, and Sacks agree to the unifying character of a discipline. The disciplinary worldview does not just separate sciences from each other, but prepares for an interdisciplinary exchange and interaction. Interdisciplinary interactions connect divergent specific knowledge in order to explain complex, relational phenomena. Therefore, the authors argue that interdisciplinary work elaborates disciplines rather than opposing them.

([46]) According to the American Heritage Dictionary of English Language, Forth Edition, the definition of science is as following: the observation, identification, description, experimental investigation, and theoretical explanation of phenomena; methodological activity, discipline, or study; an activity that appears to require study and method; knowledge, especially that gained through experience.

([47])The American Heritage Dictionary of the English Language, Fourth Edition

([48]) Frodeman, R.; Mitcham C.; Sacks, Arthur B. Questioning Interdisciplinarity. In *Science, Technology, and Society Newsletter.* Nos. 126 & 127 (Winter/Spring 2001), pp. 1-5.

Also on webpage: http://sciencepolicy.colorado.edu/newdirections/resources/documents/. Accessed on July 09, 2004. 'New Directions' is an initiative which aims to develop new models for interdisciplinary collaboration, where physical scientists, social scientists, and humanists work together with public science agencies, the private sector, and communities to deepen our understanding of and developfective responses to environmental problems. Launched in the fall of 2001 with initial grants from the Colorado School of Mines and the National Science Foundation, New Directions has now received support from NASA, USGS, EPA, NEH, NCAR, and the Geological Survey of Canada, as well as a consortium of universities (numbering 11 to date).

There are also many subdivisions within interdisciplinary research: e.g. 'multi-disciplinary', 'cross-disciplinary', and 'trans-disciplinary', among others. ([49]) Each term describes a certain kind of communication and exchange. In the overall debate about the types of interdisciplinary work, a basic clarification and differentiation is possible: while multi-disciplinary, cross-disciplinary or inter-disciplinary are more about interactions between disciplines, where researchers can maintain their disciplinary priorities; trans-disciplinary reflects integration, synthesis, and the fusion of several disciplines. However, these terms share the character of describing the interaction of many different professional methods and working efforts. These terms are the product of many scholars challenging, questioning, and redefining 'interdisciplinarity' because of the many paradoxes this term evokes in both theory and practice.

One paradox is the evidence of professional silos. Although a professional silo is a synonym for discipline, it has a less positive implication. The metaphor of a silo reminds us of its clear, distinct form, containing a homogenous material that is not visible from outside. There is usually one way in and one way out, both controlling and regulating the input and output. In regard to professional silos, it exemplifies its strong boundaries; porosity of its form is not a defining characteristic. Also, interactions, intermingling, or exchange with things outside the silo walls is not anticipated or is strictly regulated. Therefore, it is in opposition to the idea of exchange, interaction, and the common trading zones of interdisciplinary work.

4.1.1. Health and Disciplines: The Necessity of Interdisciplinary Approaches

Why is it necessary to work on health issues in an interdisciplinary way? Who might be possible partners for an interdisciplinary collaboration and exchange of knowledge? By attempting to frame the broad topic 'Health by Design', the view outside professional disciplines becomes part of the solution finding.

In analysing the relationship between health and housing, Roderick J. Lawrence realizes that he needs to go beyond merely focusing on housing and residential alternatives (his focus of study). ([50]) Housing is a factor affecting people's health. Yet, there are also other ways in which human health is influenced. *(Fig. 4.1)*

([49]) In regards to the types of interdisciplinarity see: Klein, Julie Thompson; Sperber, Dan; Weingart, Peter.

([50]) *Roderick J. Lawrence. Housing and Health: From Interdisciplinary Principles to Professional Practice.*

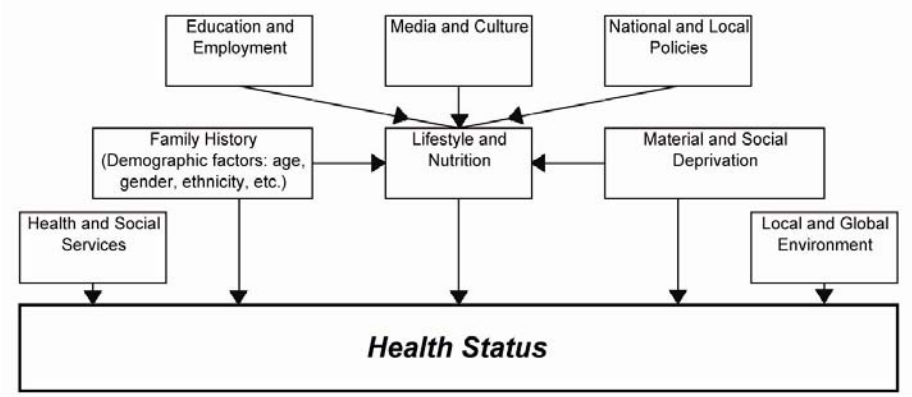


Fig. 4.1: The multiple influences on health status. Sources: Roderick J. Lawrence. Housing and Health: From Interdisciplinary Principles to Professional Practice.

Lawrence observes that the field of housing needs to be viewed in a broader sense, namely with an ecological understanding of the environment and its influences on human health. This is necessary in order to contribute more effectively and sustainably to the improvement of people's health status. In addition, many fields of people's everyday life need to be considered (such as access to health and social services, the family background, the individual and communal lifestyle and nutrition, the material and social deprivations, and relationship to the local and global environment). The diagram (above) thus represents possible links to and overlapping zones of interests of other experts working in these parts of people's everyday life.

> *"Residential environments are known to be an important determinant of quality of life and well being following the results of numerous studies in a range of disciplines. Today we know that the multiple components of housing units and outdoor areas need to be considered in terms of their potential and effective contribution to physical health, and social and mental well being… Our capacity to deal with these complex subjects is insufficient for several reasons including the diversity and complexity of these problems, the difficulty of identifying and measuring the interrelations, between them and their components; and the need to understand the relative importance of these components in precise locations, at different geographical scales and over time. ([51])*

Lawrence understands that a uni-disciplinary perspective creates shortcomings. Single, disciplinary approaches are sectoral, whereas interdisciplinary approaches offer a broader perspective. Demanding that perspective does not undermine the system of disciplines. Each professional knowledge-base is important. It enables a better understanding of the limits and potentials of one's own and other's expertises. As Norene Pumphrey (Vice President of Affiliated Hospitals at Cardinal Health System) stated in her interview, first comes the setting of a base of knowledge and later the exchange of one's with others' knowledge bases follow.

> *"I think you have to have some kind of a body of knowledge to identify with before you say I am all to all people… You have to set a base and then make sure everyone understands what your profession is about. Once people understand their profession, their ethics, then you bring in others… So, yes there is a silo. I prefer to think of it as*

([51]) *Roderick J. Lawrence. Housing and Health: From Interdisciplinary Principles to Professional Practice.*

a discipline because in my world a silo is a negative thing. To me a silo is something where you need to get out of, whereas a discipline is something that you grow and develop it to understand, so that you can go out, represent it, and pull other people into it."

The uni-disciplinary perspective relates to the metaphor of the professional silo. The 'narrow vision of academics, professionals, and policy makers addresses the treatment of symptoms rather than solving the fundamental issues'. ([52]) Knowing one's own expertise but also being able to enlarge it onto a multi-disciplinary platform where other specialists contribute would not only help Lawrence's expertise to become elaborated, but would also support broader links and relations. *(Fig. 4.2)*

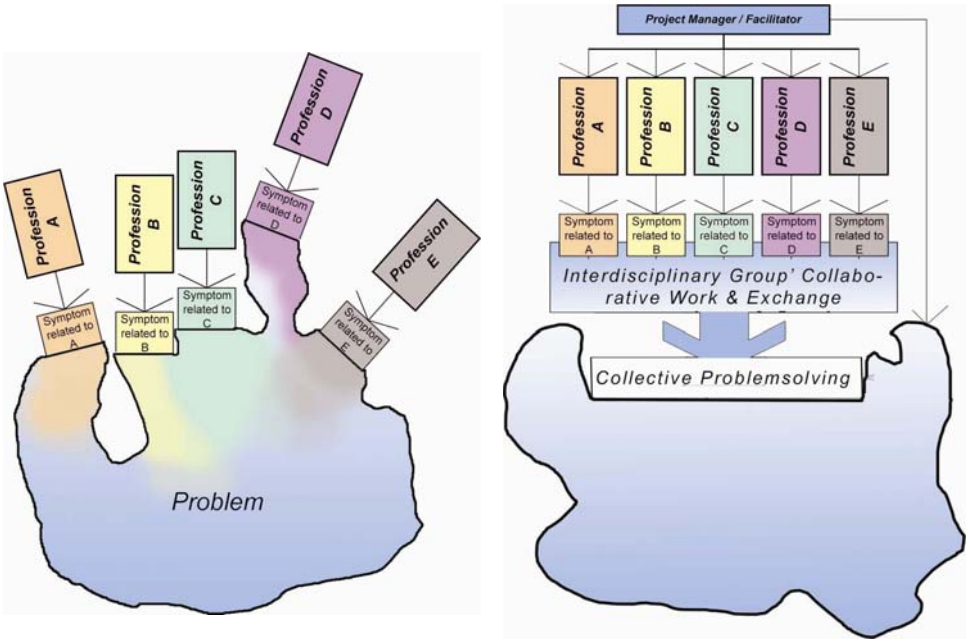


Fig. 4.2: The comparison of symptom treatment of uni-professional problem solving (a) versus the multi-disciplinary approach to a problem (b).
Graph (a) visualizes the one directional learning process in regards to an issue. It strictly focuses on the problem solving seen within the disciplinary expertise. The result is a symptom treatment of the issue. In contrast, in graph (b) disciplines interchange expertise in interdisciplinary groups which creates exchange, multiple influences and feedbacks, while focusing together on the common goal. The result is a strong problem treatment, conducting actions from various points and therefore coordinated. Effects will have a longer influence.

In Lawrence's perspective, creating healing and curative built environments cannot be planned and realized only by experts in architecture and planning. The complexity of health issues demands a collective health improvement, multi-layered perspectives and solution finding. Complementary knowledge and methodologies will improve the public health situation and will enable enhanced, advanced, and

([52]) *Roderick J. Lawrence. Housing and Health: From Interdisciplinary Principles to Professional Practice.*

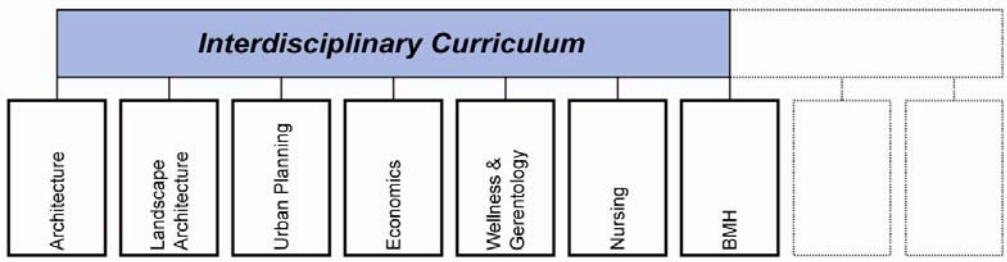
innovative results. The necessity for interdisciplinary work is thus conclusive, according to Lawrence's research.

4.1.2. Ball State University: Necessity of Interdisciplinary Approaches

According to the BSU project description, one professional perspective was not enough to articulate a holistic framework for an interdisciplinary 'health by design' curriculum. This became vivid in the preparation of the databases. Therefore, dialogues with people from other disciplines in practice and academia helped to approach the project in a more complementary and satisfying way.

At Ball State University many different departments have become interested in the new curriculum focusing on health supportive environments. The list of departments include Family and Consumer Sciences, Nursing, Physical Education, Wellness & Gerontology, Architecture, Landscape Architecture, Urban Planning, Economics, Finance & Insurance, ISOM (Information Systems Operation Management), Marketing & Management, Communication Studies, CICS (College of Information and Communication Sciences, Telecommunications, Art, Music, Theatre & Dance, Anthropology, History, CME (Continuing Medical Education), NREM (Natural Resources and Environmental Management), Physiology & Health Sciences, Political Science, Psychological Science, Social Work, Sociology, Counseling Psychology & Guidance Services, Teaching & Learning Advancement, and Teaching & Learning Advancement. ([53]) Out of this range of academic interests and potential partners, faculty members and off campus practitioners were chosen for a survey. *(Fig. 4.3)*

Fig. 4.3: Participants; the disciplines within this survey are not restricted to those which you can see here. Many other disciplines can be involved in such an interdisciplinary curriculum dealing with health by design.



The list of participants reveals an exemplary group at Ball State University. It is further extendable, as related to the many other academics and professionals that expressed their interests to the analysis of healthy environments, organizations and communities. The constellation of professionals was influential on the survey's outcome and the initial steps for the curricular course planning. It would be

([53]) Course Advertisement by the end of spring term 2004

interesting to see how other universities who proposed a 'health by design' orientated curriculum approached and composed their groups of professionals. ([54])

Although the "ecological" framework of health related issues demands professional collaboration, the environment we live in is just too complex and the range of related professions is too wide and each is too specialized. It will never be possible to invite all professions to one table to discuss the future of a project. This fact has disadvantages and advantages. A disadvantage is that each project asks for a customized set of questions, objectives, process and partners. This is an enormous effort regarding the variety of professions and real time scheduling. However, an advantage is that a health related project focuses on a particular situation. The problem–solving process is adjusted to specific malfunctions, the needs of a community or organization, its leadership, priorities, and methods. Therefore, each case is protected from adopting an all-purpose-solution. Constant questioning, re-evaluation and a critical approach are possible.

4.2. The Evidence of Differences: The Survey

Experts from economics, nursery, or planning have specific views on health issues due to their differing disciplinary priorities and values. The advantages of interdisciplinary research work are generally accepted (such as answering contemporary demands in finding sustainable solutions for complex issues; complementing knowledge beyond disciplinary boundaries; exchanging knowledge, etc as discussed previously). Therefore, it is important to gather disciplinary knowledge and prepare for an interdisciplinary interaction. Do experts have overlapping interests and commonalities? What are their frames of reference, schemes and tools? How different from each other are their methods?

A survey was prepared. It consisted of five main questions. In conducting the survey, the comparison and the analysis of the information led to an apprehension of the distinctions, differences, and overlapping interests of people working in various fields. This led to additional questions, asked in each personal conversation. The survey focused on the relation between interdisciplinary work and professional boundaries, on possible disciplinary overlap of interests, on tools and methods, and on references.

The outcomes would enable the planning of linkages and partnerships.

([54]) Clemson University; College of Health, Education, and Human Development: one of their research projects is *"Exploring the Relationship between Architectural Environments and Health"*, http://www.clemson.edu/reports/research/2000/14.htm.

See also: The Center for Health and Global Environment at Harvard Medical School offered an interdisciplinary course in this field. http://www.med.harvard.edu/chge/course/introduction/why/why.htm.

See also: Peter Williams. The Institute for Medicine in Contemporary Society. *Creating a Common Core: A New HSC program in Interprofessional Education.* Contexts Vol.7, No.2, December 1998. http://www.uhmc.sunysb.edu/prevmed/mns/imcs/contexts/macy/pcw.html.

See also: Center for Health, Culture, and Society at Emory University, (CSHCS), Atlanta, GA. http://www.emory.edu/CHCS/pdf_CHCS_UTF.pdf

After compiling the survey results, several findings became visible. Although participants explained affinities to "adjacent" professions, they defined distinct boundaries of their professional knowledge, responsibilities, and benefits to the project's objectives. The necessity of interdisciplinary work was strongly underlined. Commonalities were evident, as were overlapping and common interests. Yet, differences were more evident than expected. The experts seem to express minor or no active relation to each other. Definitions and opinions of experts in regards to 'health by design' related issues seem to be independent, unrelated, or sometimes in contrast to each other. Also, strong distinctions and judgments about other professions were lying within the answers. Each represented their professions' particular definitions. The articulation of the discipline's view, interest, and approach to the topic differed widely. This was a surprising observation given the fact that all participants were introduced to the upcoming 'health by design' curriculum and its interdisciplinary ambitions. In the following sections of the report, the survey is analyzed. All results will be related to previously discussed topics. The survey can be viewed in Appendix 7.2.

4.2.1. Interests and Definitions

This section relates to the survey chart question I – III and A – D, which is based on interview results. Here, the experts from urban planning, wellness and gerontology, the health delivery field, and architecture stated their views on the definition of health, the built environment and their interest in 'health by design'.

Definition of Health, Question I to A-D: The experts reveal a range of different approaches towards the definition of health. Yet, they similarly understand the solution for individual health problems tied to the environment in which individuals live. Health is not seen only in the individual's body but also in its mind and spiritual condition including the social context. This is especially essential in the profession of the architecture. (I, II, III/D) Moreover, health is connected to 'community health', to the ability of 'living a full life', to a sensitive 'balanced system', to a 'general sense of well being' and comfort. (I/A-D) Although similar, the experts expressed their views with varying words. This is even the case within one profession. (I/D, I-D3)

The World Health Organization's health definition should be incorporated in order to get a common defining ground before proceeding further. ([55])

Definition of Physical/ Built Environment, Question II to A-D: This question reveals the difficulty of some professions to define what the physical or built environment is and what it has to do with health. Some professionals deal directly with buildings (health care delivery specialists dealing with hospital buildings or clinics, architects dealing generally with buildings, urban planners with spatial location and infrastructure decisions, etc). The "meaning" of the physical/ built environment was stated as follows. The experts underlined the relation between the individual and its proximate and wider environments. Also, the environment has many aspects besides the built one (social, cultural, political, spiritual, psychological, acoustical, visual, etc). (II/B-D, III/D) In addition, it is important to think about the

([55]) See chapter three.

individual's perception of the environment: how does the environment affect people, how is it responsible for influencing choices, or the course of health promotion, recovery and maintenance. (II/C) This knowledge can lead to a better understanding of the 'supply and demand' theory, discussing the need of providing high quality design of health promoting spaces according to the course of the patient's disease. (II/C) In addition, the individual's environment can be seen at various levels: immediate, background, building, and communal. (II/B-D, III/D) Therefore, the physical environment needs to be commonly defined and divided into various levels of intervention.

Interest in 'Health and Design, Question III to A-D: The different professions revealed various approaches towards health. In the answers to the survey, three main approaches were evident: Urban planning and wellness and gerontology are interested in community health by developing and enhancing community awareness. Also, policy related actions would need to occur (I/A, I/A, 3/B). While urban planning focused on policy development and spatial / location issues, wellness and gerontology was interested in rethinking the health care system, similar to the health care delivery specialist's demand, leading to the health delivery continuum model. (1/C) The health care delivery specialist was interested in the health delivery service according to the specific stage of illness. (III/C) (III/D) Therefore, A, B, C focused on system oriented health promotion and restructuring the health delivery models. Finally, architects targeted on buildings and their relation to health promotion, service delivery, and therapeutic qualities of buildings.

All experts thought about health issues from their perspectives. Therefore, all were contributing to health promotion, only on different modes and levels of intervention.

4.2.2. Interdisciplinary Work

This section relates to the survey chart Question 1 and A-G, based on both interview and questionnaire results. Here, seven experts offered their views on the interdisciplinary nature of 'health by design'. All participants acknowledged the importance of the interdisciplinary nature of 'health by design'. However, the professions had variations of emphasis. (1/A-G) Three main characteristics were evident: the perspective on interdisciplinarity, its actual practice, and the question of whom does the discipline serve.

The perspective on interdisciplinarity: First, the urban planning expert introduced the perception of disciplinary silos, which need to be broken through and connected with others. The expert believes in the profession's intrinsic value stance of linking with other fields, thus giving a dominant role to interdisciplinary work. (1/A) The health care specialist however, made a distinction between the terms 'silo' versus 'discipline'. 'Silo' as a heavily "loaded" word, implies professional shortcomings through narrow vision and the inability for collaboration. Conversely, "discipline" implied a professional competence and knowledge, which can be respected and used by others, not excluding other disciplines. While urban planning seemed to believe in its problem solving ability without limitations and boundaries, wellness & gerontology and health care delivery accept the restrictions of a single

profession and were eager to learn from other professions. (1/A, B, C) However, these three experts' perspectives were analogous because they have the practice of dealing with multidisciplinary groups: urban planning is concerned with problem framing and solving on city scales, dealing with politics, finance, builders, community groups and other interests; the health care delivery specialist is used to composing and orchestrating multi-disciplinary groups who are concerned with the creation of hospital environments; and wellness & gerontology is dealing with health promotion on many fronts with regards to systems theory.

In contrast, the answers of the experts from architecture, economics, nursing and landscape architecture seemed to leave an unknown and not clearly defined space for the mystery of 'the other disciplines'. Therefore, they have three strategies to add to the interdisciplinary reality in their profession: using tools incorporating multidisciplinary concerns (1/ D1, e.g. 'LEEDS'); viewing practical problems as neutral places of activity where each discipline makes their own contribution (1/D3, F, G); or leaving the responsibility to a project leader, who would manage the various aspects of a project, but define separated assignments to each discipline. (1/D2) They are indeed focused on their own profession, yet acknowledge the existence of other disciplines and respect their specialized competences. The first group seemed to be policy and communication oriented; they lead and organize processes, looking in a collective way into a problem. The second group is action oriented, therefore looking from its own perspective on a problem and fulfilling the specific discipline orientated task as part of a bigger project.

This leads to the second observation: *The actual practice of interdisciplinarity*. Less has been mentioned in how to work and communicate in an interdisciplinary fashion. As mentioned, many of the experts seem to have a set of tools which incorporate interdisciplinary interests into the project. Yet, this leaves out the very practice of how to communicate with other experts. The "how" is mainly explained by urban planning, wellness and gerontology, and health care delivery specialists. (1/A, B, C) Urban planning opened a discussion about the term 'silo'. The issues are clear: silos need to be broken down, because they inhibit exchange, openness and accessibility. (1/A) Silos tend to be judgmental, and a hierarchical perception substitutes for an understanding of disciplines as located on a map of equality and legitimacy. However, ways to communicate were mentioned: a two-way-communication (translation; seeing the other's limitation – admit own limitations; overcoming a 'symmetry of ignorance'; explaining & listening); an exchange of competences (utilizing other's disciplinary knowledge, making one's own knowledge accessible; discussing one issue with several disciplinary languages; defining terms from several disciplinary perspectives); and creating new partnerships and linkages which add to the multidisciplinary knowledge. (1/A, B, C) Facing these requirements for a constructive and productive discussion of a project opens up the need for a skilled professional, trained for combining, coordinating, and translating professional competences.

The need for a project manager is evident.

Serving the interests of whom? Many judgments, underestimations, or prejudices come from this question. While the urban planning expert sees his profession's goals in the benefits to the community, he sees other professions such

as architecture or economics in the guiding hands of a client. Having the community's goals in mind are understood as more far-sighted, sustainable, healthy, and communal-beneficial than having a client's goals in mind. The Client is supposed to make more limited, and personal decisions (depending on the subjective and self-sustained benefits for the client) (1/A). Yet this statement seemed to be in contrast to the 'accused' experts' own view: the public health, safety and welfare are obligatory for many professions. (III/C, D, 1/F, G) Therefore, the question of which a profession serves is important to discuss in order to highlight and correct misperceptions, and to avoid a hierarchical order of profession's values. In addition, real life projects need to serve many interests, yet simultaneously are heavily driven by economic forces.

Consequently, the experts agreed on the need for project management, in which disciplines find connections, yet follow their own ways, respect other discipline's legitimate and equal positions, and define the interests which need to be focused (1/A-G).

4.2.3. Tools, Methods, and Approaches

This section relates to the survey chart question 2, 3 and A-G, which is, based on interview and questionnaire results. Here, the experts stated their views on how to assess the performance of health supportive environments.

Case studies, Question 2: All experts gave a wide range of case studies. It was apparent that almost no case studies matched the other. However, exceptions of exemplary environments on the community level were Salem, Oregon and Boulder, Colorado. (2/A, B) Also, three tendencies in how to approach a case study were evident. First, examples on the community level lead to suggestions to analyze community environments (2/A, B, C, D4, F, G). Then, hospitals in general seemed to be a starting point. (2/C, D1, D2, D3: community hospitals, several Swedish Hospitals, the Swiss INO Hospital, Alvar Aalto's tuberculosis sanatorium). In addition, studies on relationships between health and environments on community, building, or near environment level were important. (2/B, D1, D3, F: HERO, Me-home, indoor spatial quality analysis, Healthy People 2010, etc.) Yet, for the economics expert it seemed important to specify the case study analysis in the framework of a particular hypothesis. Otherwise, the sheer quantity of case study analysis options would not be manageable. (2/E)

Performance assessment systems, Question 3: Based on case study analysis in each discipline, experts deduce an assessment system. Each of the seven survey participants made suggestions in how to begin a project focused on health supportive environments. The urban planning expert suggests asking basically two questions: how to identify community health; and what is the most desirable place to live? Based on these guiding questions, the method of post occupancy evaluation (POE) is being applied with different foci: stress factors, costs, communal and formal organization of entire communities in rural or urban environments, etc. (3/A) This method leads to a deduced set of guidelines which will be implemented in a future action plan. Performance assessments are a common method of professions in general. Drawing lessons from existing projects with their disadvantages,

advantages, and potentials is essential. In addition, architecture and landscape architecture experts suggested approaches in the assessment of an existing built environment other than POE's. (3/D1, G) Wellness and gerontology specialists, economists, and architects also take cost considerations into consideration. (3/B, E) However, architecture and the health care delivery specialist proposed general assessment systems on which future projects can be planned (3/C, D1, D3: LEED, HCIA, JCAHO, Press Ganey, Arbor).

Although the performance assessment is a common tool, professions use it differently, depending on their interests and expertise.

4.2.4. Doubts about tying health and design together

This section relates to the survey chart question 4 and A-G, which is, based on interview and questionnaire results. The seven experts stated doubts about the linkages of health and design.

The experts seemed to be convinced about the legitimacy of the connection between health and design. ([56]) They underlined it as an important and inescapable reality of today's health care discussion. Urban Planning stated its interest in more linkages and the analysis of human behavior patterns and lifestyle in relation to health. (4/A) The economics expert observes a growing awareness and need for health supportive environments, leading to an expanding demand (4/E: 'larger demand for houses with wheel chair access; 'older people are likely to be affected', etc).

Yet, many experts doubt the availability of sufficient education and background knowledge to finance these projects. Besides students and professionals, (4/D2) clients or communities need to be convinced and educated about the necessity to rethink our health in relation to how we live. (4/D1, D3, G) Advertising and marketing are tools to encourage this 'enlightenment'. (4/E) If health is connected to "design", embraced by the social and political authorities, and realized in professional practice, then the consequence would be a restructuring of the health care system. (4/B, F)

However, the wellness and gerontology expert see the major doubt about the connection between health and design. How will a project based on 'health by design' with its many reasonable aspects be possible to apply? What can be said with certainty about the causal link or direction of causality between "health" and "the designed environment"? Here, the pragmatism is in doubt because of the multi disciplinary approach. (4/B) Communication problems between disciplinary leaders, capturing complex relationships, and real time pressures present serious obstacles.

4.3. The Survey's Conclusions

Although the initial aim was clear, the participating experts differed in interpretations, perspectives, definitions, methods, and solution finding methods.

([56]) See Appendix 7.2.

Individual professors made statements that hindered the imagination of an 'easy-going' interdisciplinary project. Disciplinary boundaries, differences, distinctions, and priorities became articulated. The reality of interdisciplinary work challenges conventional disciplinary practice insofar that a multi-disciplinary exchange of perspectives is demanded. Therefore, the up-coming interdisciplinary project needs to be prepared by investigating the reasons for a negative collaboration. Some of the reasons are the evidence of professional silos; the lack of a common ground with an adequate common language; the hierarchical perception of other profession's values; and the unwillingness to give and take knowledge of clearly defined knowledge silos.

4.3.1. Disciplinarity, Interdisciplinarity, and Silos

Many disciplines agree to the advantages and the necessity of bringing interdisciplinary exchange into everyday practice. However, Denise Caruso, executive director of the Hybrid Vigor Institute for cross disciplinary exchange, observes that up to now, there has been very little focused inquiry regarding the components and factors that drive interdisciplinary projects to success or failure.

> *"… But neither the popularity nor the necessity of interdisciplinary research is reflected in the reality of the situation today: Shockingly few researchers or institutions have meaningful experience with its actual practice… The reason that such a paradox exists is clear: the practice of interdisciplinarity is difficult and fraught with roadblocks, particularly for researchers who have been raised and who continue to participate in the tradition of disciplinarity and departmentalism…"*

In a similar mind set to Caruso, Dan Sperber, a French social and cognitive scientist, director at the Jean-Nicod-Institute for Interdisciplinary Collaboration between the Humanities and the Social Sciences, argues that many professionals use only the rhetoric of interdisciplinarity which acknowledges a juxtaposition of research interests between several disciplines, yet do their analysis work strictly within a conventional disciplinary approach. ([57]) Both scholars notice the difficulties that a practice of interdisciplinarity faces. Disciplines are dominant organisations of sciences and professions, protecting and enhancing their boundaries. In addition, disciplines strongly focus and narrow their fields of interest onto a specific question. Separated from its context, the logical and scientific approach analyzes one particular aspect, proposing specific conclusions. It is probably efficient to view matter without context and in a theoretical bubble, in order to come closer to a very particular point. Yet, it is important to step back also and see the whole picture and its interdependencies, as part of a bigger whole.

It is important to understand these professional boundaries. Professionals and specialists should be enabled to represent their discipline's knowledge in an interdisciplinary environment, exchange useful information, and by coming back to their roots, enrich their own disciplines. In practice, due to time constraints, collaborative work is essential and already practiced due to the interdisciplinary

([57]) Sperber, Dan. Why rethink Interdisciplinarity? In: http://www.interdisciplines.org/interdisciplinarity/papers/1. Last update: 2004; viewed June 23, 2004.

reality in many areas. These everyday routines of practice need to be more thoughtfully analyzed, more clearly articulated, and more forcefully adopted into the discipline-dominated universities in order to enable future professional and theoretical interdisciplinary work.

4.3.2. Levels of intervention

Because the definition and the scope of "health" and "design" extended its limits from the individual's world (the near environment) to the collective entity (the community or regional level), a variety of actions need to be undertaken. Therefore, the need of a conglomeration of professionals is evident.

Different professions have different perspectives, which lead to different approaches; consequently, the results are different. Yet, in health issues professions act according to the same goal, namely improving and promoting public health. Therefore, experts focus on different parts of the society's socio/physical system according to their specialties; planners work on the communal level, hospital specialists focus on the hospital facility level, economics work on the financial planning of a project or larger social policy, etc. Professions deal on many various levels of interventions that have relations to each other.

For analytical convenience, these "spheres of action" or "levels of intervention, investigation, and understanding" in the built environment could be distinguished (but not separated) according to a "near environment" level (interior design), the "building" level, and the "tissue" (or urban design) level. More levels may well be defined, and are related to each other hierarchically (see diagram below). The particular constellation of actors operating at a certain level (users, decision-makers, etc.) can be studied as well as their respective exercise of control in a "downward" direction and influence in an "upward" direction in that hierarchy. *(Fig. 4.4.a, b)*

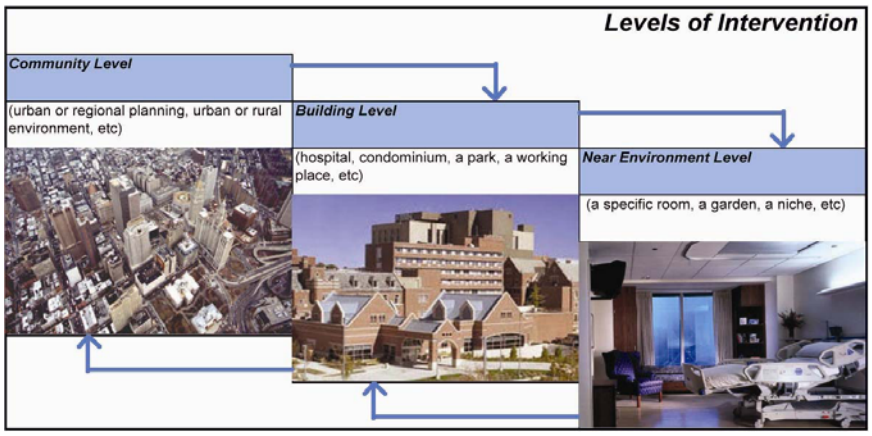


Fig. 4.4.a: Levels of Intervention divided into three levels. As a simplified diagram, this scheme shows the main levels of intervention considering the nearest level of intervention of the room towards the broadest intervention on urban and regional level.

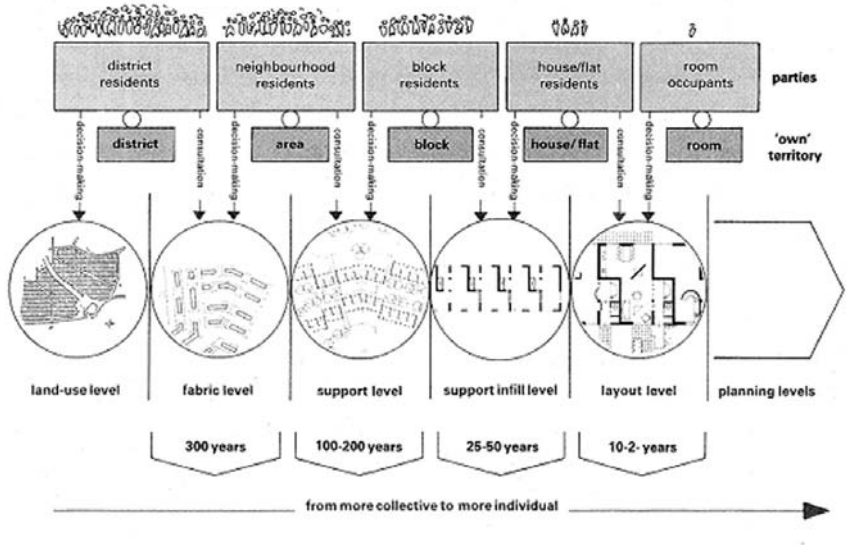


Fig. 4.4.b: Levels of Intervention divided into five levels. This diagram exemplifies environmental structure from the room as the 'lowest level' of intervention towards the broadest level of the district.

Viewing the environment in this 'levels of action' framework is effective because the society we live requires many specialized activities and interventions that no one is able to do alone. Yet, it is important to know the relation, the similarities and the constraints of disciplines vis-à-vis each other, operating at the same and adjacent 'levels'. This enables us to know one's place in the whole framework. For example, the decisions of the urban planner give a framework for the landscape architect regarding where to plan green spaces and other public spaces as well as the "zones" where buildings can be constructed; the architect sets rules for the contractors and makes buildings that give space that interior designers specify; the hospital specialist plans health care delivery facilities in which nurses continue to organize their work. The programming of the hospital facility itself demands many specialists: physicians, architects, planners, nurses, economics, etc. Therefore, the levels of intervention mark an organization of actions, structuring the distribution of influence "upward" and control "downward". It is necessary to map the responsibilities and relations between the participating parties with their specialties prior to a project. If links and relations are not clear, the perception of one specialist to the other one can be confused. As David Gobble, director of the Fischer Institute

of Wellness and Gerontology at Ball State University observed, specialist with 'strong personalities, egos, biases, expertise' will come together. The interdisciplinary communication is to be facilitated and eased, in order to get the experts to open up, respect, and work constructively with each other for the common goal of health solutions rather working against each other.

4.3.3. Common Platform & Communication

> *"I have … doubts about the pragmatism. We have people coming together with different world views, disciplines, strong personalities, biases, and expertise. Can we all sit around the table and understand each other, respect our differences but appreciate our contributions? Can we find a new language capturing the complexity of all these disciplines, as we talk here about higher order synthesis? This is the challenge. This is not easy scholarship, this is a pedagogical challenge to get people to come together from a functioning health care system, from 6-7 disciplines, with strong personalities, egos, biases, expertise, to come and open up…" ([58])*

As quoted, the challenge of an interdisciplinary curriculum is both the scope of health in relation to design and the communication in a multi-disciplinary group of professionals and students. With the participation in the survey, experts suggested many different ways to see health by design, but stressed their own point of view since this is the base of their expertise. The common goal of producing a health supporting environment was not in jeopardy. Rather, the evidence of the different professional languages that were used was a point of concern. How could a satisfying health supportive environment be possible if experts see matters from such different angles and understand the same terms in different ways? Communication suffers. This circumstance reveals everyday issues in the practical conversation of multi-disciplinary groups. Uni-disciplinary perspectives, prejudices about other profession's practices and validity, and distinctly different use of professional language hamper constructive communication.

The two-way-communication is not always easy because of status differences, competence imbalance or variety in valued work. Overall, unproductive status heroism is misplaced in the collaborative work for a 'health by design' project. The relationships between diverse partners are not limited to the inclusive expert circle but need to incorporate other members of the common society.

Fig. 4.5: Two-Way-Communication
Connecting and relating many different partners within the society.

Power imbalances between a teacher/ professor and a student seem to be obvious. Sometimes differences between the experienced and the non-experienced open ways for questioning ingrained methods and perspectives. Prejudices between scientists and humanists are common because of differing research methods. Often

([58]) Interview with the expert in wellness and gerontology.

scientific work is valued more because of its focus on experimental and technical research results, leading to questioning of the research methods of social scientists based on material culture research or ethnographical studies, etc. There is a big disagreement between the value of scholars and practitioners; the one group is supposedly far away from practical actions, while the other group is so close to applications that larger perspectives are missed. Finally the discrepancy between experts and the public needs to be narrowed because of the relation of one to the other: many organizations commission experts, yet the public itself should be part of the expert's work in order to insure the focused solution finding for the affected public. Expertise should be accessible for the laymen.

Interdisciplinarity does not just mean that a group with members from different backgrounds comes together, talks about a project, and makes guidelines for their own field. Rather, serious interdisciplinary work is high scholarship and professionalism, because various specialists meet in order to produce common knowledge.

The basic communication of interdisciplinary groups needs to be prepared, yielding a common ground. Then, the ensuing conversation needs to be guided and views translated or mediated. As a matter of fact, health concerned professionals will face the challenge of how to communicate, how to understand each other, how to acknowledge each others' potentials, and how to enhance this knowledge for thinking about healthy environments. Their various foci incorporate issues of recognizing professional disciplines and silos, expanding them, and discovering potentials.

Facilitating an interdisciplinary project starts with the establishment of a common ground. Due to the different backgrounds, competences, definitions, and languages each expert has, it is essential to start out agreeing upon clear definitions, a common vocabulary, and specifying responsibilities and commonalities. In regards to the coming interdisciplinary curriculum, the underlying definition of health itself can be according to the World Health Organization.

Therefore, the focus of the interdisciplinary curriculum must be extended beyond the mere content of the topic of "Health and Design". Rather, it needs to incorporate considerations about models for interdisciplinary communication. Without a working strategy and a constructive working atmosphere the product of such a group will not be satisfying. Synthesis and alternative approaches, using multi–professional expertise, perspectives, sensitivities and tools embody a great potential to find promising solutions for a problem task.

4.4. Conclusions: Paradoxes and Potentials

The interdisciplinary concept and its practice is not easy scholarship. Nor is its methodology commonly agreed upon. Up until today, little has been done in the analysis of how to work in interdisciplinary groups. Peter Weingart even goes so far as to argue that interdisciplinarity exists as a discourse but not as a practice. Professionals claim its moral desirability but interdisciplinary work still challenges and reinforces disciplinary thinking. Yet, many scholars such as Julie Thompson

Klein, Roderick J. Lawrence, Dan Sterber, Veronica Boix Mansilla, Howard Gardner, Chunglin Kwa, Denise Caruso and many more try to answer the question of what makes good interdisciplinary work. However, in these many attempts and on the basis of the survey, several paradoxes within interdisciplinarity can be agreed upon.

Paradox of the Academy: Interdisciplinarity implies crossing disciplinary borders, engaging in trading zones and enabling the permeability of boundaries. "Hybridization" becomes an issue when possible "boundary blurring" occurs between well-defined groups. Because disciplines map questions intrinsic to their fields and divide their knowledge into departments of expertise, each discipline can be perceived as inadequate when facing 'real world problems' such as health. ([59]) Interdisciplinary research implies a better fit and suggests a redrawing of the disciplinary maps. However, interdisciplinary work does not unify as expected and cannot be the opposite of disciplinarity. Rather, it produces more, but narrowed disciplines; rather than meeting and uniting people, it departmentalizes even more. (Weingart, Kwa, Caruso)

Also, the importance of disciplines at universities will continue while interdisciplinary work is emphasized in independent centers and organizations. Yet, students studying interdisciplinary classes run into academic career risks. ([60])

> *"While interdisciplinarity emphasizes the goal rather than individual achievement, the university department confers professional legitimacy upon individuals, and provides both funding models and the rewards and the requirements for career advancement (including tenure and publishing quotes) to sustain them." ([61])*

Students are tied to their home department because of its reputation in a specialized field, its specialized faculty, and its funding opportunities for research in the specific field. Caruso and Rhoten continue that interdisciplinarity often and understandably becomes intellectually unappealing, or not strategic or viable, for students and also faculty. The dominance of disciplines is evident in the institutional organization and power structure of the general education system.

The Paradox of Defining Success and Failure: Secondly, defining and achieving success is differently evaluated between disciplinarity and interdisciplinarity. While disciplines usually require quantitative or measurable results, tightly bounded, simplistic or even linear, it fails to address the more fundamental issue or the basic causes. Interdisciplinary success is based on exploration and curiosity in the service of problem solving or answering questions. ([62]) As Norene Pumphrey explained about the contemporary health delivery debates, encouraging 'out of the box' thinking of interdisciplinarity will advance today's health care systems better than specialized advancements.

([59]) Margaret Somerville and David Rapport introduce the term "symptom treatment"; Transdisciplinarity: reCreating Integrated Knowledge", 2000.

([60]) Stephen Turner, Wilhelm Krull, Dan Sperber, Chunglin Kwa

([61]) Caruso, Denise; Rhoten, Diana. "Lead, Follow, Get out of the Way: Sidestepping the Barriers to Effective Practice of Interdisciplinarity." In: http://www.hybridvigor.net/publications.pl?s=interdis&d=2001.04.30. Accessed on July 09, 2004. Page 8.

([62]) Caruso and Rhoten, page 7

The Paradox of common goals and professional interest: Third, working with many disciplines can only be successful if the actions are focused around very specific mission-goals. ([63]) Then, societal, common interests lead knowledge production within a context, rather than depending on the disciplines to do it in their own enclosed departments and laboratories.

> *"Indeed, interdisciplinary efforts themselves may be characterized as shallow rather than deep, insofar as they have not stepped outside the disciplinary matrix to involve representatives of the public or common good. Indeed, there has been little serious questioning of a manifold of presumptions underlying disciplinarity, such as the basic need to complement intense disciplinary specialization with light acquaintance of many disciplines (by means of general education curricula) or to extend disciplinary compass and harness disciplinary utility when faced with socially set problems (through interdisciplinary research)." ([64])*

Professionals who are coming together are not really meeting and exchanging competences. Rather, the lack of networking can go so far that the underlying issue will not be solved because of disciplinary mistrust and pride. However, regardless of the goals implied by non-scientific interests, disciplines will approach complex challenges still from their perspectives and impose their own methodology in order to give validity for this work. The lack of a consensus on a common problem and a mutual understanding on a methodology, terminologies and definitions is the basis for the failure of multi-disciplinary endeavors. (Kwa, Weingart, Caruso)

The Paradox of Reference and Reputation: Fourth, the survey revealed the differences in the reference sources of professionals, indicating no overlaps or similarities although health related research is done in many disciplines. Caruso and Rhoten describe two reasons for the failure of interdisciplinary communication and understanding. One is the basic 'physical and conceptual accessibility' of extra-departmental publications, because each departmental has its own catalogue of scholarly journals and because experts might not understand other literature than their own due to linguistic, theoretical, and methodological differences. Hand in hand goes the fact that the rising costs of academic journals narrows down quality scholarly information while the influx of unfiltered and unrequested publications is growing. This underlines the departmental concentration of field - orientated choice of reference resources.

The other problem in the lack to access to interdisciplinary references is scholarly publishing itself. By referring to key scholars within a given field, publishing in discipline specific journals, and using specific modes of inquiry are often institutionally required in order to maintain professional status, validity, and reputation.

The Paradox of the Politics of Knowledge and Trust:

> *"But learning to trust is absolutely essential if interdisciplinarity is to consistently yield the kinds of discoveries and unexpected connections it has in the past; researchers cannot look for similarities or matching patterns between their works and others'*

([63]) Caruso and Rhoten, page 9

([64]) Frodeman, R.; Mitcham C.; Sacks, Arthur B. Questioning Interdisciplinarity. In *Science, Technology, and Society Newsletter.* Nos. 126 & 127 (Winter/Spring 2001), pp. 1-5.

unless they are willing to risk their position as 'experts' long enough to actually focus on another discipline's perspective." ([65])

The last but most important reason for interdisciplinary project success or failure is based on how individual researchers overcome boundaries of competences, authorship, and competition within multi professional groups. Because of mistrust, skepticism, misevaluations or irrelevance, experts are likely to think about their preferred positions in questions of equipment and research grants, space, or the use of outstanding facilities. Therefore, mutual understanding, trust, and communication among equal professionals are essential.

Because of the necessity of interdisciplinary work for new and more comprehensive inquiry and innovation, and the reality of everyday practical issues within interdisciplinary situations, the conventional interdisciplinary approaches need to be rethought and the concentration on potentials reinforced.

Potentials for new, specified disciplines: Indeed, through interdisciplinary practice new disciplines can be founded such as biotechnology, biophysics, bioengineering, biomedical technology, etc., industrial ecology, environmental sciences, cognitive sciences, information technologies, etc. This can be a potential for new but more focused research with innovative applications. In regards to health, health promotion overlaps many fields as we have seen. Yet, since responsibility is demanded, health promotion resulted in a separate discipline with own organization, knowledge, curriculum, and sub-specializations. ([66])

Potentials for innovations through interdisciplinary completion of various knowledge frames: Because of its limitations, the disciplinary reductionist view on any given subject will be substituted by interdisciplinary knowledge. Problems are being discussed from many different perspectives. Personal specialization is applied within a sphere of many other specialized people, yet thinking about a common knowledge-base. Within that sphere of collaborating expertise experts have the knowledge of each other's strengths and weaknesses. New relationships are established, new linkages initiated. Obtaining additional competences in other disciplines than the home field gains multiple recognitions and enhanced reputations. The range, efficiency and sustainability of professional interventions become broader. The result is a synthesis of competences brought to a single metric, therefore leading to a sustained problem solving strategy, in our case to a more sustained public health.

Potential of crossing boundaries: An alternative to the foundation of new disciplines is to educate scholars and practitioners in such a way that they are enabled to convey their expertise to many disciplinary competences. Therefore, one discipline can be practiced and focused upon, while the same focus is connecting to other disciplines, borrowing the other professional language and terminology to explain problems. This implies the knowledge of various disciplines with their own definitions, tools and methods. Knowing ones own competences and being able to borrow other discipline's methodologies elaborates professions and expands validity.

([65]) Caruso and Rhoten, page 11, 12

([66]) Nicholas, Donald R.; Gobble, David C. "World Views, Systems Theory, and Health Promotion". In *The American Journal of Health Promotion*. September/ October 1991, Volume 6, No. 1. pp. 30-34.

The limitations of canonized knowledge are extended. Yet, by using cross-disciplinary competence properly, respect, reputation, and connection can be gained. Therefore, interdisciplinarity has the potential to educate students to become critical thinkers and independent learners.

Potential of consensus, commitment, and trust: Finally, an underlying strategic research method or mission-oriented research is essential. Particularity and fresh attention is demanded. Knowledge is generated not for the sake of knowledge. Rather, knowledge production is steered by societal stakeholders or the market. Contextual interdisciplinary knowledge is opposed to the research based, uni-disciplinary institutionalized canon of the professions. Further, interdiscipliarity protects against ignoring other disciplines with their competences, and disciplinary ego cultivation, in order to elaborate one's own profession.

Recommendations: To achieve fertile and promising interdisciplinary communication, several schemes are recommended for implementation: the establishment of a discussion platform; thinking about communication strategies; work on organizing overlapping relationships; and agreement upon a concept of leadership. The underlying basis for this endeavor is doubtless the need for an active clarification of the issues, objectives, concepts and methods. This will be explained in the next chapter.

References

Caruso, Denise; Rhoten, Diana. "Lead, Follow, Get out of the Way: Sidestepping the Barriers to Effective Practice of Interdisciplinarity." In: http://www.hybridvigor.net/publications.pl?s=interdis&d=2001.04.30. Accessed on July 09, 2004.

Frodeman, Robert; Mitcham Carl; Sacks, Arthur B. Questioning Interdisciplinarity. In *Science, Technology, and Society Newsletter.* Nos. 126 & 127 (Winter/Spring 2001), pp. 1-5. Also on webpage: http://sciencepolicy.colorado.edu/newdirections/resources/documents/.

Klein, Julie Thompson (Dept. of English, Wayne State University). *Interdisciplinarity: History, Theory, and Practice.* Detroit: Wayne State University Press. 1990.

Klein, Julie Thompson. Crossing *Boundaries: Knowledge, Disciplinarities, and Interdisciplinairities.* 1996.

Lawrence, Roderick J.. Housing and Health: From Interdisciplinary Principles to Professional Practice.

Sperber, Dan. *Why Rethink Interdisciplinarity?* On the homepage about interdisciplines: http://www.dan.sperber.com/interdisciplinarity/papers/1. Last update: 2004. Accessed on July 09, 2004.

Weingart, Peter. "Interdisciplinarity: The Paradoxical Discourse." In P. Weingart and N. Stehr (eds.). *Practicing Interdisciplinarity*. Toronto: University of Toronto Press. 2000.

5. Some Tools to Use in an Interdisciplinary Curriculum

> *"By now you've found colleagues in other fields that you want to work with, and you have managed the financial and administrative paperwork to set up a project together. With those obstacles behind you, it is tempting to think that nothing more can go wrong and to plunge joyfully into doing the work. But there are special challenges to working cooperatively with colleagues from other disciplines. Intentional communication, especially in the beginning of a project, is necessary to avoid confusion, destructive conflict, and disappointments…" ([67])*

As Fran Lightsom, a scientist interested in cross-disciplinary scientific information suspects, it is indeed tempting to assume no disturbances for a constructive experience of working together, just because key partners has been identified and the broader topic framework of the interdisciplinary curriculum is set up. Yet, as described in Chapter Four, getting people interested in a topic is just the start.

As explained in previously, learned mechanisms of professional expertise reveal themselves when the experts are expected to start to work. ([68]) Yet, these methodologies differ in many ways. Working in an interdisciplinary way demands a great deal of attention to both merging of content and many kinds of expertise, and its practice of communicating these various kinds of expertise. This chapter attempts to suggest methods and tools for effective interdisciplinary teamwork, thus forming a base for starting the BSU project. In the first part, a general interdisciplinary communication guideline is presented. It is followed by a list of disciplinary methods and tools of research inquiry, together with listings of disciplinary assessment factors.

It is important to state that this chapter of the report is the result of a mono disciplinary perspective. Therefore, it restricts its data gathering and suggestions for preliminary use within the interdisciplinary curriculum project. This section has the purpose of supporting the initial phase of presenting the exclusively disciplinary perspectives gained from the survey. It also makes the effort of formulating a preliminary guideline and road map. Yet, these insights are not a substitute for the 'health by design' team. Each participant of the interdisciplinary curriculum project team, the initiators as well as the students, needs to communicate directly about their perspectives, engage in discussions and negotiations, and agree upon a final road map with a common purpose of the project. Therefore, although this report will give a basis of data and a guideline, it needs to be evaluated, completed, and assured by participants of the interdisciplinary group. The work is still to come.

5.1. Interdisciplinary Communication Guideline

When teams of experts with diverse academic backgrounds come together, conflicts and misunderstandings are natural. The reason is that

([67]) Lightsom, Fran. „Preliminary Suggestions for Success in Interdisciplinary Teamwork". http://www.mines.edu/newdirections/commons.htm#iddocs. Accessed: June 22, 2004. Last modified on May 24, 2002

([68]) See appendix 7.2-

interdisciplinarity does not mean that a physician works together with a therapist, a nurse, or a psychologist. Rather it includes the idea that a physician works with a humanistic scholar, a financial specialist, and an engineer. This constellation of a team requires the need to overcome many barriers: departmental focus; lack of a common purpose, timeline, deliverables, success and failures; mistrustful communication; protection and hiding of information; and lack if trans-disciplinary evaluation, and publishing of gained insights. Lightsom describes the functionality of a team in the following:

> *"…This is the essence of interdisciplinary research: a group of people with complementary skills, knowledge, and points of view, who are working together because they share commitment to a single purpose. Working together requires commitment to a project timeline and to quality standards for the project's deliverables, which are the research project version of performance goals. To work together, team members need agreement and commitment on their approaches to conducting the research, to communicating with each other, and to managing the project. Finally, without mutual accountability, we would not be 'working with' each other, but only 'working alongside', or 'working for' each other, and the true interdisciplinarity nature of the project would be lost." ([69])*

'Working with' each other instead of 'working alongside' or 'working for' is not easy professionalism. Lighsom, as well as Caruso, Rhoten, and Klein are known for their observations of interdisciplinary practice and developed lists of tips and action plans. On that basis a guideline with six sequential suggestions will be introduced.

Thus, interdisciplinary research is heavier and more complex because of the need for multiple explanations of 'conventional' lingo. Communication will be composed of translations and discussions of conventional work. The investment of more time is an obstacle for funding of such group collaborations. Sometimes the team will not find an answer to a complex problem at the center of a project. Thus, the benefits are obvious: questioning conventional thinking, reevaluating ones own and other's knowledge in the light of an unorthodox perspective, learning new methods, enabling competences in disciplines beyond our own, inviting wider audiences to study results, accelerating intellectual abilities and innovations, on-going collaborations and collegiality. Interdisciplinary practice, in short, can be beneficial. This action plan will lead the interdisciplinary curriculum for the 'health by design' workshop at Ball State University to successful results with rich scholarly findings.

5.1.1. Collaboratively Articulating the Common Purpose and Presenting Perspectives

> *"This identification [of a common topic] occurs in a number of ways, particularly in the recognition of similarities between questions, and the discovery of shared themes, between the disciplines. Overwhelmingly, failure comes from choosing too broad a topic." ([70])*

([69]) Lightsom, Fran.
([70]) Caruso & Rhoten, page 9

Interdisciplinarity emphasizes the goal rather than individual achievement, leaving behind the department's or the individual's focus. Yet, professionals are trained for years and years on disciplinary knowledge, perspectives, articulation, and questions. Therefore, individuals need to present their points of view, priorities, methods, expectations, and terminology on a discussion platform in order to find a common starting point. The team's purpose needs to be understood and to be meaningful to all team members. A shared purpose calls for a serious contribution from each team member and supports an appreciation for the motivations and points of views of the others. If the common mission is clear, a team member will accept extra-departmental perspectives and become less critical of the motives and the work styles, as Lightsom expects. This is the foundation for individual and collective work. The following questions can then be addressed:

1. *Define the common problem and the project collaboratively.*
2. *Present the professional perspective onto the problem and the project.*
3. *Converse about specific examples, special cases, hypothetical outcomes, expectations together.*
4. *Determine goals, objectives, research questions, and variables jointly.*
5. *Envision a spectrum that is neither too narrow nor too broad for the task at hand.*
6. *Identify relevant approaches, tools, and partners together.*

(Lightsom, Klein)

5.1.2. Caution to Language, Definitions, and Terminology

The first phase presents an opportunity to detect the different use of the same words by various professions, though their meanings differ. Understanding these differences preserves the strength of the different approaches, yet requires attention to communication and a project structure. Lightsom suggests leaving professional terminology behind, and using a common language for the forthcoming communication. Similarly, Klein argues for the creation of a 'hybrid interlanguage'. However, Caruso and Rhoten state that a common language is not viable facing the ongoing further development of disciplines and specialization.

> *"The integration and specialization must co-exist… The best practice for researchers who work together on projects is to first invest in a common understanding of disciplinary jargon and methods. Beyond that, or outside of a team environment, researcher must be hyper-vigilant about language, taking extra effort to explain themselves rather than expecting their extra-disciplinary colleagues to translate between the various shorthands of lingo and metaphor, scholarly references and assumptions." ([71])*

The crafting of a common language is not really possible, because the importance and relevance of each discipline remains significant. Rather, the coexistence of specialized terminology and mutually agreed definitions are important, taking extra effort to explain. Taking care of the language by avoiding professional jargon, taking the time to explain important terms, or defining collectively upon important idioms will minimize confusion and misassumptions, and project misevaluations. Being

([71]) Caruso & Rhoten, page 10

sensitive about the language in the early stage is one of the key strategies in interdisciplinary practice.

1. *Listen sensitively to the use of terminology in regards to professional specific terms and definitions.*
2. *Define the most important disciplinary terminologies in order to teach yours and learn other's.*
3. *Agree upon definitions, which should be interdisciplinary understood.*
4. *Spare time to explanations of departmental clear terms, references, and metaphors.*

5.1.3. Agreeing upon the Project Structure, the Schedule and the Outcomes; Also, a Project Manager is needed

In this third part, the team decides about the project structure, underlying guidelines and methods, the time schedule, the interim and end outcomes. From the very beginning, research methods need to be discussed in detail, because all team members do not understand the techniques of each discipline. The group can decide how to incorporate and combine approaches to achieve project goals. Utilizing disciplinary skills in planning the project is important to determine in which way these skills will contribute to the product's result. In order to support and assure the constructive discussion, the group should elect for each phase a different project manager or project chair.

> *"An important consideration is management of perceived differences in status that can impede interdisciplinary teamwork. If project management is reserved to members of a single discipline, potential contributions of other disciplines may not be recognized or volunteered. In addition, interdisciplinary work requires team members to be open to the points of view of other disciplines, which is difficult when members feel a necessity to defend their own way of doing things. One rule of thumb is that all project members should contribute to research and writing as well as to decision-making."([72])*

As a 'horizontal thinker' he or she has significant extra-disciplinary interests and encourages further explanation and translation of jargon, mediates between priorities and status, and reminds the group of its mutual goals and priorities. At the same time, the project chair must 'be ready to admit naivety' and ask for explanation, to test ideas across disciplinary lines, and to involve the group as an intellectual resource in considering them. ([73]) This project chair is also someone who forges trust and equality with the team members by linking disciplines, professionals, and ideas.

Additionally, Caruso and Rhoten give great attention to defining success because these terms are differently perceived within disciplines and interdisciplinary groups.

([72]) Lightsom

([73]) Robert Kahn, The MacArthur Foundation Program in Mental Health and Human Development: An Experiment in Scientific Organization (A MacArthur Foundation Occasional Paper. New York: The John D. and Catherine T. MacArthur Foundation), 20. Quoted by Caruso & Rhoten, page 14. (about network chairs at the MacArthur Research Networks (MRN))

"While disciplines usually require quantitative or measurable results, interdisciplinary success is based upon exploration and curiosity in the service of problem solving or answering questions, which may or may not yield the kind of tangible results we expect from traditional research…The prevailing, disciplinary approach to problem solving is often tightly bounded, simplistic and linear, calling into play what Margaret Somerville and David Rapport call the 'symptom treatment' coupling, which most often fails to address the more fundamental issue of basic causes. Interdisciplinary work by definition encourages more initiative, 'out of the box' thinking ..." ([74])

The success of the project lies here: are the team members able to acknowledge, accept, and apply methods that are not their usual set of tools? How much of their own and how much of the other's professional proceedings can be tolerated, learned, extended, and assessed without minimizing or overrating competences? These are organizational and personal challenges for the individual experts and are basically intrinsic within a discipline but need to be explicit within an interdisciplinary group. Therefore, this part of the collaborative work contributes to clarifying, explaining and understanding differences in expectations, working processes, communication, and measurement tools.

1. *Evaluate and decide the research method in regards to mutual goals:*
   a. *Does the articulated project show recognition of the separate disciplinary contribution?*
   b. *Is the method of data collection likely to be helpful to many disciplines?*
   c. *How to achieve an integrated assessment system? - synthesis of skills*
2. *Label and describe tasks to the different members to solve them individually or collaboratively in regards to method, time, and common goal. Appoint a project manager. .*
3. *Devise a mutual plan that is significant, comprehensive and feasible.*

(Lightsom, Klein)

5.1.4. Establishing Trust and Assuring Communication

"Although trust may seem like an intangible, excessively psychologized goal, it is cited consistently in the literature as a reason that many interdisciplinary projects break down. Researchers must trust that they are respected and considered as equals to these outside their disciplines – and that they are in the presence of equals – in order to feel secure enough to engage with others." ([75])

Beside communication, trust is likewise a principle factor for a flourishing symbiosis. Professionals are known as 'experts', demonstrating outstanding skills in specialized fields. As they are invited to an interdisciplinary group, they meet professionals of other fields who are also experts. It might be difficult for experts to risk going beyond comfortable boundaries, and share control of their research because the other professionals are not experts in the same field. Therefore, skepticism or even disrespect of others' perspectives, methods, and research results may be the consequence. Experts need to accept that professionals from other fields, who do not share the same expertise, are equal. Equality is the prerequisite for trust and fertile communication. Finally, researchers cannot look for similarities or

([74]) Caruso & Rhoten, page 8
([75]) Caruso & Rhoten, page 12

matching patterns between their works and others' unless they are willing to risk their position as 'experts' to actually focus on another discipline's perspective.

Based on trust and equality all team members must be taken seriously. Communication means a two-way dialogue between two contrasting partners, where both contribute and 'work with' each other. Rather than one is understood as superior than the other, the communication should incorporate strengths of both partners by questioning and accepting them equally.

1. *Use role clarification to find out what partners need and expect from each other.*
2. *Re-clarify differences in language, methods, tools, concepts, theories, and worldviews.*
3. *Provide time for mutual learning.*
4. *Insure ongoing communication and exchange, both face-to-face and electronically.*
5. *Use conflicts creatively to refine and advance the work.*
6. *Capture the knowledge produced throughout the work process in tangible forms.*
7. *Communicate with counterpart teams and initiatives at regional, national, and international levels to share ideas, approaches, and results.*

(Klein)

5.1.5. *Creating Synthesis, Interdependence, and Shared Knowledge Production*

As point 5.1.3 noted above, the agreements upon terminology, methods, goals, and objectives, and also further explanations, clarifications, and definitions lead to the discovery of similar working patterns and shared perspectives. This underlies and forces a further process of overcoming competition and boundaries of competences. Differences are reduced, extra-disciplinary knowledge is shared, and new partnerships arise. Individual experts start to need the other partners knowing that alone, no one can solve the mutual goal single handedly. Through trust and the respect for the equal partner symbiosis with others becomes part of the effort to produce the same knowledge.

1. *Provide for sustained interaction and coordinated tasks in structure and work plan.*
2. *Engage in ongoing integration, joint activities, and iteration.*
3. *Strive for interdependence, "teammates", and equal power sharing.*
4. *Be responsible for new knowledge, and take on risks for new extra disciplinary partners.*
5. *Move from a multidisciplinary contracting mode to consulting and partnering modes.*
6. *Reflect explicitly and collectively on interdisciplinary and collaborative components.*

(Lightsom, Klein)

5.1.6. Evaluation and Publishing Insights

The evaluation of the interdisciplinary project should consider not just the comprehensive insights, but also the interdisciplinary collaboration methods, the new partnerships, and the overall successes and failures. When time comes to publish and distribute the results the trust issue my come up again. Because of institutional expectations and restrictions, researches are often required to present their studies within their fields. Interdisciplinary insights and results are not always accepted, as Caruso and Rhoten describe:

> *"Publishing is a particularly intractable barrier for interdisciplinary scholars who are required to publish in order to maintain their professional status and reputation capital… The questions are: Where do researchers using interdisciplinary approaches have to publish to remain employed? And if they publish is a journal outside their home discipline, does that journal carry any reputational weight with their home department?"*

The authors see a definite and understandable fear in maintaining credibility and validity of the each participant's expert status if different methodologies, terminologies, partnerships and unexpected result are part of the research. However, publishing the collaborative work and the interdisciplinary dimension is important not just to strengthen disciplinary reputations but also to build new competences in other fields. Institutions need and will accept this interdisciplinary communication of multi-disciplinary content, because new insights are usually innovative and visionary on complex issues. ([76]) Scholarly publishing in other then the home disciplinary journals rewards the researcher because new competences such as comprehensive terminology, methods, and references can be used for the explanation of the interdisciplinary work in many discipline-specific publications. This is called 'boundary crossing'. ([77]) It is translation of ideas into the lingo of another discipline, according to Dan Sperber and Sydney Pierce. ([78])

1. *Evaluate interdisciplinarity and collaborative aspects.*
2. *Implement new knowledge, models of research and education, and action plans.*
3. *Bridge academic, non-academic, and public discourses.*
4. *Forge integrative partnerships with stakeholders outside the university.*
5. *Articulate findings and recommendations in the public sphere, using all appropriate media from electronic means to informal community-based networks.*
6. *Disseminate findings, recommendations, and results in disciplines, professions, and interdisciplinary fields.*

(Klein)

5.2. Disciplinary Tools and their Potentials for Synthesis

Based on the survey with BSU faculty and off-campus professionals interested in the interdisciplinary curriculum, this section attempts to analyze the potentials of the synthesis of the disciplinary skills, competences and perspectives. What tools and methods are being used? Where are the similarities? And how is it possible to utilize these disciplinary skills?

([76]) Some of innovative and visionary successful projects are the following which were the results of interdisciplinary scholarship and collaboration: the Human Genome Project, climate changes, the invention of the personal computer, the internet, genetic manipulation and production, etc. Adequately, the rise of 'hybrid disciplines' need to be mentioned also communication design, digital architecture, building economics, etc.

([77]) Pierce, Sydney. „Boundary Crossing in Research Literatures as a Means of Interdisciplinary Information Transfer," Journal of the American Society for Information Science. 50, 3 (1999): 271-279

([78]) Sperber, Dan. Why Rethink Interdisciplinarity? On the homepage about interdisciplines: http://www.dan.sperber.com/interdisciplinarity/papers/1. Last update: 2004. Accessed on July 09, 2004.

This section relates to the survey questions 2, 3, 6 and A-G, which are, based on interview and questionnaire results. The experts answered questions about case studies, project assessment tools and factors, and how they would approach a project concerned with alternative futures for Ball Memorial Hospital. These answers provide a basis for communication, because they reflect each discipline's perspective on working methods, priorities, and approaches. Yet, in order to reach a collective, interdisciplinary result, this information needs to be merged into one road map.

5.2.1. Similarities, Patterns, and Potentials

The disciplinary differentiations offer potentials for interdisciplinary work. Each individual representing a discipline brings specific knowledge, thus enlarging the array of methods the project can use. This can increase the value of the results. The following chart represents the experts' answers to the survey's questions. The answers range from what research methods they use for the evaluation of a project, the assessment factors, a listing of case studies, additional important key words, and the sources they refer to. *(Fig. 5.1)*

In regard to the similarities of tools and methods in the research, it was interesting to observe that many professions share the same methods, although most are not aware of it. (Part 7-10/A-G mainly proves the disciplinary differences based on professional traditions; overlapping references were not or were seldom the case) (*Fig. 5.1: 1-6/A-G)*

Believing that a method is 'owned' by only one or two closely related professions, the specialists did not realize that their usual working strategies were often shared. For example, the case study analysis method is broadly used as a tool for many disciplines. Also, cost efficiency studies are usually a device for project management and evaluation used by several disciplines dealing with financial issues.

It is important to emphasize that the use of tools in general does not necessarily insure the best and optimal results. Rather, tools serve as procedural instruments to achieve satisfying minimum results. If one would like to go beyond the mere application of tools and methods, then attention needs to be given to the individual participants and their talents, the configuration of the 'right' mixture of professionals, and their creativity in working together, as described in section 5.1 about 'Interdisciplinary Communication Guidelines'.

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		1	2	3	4	5	6	7	8	9	10
		Scenario-Planning	Case-study technique	Post Occupancy Evaluation (POE) & Performance Measurement	Cost-Effectiveness-, Cost-Efficiency- & Cost Benefit-Studies	Tracking building transformations	Capacity Analysis	Additional Studies / Assessment Tools	Additional Interests / Key Words	Case Studies	Interests in other disciplines
A	Urban Planning	X	X	X	X			**David Kuehl** (community planning)	Quality of communities: health orientated identification; empowering of communities; What is the most desirable place? Environmental racism: noxious facilities, located least powerful Costs: Living costs, costs of becoming ill and staying healthy Measurement of Stress: traffic, polution, noise	Oregon; Madison; Bolder/ CO	political science; trasportation; psychology; sociology; anthroplogy
B	Wellness & Gerentology	X		X	X			**HERO-Studies** (health claims and lifestyle issues) **D. Eddington** (Cost-Benefit- Analysis at work sites)	Quality of communities: health orientated identification; empowering of communities; What is the most desirable place? healthy places': lesser obesity, fewer chronic diseases	Bolder/ CO; Olympos/ Washington; Salem/ Oregon; work sites	anthroplogy; public health; urban planning; design; policies
C	Health Care Delivery Specialist	X	X	X	X			**HCIA** (how hospitals are organized today and to survive into the futures. Evaluations based onclinical & financial focus, not on environmental or social) **JCAHO** (Joint Commission of Accreditation of Healthcare Organizations) **Press Ganey** (display customer satisfaction studies with hospitals) **Arbor** (display customer satisfaction studies with hospitals)		larger hospitals on community level	
D	Architecture	X	X	X	X	X	X	**LEEDS** (Leadership in Environmental Design) **Hechsong Mehome-Studies** (school children's performance and behavior in relation to day light in class rooms; computational fluid dynamic techniques)	Increasing clinical outcomes through stress free environmental design; faster recovery is proofed Formal aspects: light, color, geometries, patterns, stable envirnment in contrast to an unhealthy condition of an individual Extending LEEDS: human comfort, rating energy exchange, visual qualities, indoor air filtration, natural/mechanical ventilation, outgassing of materials and buildings, commissioning a building distance and access to exersice and health care facilities; distance - buildings; community projects	quicker recovery through comfortable and stress free environments; importance of interior: day light, fresh air, color, texture, finishes, noise, out gassing, etc. Swedish, Japanese, Swiss examples of hospitals; INO (Swiss hospital) Alvar Alto's: sanatorium for TB patients retirement facilities; 'doc in the box'	perception of design; interior design; psychology; public health; safety; welfare; adaptability of spaces; physiology; neurology; project management; engineering; product specification; medicine
E	Economics	X	X		X				Cost-Benefit-Anlysis (quantifying benefit and costs; time span of benefits, costs, and building construction; presenting net present values of future benefits based on interest rates)	scientific method: developing hypothesis - testing it using real world data	taxes
F	Nursing	X	X					**Healthy People 2010** (framework for augmenting interdisciplinary collaboration for education and practice) **U.S. Surgeon General Report** (Physical Activity & Overweight)	Evaluation of internal and external environments		wellness; socio economics
G	Landscape Architecture	X	X	X				**Ulrich-Studies** (POE of gardens and outdoor places) **Jo Westphal** (blood pressure & anxiety responses and gardens) **Claire Cooper Marcus & Marni Barnes** (outdoor spaces supporting health)		Central Park, NY, NY The Play Yard, Enid A. Haupt Glass Garden, Enid A. Haupt Alva and Bernard F. Gimbel Garden at the Howard A. Rusk Institute of Rehabilitation Medicine, NY, NY by Martin H. Cohen	natural environments; sciences; design; perception of space; health

Fig. 5.1: Summary of the Survey Results: Listed are the professionals' contribution about used analysis method, assessment resources, important keywords, suggested case studies, and a list of further disciplines the experts feel adjacent to.

5.2.2. Analysis Methods and Tools

The instruments presented will support an efficient exchange and synthesis by linking information rather than protecting information.

Several tools such as scenario planning, case study analysis, post–occupancy evaluation (POE) and performance measurements, transformation tracking, and capacity analysis are introduced briefly. The introduction of these tools will give basic information about the range and the variety of the disciplinary methods. Other tools in support of the planned interdisciplinary curriculum certainly exist.

		1	2	3	4	5	6
		Scenario-Planning	Case-study technique	Post Occupancy Evaluation (POE) & Performance Measurement	Cost-Effectiveness-, Cost-Efficiency- & Cost-Benefit-Studies	Tracking building transformations	Capacity Analysis
A	Urban Planning	x	x	x	x		
B	Wellness & Gerentology	x		x	x		
C	Health Care Delivery Specialist	x	x	x	x		
D	Architecture	x	x	x	x	x	x
E	Economics	x	x		x		
F	Nursing	x	x				
G	Landscape Architecture	x	x	x			

Fig. 5.2: Analysis Methods and their use in various disciplines

Scenario Planning: The survey presents a multi-disciplinary interest in the 'scenario planning method'. 'Scenario planning' is a tool that investigates several possible future scenarios of a project or organization. It is a group process that improves the quality of present decision making through analysis of a variety of project solution strategies, located in the future by encouraging knowledge exchange and development of mutual central issues important to the future of the project. ([79]) As a management method it helps to insure the success of a project, an organization, or a group in the reality of a rapidly changing and uncertain world. ([80]) Another term for 'scenario planning' is also 'futurizing', which means basically the same:

([79])Martin Börjesson

([80]) Wilson, Ian. From Scenario Planning to Action Plan. Published on http://horizon.unc.edu/projects/seminars/futurizing/action.asp, by Martin Börjesson, a scenario planner; a scenario planning resources webpage http://www.well.com/~mb/scenario/. Published on 8/2/2003, update 2004/02/09. Accessed July 2004.

speculating about possible futures, thinking in a particular future scenario, yet deciding upon the present actions.

According to Ian Wilson, 'Scenario Planning' is like saying 'Tell me the future, so I can make decisions'. Yet, the very nature of this method is 'forecasting' multiple futures; the decision lies in the decision-maker.

> *"However good our futures research may be, we shall never be able to escape from the ultimate dilemma that all our knowledge is about the past, and all our decisions are about the future."*

In the management world, this is a widespread dilemma, because a good manager is somebody who can lead an organization into the right future with decisions made today. But the future lies in uncertainty; we can only make assumptions that are the actual basis of present decision making. Therefore, Wilson suggests that defining a 'decision focus' for every scenario-set is more appropriate and is the first step. Here, the priority lies not in the possible influences affecting the project, and exploring areas of risk and opportunity. Rather, scenario planning is a tool that shows implications of a variety of decisions, in which to choose what seems the best for the project from the project group's point of view. Also, scenarios normally deal with strategic longer-term trends and uncertainties with a 5- to 10-year time span, rather than tactical short-term events. However, a narrowed scope of a strategy is better for a scenario construction. In addition, the context for an action needs to be clarified before actions themselves can be implemented. Wilson warns about over-detailing strategies, which generally 'paralyzes action'. Lacking analysis about the probabilities of a scenario, it is easy to choose the most probable one. It needs to be tested against a variety of scenarios, in order to estimate strength and weaknesses. Therefore, he suggests four approaches to link scenarios with strategies:

Sensitivity/Risk Assessment: Here, the need for a decision is already there, yet it needs to be evaluated as to how beneficial and vulnerable this strategy is in different conditions/ scenarios. The benefit/ vulnerability rate within each scenario is estimated. This approach is a very straightforward tool which encourages a 'go/or not go' decision.

Strategy Evaluation: This approach tests an existing decision in order to modify it. The division of an existing strategy into different aspects provides the basis for a rating of addressed or missed opportunities, or foreseen or overlooked risks, successes or failures.

Strategy Development (Using a "planning-focus" scenario): This approach consists of selecting one of the scenarios as a starting point and focus for strategy development and then using the other scenarios to test the strategy's resilience, while assessing the need for modification. The strategy development includes first the review of the scenarios to identify the key opportunities and threats, looking at each scenario in turn and then looking across all scenarios; then, determine what should be done, and what not; third select the most probable "planning focus" scenario; integrate the strategic elements identified in step two into a coherent strategy for the "planning focus" scenario; then, test this strategy against the remaining scenarios to assess its resilience or vulnerability; lastly, review the results

of this test to determine the need for strategy modification.

Strategy Development (without using a "planning -focus" scenario): In this approach, all scenarios are taken into consideration without judging probabilities and then aims for the development of a resilient strategy that can deal with wide variations of conditions. It is the most demanding method by providing the biggest possible variety of choices. The steps are a) first identify the key elements of a successful strategy; b) second, analyze each scenario to determine the optimal setting for each strategy element; c) third, review these scenario-specific settings to determine the most resilient option for each strategy element; and d) fourth, integrate these strategy options into an overall, coordinated strategy.

Case study analysis: The tool of the case study is an almost universal tool. Many different disciplines use case studies in order to clarify and frame problems, issues, methods, or solutions. There is no doubt that the initial assumptions and questions from which the different disciplines approach the topic of health by design are different, as well as the perspectives, priorities, the requirements and the lessons to be learned. However, case studies are applied in similar ways and are one of the best ways to explain issues across disciplinary boundaries.

According to the Harvard Business Studies, case study analysis can examine not just positive and negative precedence, but also best practices. ([81])

The teaching of the case method is divided into several consecutive steps. First, students will be introduced to a particular case in which they place themselves in the role of the decision-maker as they read through the situation. In doing this they identify the problem they are faced with. The next step is to perform the necessary analysis: examining the causes, considering alternative courses of actions. This is important in order to come to a set of recommendations. Students read and reflect on the case, meet in small study groups before class to "warm up", and discuss their findings with other classmates. In class, students probe underlying issues, compare different alternatives, and finally, suggest courses of action in light of the company's objectives.

As you watch a case study unfold in class, students do 85% of the talking, as the professor steers the conversation by making occasional observations and asking questions. Individuals from diverse industries, functions, countries, and experiences enrich this classroom interaction. At the end of the class, students find that the day's lesson lay in the exchange of ideas among their classmates. In many cases, convinced they have the right answers; students are surprised at the variety of points of view that emerge from their classmates during the course of the classroom discussion. Having to listen carefully to others' arguments and define their analysis, students learn from one another. Studying and preparing cases, students recognize the unique aspects of different situations, define problems, suggest further avenues of analysis, and devise and implement action plans.

Practice in case analysis helps to develop disciplined analytical thought processes enabling managers to more successfully tackle issues on both familiar and unfamiliar ground – defining or framing the problem, breaking it down,

([81]) Case-study methods – Harvard Business Studies. ‚Case Method'. Homepage of the MBA-Program at Harvard: http://www.hbs.edu/mba/experience/learn/thelearningmodel/howthecasemethodworks.html

identifying areas of analysis, ordering relevant facts, drawing conclusions, formulating recommendations. ([82])

In the following a guideline for a case-analysis is presented. ([83]) First, briefly define the problem while placing yourself in the role of the decision-maker. That means that you should go through the case quickly, asking yourself, "What broadly is the case about and what types of information am I being given?" Then, draw upon a base of content knowledge (theory) that will provide a useful framework for you to develop a deeper understanding of the problem. That means that you should read the case very carefully underlining what seem to be the key facts as you go. Try to put yourself in the position of the manager/ decision-maker and to develop a sense of involvement in his or her problem. The next step is to apply this framework/ theory to the problem and to ask how this particular use of the theory deviates from the standard use for the theory. Never expect the theory to fit perfectly. Theories are valued for two aspects: first, their ability to explain or predict; and second, their generalize-ability or the breadth of their applicability. That means that you should define what you believe to be the basic issues in the case, and look for material or information relevant to the questions given you with the case assignment.

After that, identify the areas for analyzing these issues and questions. Prepare an outline of your analysis, with headings on separate sheets of paper. Then, apply the theory as modified by step three to the problem. Go back through the case, jotting down on your work sheets the facts that bear on each of your areas of analysis. Next, focus on the project. What data is relevant to your analysis? What does it tell you? Later, study the factual information as you have sorted it out, weighing both the qualitative and quantitative evidence carefully. Thereafter, formulate a set of recommendations directed at the issues you've identified. Expand on your implementation plan, including a consideration of the metrics or other tools you would use to measure the success of your course of action. Finally, present your results and compare them with the different teams to discuss various solutions. You have the opportunity to see what others see that you did not and you have the opportunity to subject your thought processes to critical reflection in a supportive environment.

Developing a catalogue of case studies concerned with the issues of healthy environments is needed since few are explicitly conducted. According to Norene Pumphrey, Vice President at CHS, case studies are available though always restricted for certain details; examples of healthy environments of entire communities or urban agglomerations are hard to find. Based on the survey a list of several cases worth study is listed in Fig. 5.3. It is extendable yet forms a basis for a case study catalogue for 'health by design' projects. ([84]) Yet, every discipline conducts analysis differently, so a variety of exemplary studies is needed. Therefore,

([82]) Adapted from The Use of Cases in Management Education, (c) 1976 by The President and Fellows of Harvard College.(out of the document on http://itech.fgcu.edu/faculty/bhobbs/ecp6705_Case_Analysis_Guidelines.htm)

([83]) Adapted from The Use of Cases in Management Education, (c) 1976 by The President and Fellows of Harvard College.

([84]) Other case studies in regards to health care facilities are Swedish Medical Center, Seattle, Washington; Pomona Valley Hospital Medical Center, Pomona, California

recommended approach is offered to form a case study list and apply it in an interdisciplinary group. First, specify the focus: which aspect of an issue needs to be analyzed. Then, specify a range of case studies from every discipline (let's limit to 10 case studies). Third, every one of these case studies needs to be analyzed by each discipline and on the basis of each discipline's expertise. Continue with the creation of a rating system. Finally, the interdisciplinary group chooses the best case study examples.

	9	9a	9b	9c
	Scales of casestudies	**Scales community scale**	**site & building scale**	**near environment scale**
A	**Urban Planning**	Oregon		
B	**Wellness & Gerentology**	HERO-Studies Bolder/ Colorado Salem/ Oregon		Cost efficiency studies at the work place
C	**Health Care Delivery Specialist**	hospitals	hospitals	benchmark emergency rooms in emergency departments
D	**Architecture**	Celebration in Florida BSA-project in Northern Indiana	Alvar Aalto, TB-Sanitorium IMO – hospital, Switzerland Hospital, Eric Asmussen, Sweden. Suzanne Siepel Coates at Kansas State University	Hechsong Mahome study Studies about the effects of design on people & how people interpret design. AIA – Studies about the effects of design on people & how people interpret design Documented studies about the effects of day lighting, color, fresh air, materials, overall environment, including family, not including family, noise, etc. on people.
E	**Economics**	Cost efficiency studies	Cost efficiency studies	
F	**Nursing**	Healthy People 2010		
G	**Landscape Architecture**	Central Park, NY, NY The Play Yard, Enid A. Haupt Glass Garden Enid A. Haupt Perennial Garden	The Play Yard, Enid A. Haupt Glass Garden Alva and Bernard F. Gimbel Garden at the Howard A. Rusk Institute of Rehabilitation	

Fig. 5.3: Case study List

Post-occupancy analysis & 'building in use'-studies: The method of post–occupancy evaluation, "POE" for short, is a tool, which provides a basis for various professions, especially urban planning, wellness, architecture and landscape architecture.

This method concerns the evaluation of a certain physical setting, which can be a neighborhood, a building, a garden, a working place, a physical entity in general, etc. In case of a building it can be part of the building evaluation process following the planning, programming, design, construction and the occupancy of the building. The interest of evaluating the building's impact on its occupants can focus on issues related to health, safety, security, and psychological effects that can be described on measurable performance criteria.

When psychological and sociological considerations were linked with design, the field of environment and human behavior was created. This focus on the possible relationships between human behavior and building design opened new fields that are now termed "environmental design research". Also, cross-disciplinary associations found fertile ground in this field. Wolfgang Preiser offered a definition of post-occupancy evaluation in regard to buildings.

> *"Post-occupancy evaluation is the process of evaluating buildings in a systematic and rigorous manner after they have been built and occupied for some time. POE's focus on building occupants and their needs, and thus they provide insights into the consequences of past design decisions and the resulting building performance. This knowledge forms a sound basis for creating buildings in the future." ([85])*

While POE is thus defined, ([86]) there is some controversy about the appropriate terminology. While POE focuses primarily on the performance of buildings, building performance evaluation (BPE) and universal design evaluation (UDE) emphasize a holistic, process-oriented approach to evaluation. This means that not only facilities, but also the forces that shape them (political, economic, social, etc.), are taken into account. ([87])

POE is a method that measures specific aspects of an existing building. However, a building as a physical configuration has its constructive, performative, aesthetic, social, psychological, etc. characteristics, which need to be understood and analyzed differently. Vischer explains that:

> *"… [T]here are differences between the quantitative and qualitative aspects of building performance and the respective performance measures. Many aspects of building performance are in fact quantifiable, such as lighting, acoustics, temperature and humidity, durability of materials, amount and distribution of space, and so on. Qualitative aspects of building performance pertain to the ambiance of a space (i.e., the appeal to the sensory modes of touching, hearing, smelling, and kinaesthetic and visual perception, including colour). Furthermore, the evaluation of qualitative aspects of building performance, such as aesthetic beauty or visual compatibility with a building's surroundings, is somewhat more difficult and subjective and less reliable. In other cases, the expert evaluator will pass judgment." ([88])*

Despite these difficulties, Vischer and others believe that it is possible to develop ranges and spectrums of comfort, aesthetic balances offering various experiences and changing spatial perceptions, in order to fulfill a different kind of satisfaction, acknowledging multiplicity, diversity, and variety.

The POE process has many goals. It can provide feedback to the evaluated building managers for purposes of immediate problem solving; it is helpful in troubleshooting during the shakedown period that occurs after the move-in, thereby correcting unforeseen problems in building use. Balancing and fine-tuning of the building and its use through continuous feedback can be accomplished. The documentation of successes and failures in building performance, thus justifying new construction or re-modeling of existing buildings, gives meaningful feedback on

([85]) Wolfgang F. E. Preiser, Harvey Z. Rabinowitz, Edward T. White. Post-Occupancy Evaluation. New York: 1988. p.3

([86]) Wolfgang F. E. Preiser, Harvey Z. Rabinowitz, Edward T. White. Post-Occupancy Evaluation. New York: 1988.

([87]) Jacqueline Vischer. Building in Use. Montreal: xyz. (Analysis of the design of work spaces) Jacqueline Vischer, as an environmental psychologist and professor of interior design, developed a building-in-use assessment system for office buildings. Learning from Our Buildings: A State-of-the-Practice Summary of Post-Occupancy Evaluation (2002)

([88]) Jacqueline Vischer. Learning from Our Buildings: A State-of-the-Practice Summary of Post-Occupancy Evaluation. Washington: 2002. (p.10)

planning experiences and will give hints in how to avoid weak concepts or in how to strengthen potential approaches. These documentations can be also publicized. This generalization of POE information is useful information for practice that updates and improves state-of-art design criteria and guideline literature for the architectural profession.

Post–occupancy evaluations can impact many professions related to the built environment. In regards to a POE study on indoor air quality, not only the architect who but also the building physics specialist, day light planner, interior designer, space psychologist, etc. can use the POE information in order to renew and correct standards and requirements. Also, correcting planning methods, learning from mistakes, but also considering recent achievements or changes of investment plans are possible application opportunities for this tool. POE seeks for facts of a physical object, not to prove its failures in planning and design, but to demonstrate and confirm the complexity of reality that is difficult to plan, and which therefore needs evaluations and explorations in order to upgrade well-established knowledge.

POE evaluation criteria come from expectations that are based on previous experiences. These criteria are often based on professional expertise and evolve over time, yet can be extended according to the specific task, recent insights to new achievements and technical advancements. The goal is to compare these requirements with the factual situation of the object.

> *"The goal of the manufacturer or designer is to create products with desirable features, to provide good value, and to minimize problems and failures… POE's are intended to compare systematically and rigorously the actual performance of a building with explicitly stated performance criteria; the difference between the two constitutes the evaluation." ([89])*

A set of requirements need to be stated which then will be measured, examined, and observed in the actual situation. The results are either in a certain tolerance range and are therefore acceptable, are better than what was expected or can be even less than what was required. All information gathered and generated will enable further recommendations and standards for the next steps within the same building, for other existing buildings or for future projects.

In either case, the POE tool offers benefits within various time frames: it has benefits over the short, medium, and the long term. The short-term benefits are those that result from the immediate use of POE findings; identification of building successes and failures, and recommendations that focus on correcting problems during project implementation. The medium term benefits are those that relate to major decisions about existing building construction. These recommendations help to make decisions about adaptive use, remodeling, and major new construction. Also, they can help to solve problems with existing building stock (e.g. recycling old buildings into new apartments, installing new telecommunication wiring, or building additions to accommodate organizations' changing space needs).

The long-term benefits result when lessons learned from the failures and successes of building performance are applied to future buildings. These have

([89]) Preiser, p.4

further impact on the building industry as a whole. The long-term benefits can relate to a specific building use such as hotels, schools, or hospitals. In addition, their application underlines the quality assurance of a product: it requires standards for quality and performance, action taken on problems identified by these indicators, requiring accurate recordkeeping. Long-term benefits are especially important in the medical fields that have a constantly changing standardization for their services and the connected technical equipment. ([90])

Preiser identifies three elements of building performance: the technical elements of building occupancy (health, safety, and security); the functional elements (occupants' ability to operate efficiently and effectively); and behavioral elements (psychological and social aspects of user satisfaction and general well-being). ([91])

In addition, the performance evaluation of a building is also divided into three categories: the measurement technology, the databases, and the performance criteria. ([92]) The measurement technology gathers data that will be further used throughout the POE process. It includes interviews, questionnaire surveys, observations, recordings, readings, video, mapping, photography, and measurements. The data basis collects and shares the gathered results and information. The performance criteria establish guidelines and regulations for a specific building type, using the interpretations and results of gathered databases information. In regard to the question of how to conduct a POE, there are various steps to consider. Vischer suggests the development of a simple, reliable and standardized way of collecting useful feedback from occupants on a few, carefully selected and identified indicators of environmental quality. Therefore, first, identify mission and objective. Second, identify potential links to the physical environment. Third, identify specific measures for each objective. Forth, conduct evaluation pre and post. Fifth, interpret results, and lastly, identify lessons learned. ([93])

Tracking Physical Transformations of Medical Facilities: In the field of architecture, professionals recognize that large, multi-functional medical facilities are under almost constant physical change. Evidence of this is pervasive and anecdotal, yet is poorly documented. These changes are made in response to external forces in the medical care industry, including but not limited to changing demographics, insurance policies, regulations and medical practices, new technologies, staffing changes at all levels, and in response to competition. These changes in the "environment" of health care are complex and their causes are not easy to discern. The cooresponding changes in the physical environment of health care are also complex and difficult to track, and involve space organization and departmental boundaries, technical systems, security, privacy, sterile environments, and a host of less measurable but nonetheless important issues such as the potential curative and well-being effects of physical settings on patients and staff. In this context, a number of research questions can be raised: How can we track or document such physical

([90]) Preiser
([91]) Preiser, pp.17
([92]) Preiser, pp.47
([93]) Appendix B: A Balanced Scorecard Approach to Post-Occupancy Evaluation: Using the Tools of Business to Evaluate Facilities (pp. 79-87)

changes as they occur over time? How can we document which physical parts remain "fixed" while other parts "change"? If we can document such "stable" and "variable" conditions, can we then draw lessons and develop design constraints from such tracking to, a) help us "set-up" existing buildings for future change and 2) help make new buildings more accommodating to the inevitable changes and thus avoid the problems that often arise when such physical changes must be made today?

Capacity analysis: This tool supports analysis of a proposed project's constraints in respect to offering space for variable uses over time. In medical architecture, capacity analysis concerns the evaluation of design constraints when conditions of future use are known to be dynamic and decisions about these uses are distributed. Designing is, in large measure, the exploration of constraints. Constraints are of several kinds: a) those we are not free to change because they are part of the natural order such as gravity, thermodynamics, fluid flows, and so on; b) those constraints that are socially constructed such as standards and regulations; and c) those constraints we design to guide our work as professionals of a certain kind.

This research orientation focuses on the development of "design constraints" for architects and consulting engineers involved in medical architecture. Constraints are similar to "game rules" in board games. In architecture or engineering, the constraints we refer to are concerned with such things as "position rules", or "dimensional rules". We suggest that the development of such rules of the game – not standards – can be useful in making provisions for what cannot be foreseen. Design methods are needed in respect to the reality of facilities under almost constant "churn" and when responsibility for the work is widely distributed.

5.2.3. Disciplinary Factors for Project Assessment

The survey's third question offered insights about the experts' views on assessing the performance of health supportive environments. ([94]) It is important to gather basic principles embedded within each department. This is important in understanding and appreciating a discipline's focus, competence and experience.

In the following charts, several disciplinary principles are represented as a means of articulating what a given profession will look for when obligated to analyze a project. Such professional assessments are made for the following disciplines: Urban Planning, encompassing many aspects of distributing land uses, ordering infrastructure, and regulating the designed environment; (Fig. 5.5.), ([95]) Health Promotion, searching and mobilizing active partners within the political, community, and corporate arenas of responsibility, and the individual behavior research arena in order to insure the well being of the public; (Fig. 5.6), ([96]) Health Care Delivery,

([94]) See Appendix 7.2.

([95]) DUMAS (Developing Urban Management and Safety). *How to Develop Urban Management and Safety?.* December 1999. Accessible on: http://www.trl.co.uk/dumas/wp8.pdf : Accessed on Sept 09, 2004.

([96])Southeastern Ontario District Council Health; Reports; 2001 Reports. *Healthy Populations and Sustainable Communities*. April 2001. Accessible on:

focuses on the application of health care delivery models in terms of their organizations; (Fig. 5.7), ([97]) Architecture, focusing on the built environment and constructive, communal, social environmental effects, ranging in scales from the interior design, building and neighbourhood design; (Fig. 5.8, 5.9, 5.10), ([98]) and Landscape Architecture; ([99]) dealing with the physical design of not just outdoor but also indoor spaces with stress on the human relation to the natural environment *(Fig 5.11)*.

These principles are not necessarily limited to one professional view (*Fig. 5.8, 5.9)*. ([100]I[101]) Certain interests might overlap with another discipline's interests. Yet, it needs to be clear that it is often the case that similar interests are likely to be based on different understandings. Also, these listings are preliminary proposals; therefore professional contributions must extend, change or adjust this draft.

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http://www.seodhc.org/reports/15_HealthyPopulationsandSustainableCommunities_Document.pdf. Last update: 2004. Accessed on Sept 09, 2004.

See also: Gruskin, Sofia; Tarantola, Daniel. "*Health and Human Rights". New York: Routlegde.* 1999. Accessible on: http://www.oup.co.uk/pdf/0-19-263041-5_04-1.pdf. Accessed on Sept 09, 2004.

([97]) Health Care Specialists: Joint Commission on Accreditation of Healthcare Organizations. Accessible on: www.jcaho.org.

([98]) US Green Building Council. LEED-certification checklist, version 2.1. Accessible on: https://www.usgbc.org/Docs/LEEDdocs/LEED-NC_checklist-v2.1.xls. Accessed on Sept 09, 2004. Last update: 2003.

([99]) Marcus, Clare Cooper. "Gardens and Health". Accessible on http://www.designandhealth.com/edu_res/Gary%20J.%20Coates%20p239.pdf. Accessed on Sept 09, 2004.

([100]) Jonassen, Jim O.; Klemenic, Ron; Leinenwever, Mark. "Health Facility Flexibility and Humanity - An Agenda for the 21.th century". Accessible on: http://www.designandhealth.com/edu_res/Jim%20O.%20Jonassen%20p257.pdf. Accessed on Sept 09, 2004.

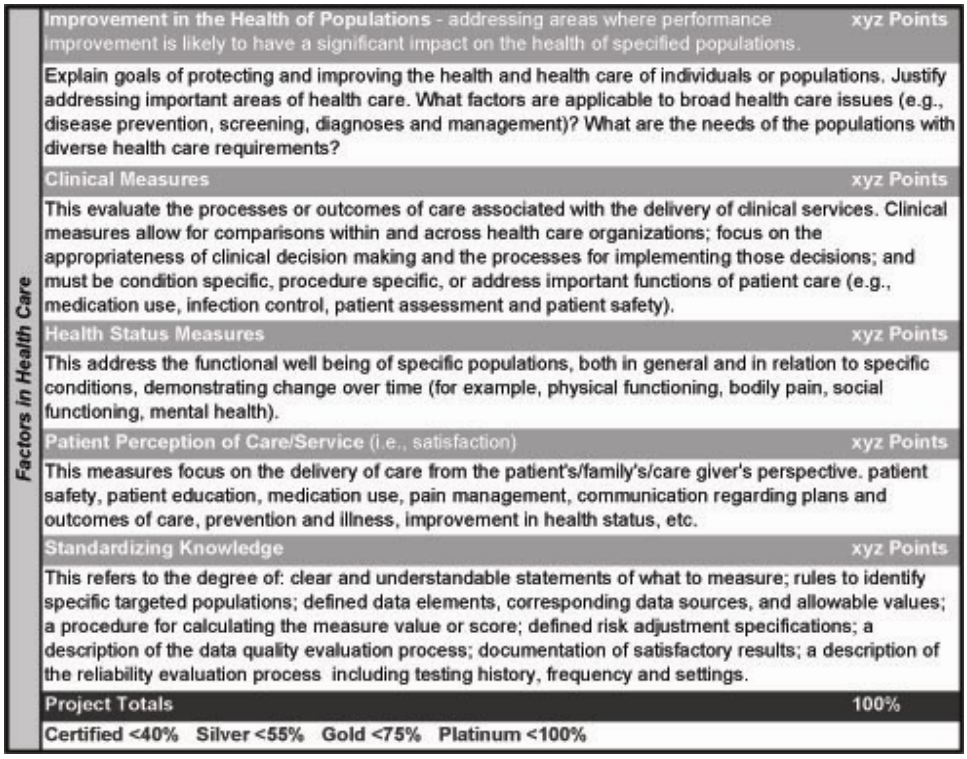
([101]) Coates; Gary J.. *The seven principles of Life-enhancing Design: The architecture of Erik Asmussen*. Accessible on http://www.designandhealth.com/edu_res/Gary%20J.%20Coates%20p239.pdf. Accessed on Accessed on Sept 09, 2004.

Proposed Aspects of Urban Planning Assessments	
Land Use	xyz Points
Housing provision (affordable & adequate housing), Production Areas, Industrial Areas, Service Areas, Education Areas, Work Places, Natural Areas, Recreational Areas, Transportation Areas, Distribution of Commercial Space etc.	
Economics	xyz Points
Employment, Sustainable & Viable Economics, Household Income, Employment, Housing Costs	
Infrastructure	xyz Points
Energy Use, Transportation Network, Mobility, Accessibility & Proximity (to water food, health, rights, etc.; also to public and private services/ facilities/ amenities), Commuting Times	
Environmental Management	xyz Points
Natural Environment, Greenspace Availability, Healthy Environment, Waste Management, Pollution	
Policy	xyz Points
Local Government, Global Government, Global Relationships (social, economical, political, etc.), Political and Global Equality, Public Sevices (health, social welfare, education and recreation)	
Population & Culture	xyz Points
Health, Political and Social Involvement, Birth & Mortality, Behaviour, Crime, Social Equity, Community Life, Civic Communities, Social Welfare and Well-Being, Conservation	
Information	xyz Points
Access, Availabilty, Neutrality, Equality, Education, Distribution	
Socio-Economic Development	xyz Points
Education, Advancement (technological, economical, social, environmental, etc.), Advantages, Opportunities, Aesthetics	
Urban Malfunctions	
Pollution (air, noise, water, land), Congestion (Migration into Cities, Traffic, Excessive Use, etc.), Vacancy (Urban Sprawl, Isolation, Segregation, etc.), Excessive Use of Energy, Decline of Public Transportation, Exclusion amd Discrimination, Unsafety, Poverty, Inflation, Stress, etc.	
Project Totals	from 100%
Certified <40% **Silver** <55% **Gold** <75% **Platinum** <100%	

Fig. 5.5: Proposed Aspects of Urban Planning Assessment.

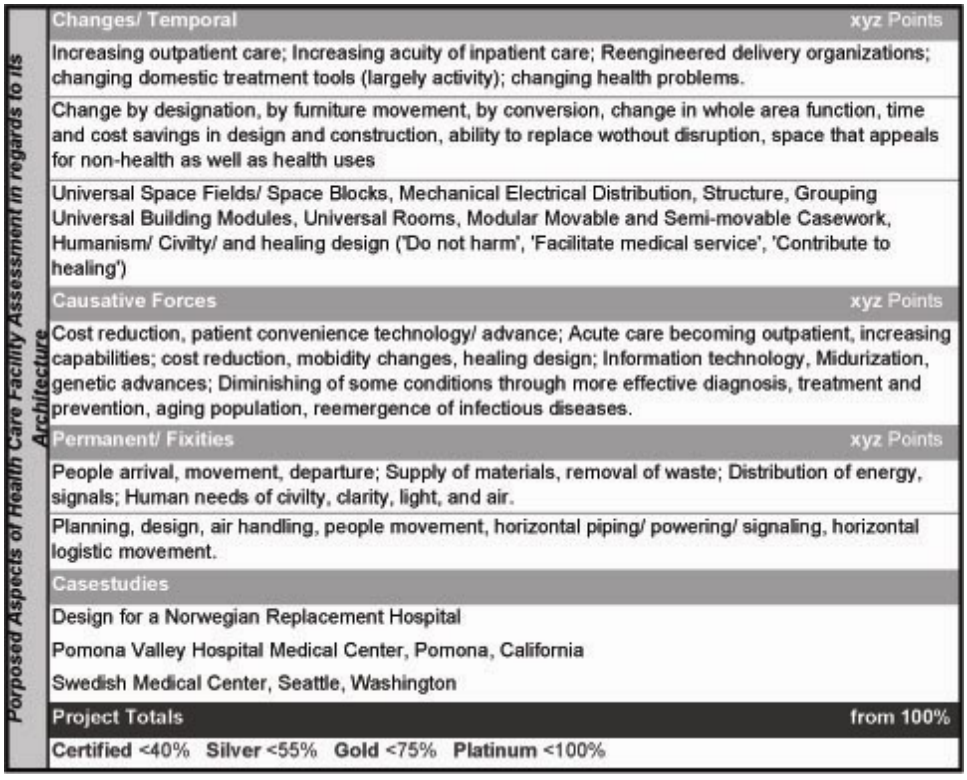
Proposed Aspcts of Health Promotion & Health Enhancement Assessments	
Disease Prevention Research	xyz Points
Education, Screening, Establishing Health Supportive Environments, Consulting	
Behavioural Change Programs	xyz Points
Smoking Cessation, Weight Control, Fitness, Physical Activity	
Occupational Health	xyz Points
Corporate Working Place Improvement, Communication between Departments, Human Resource Consulting: Health Care & Retirement, Promoting Optimal Health and Well-being of Employees and their Extendet Family, Increasing Health Care Benefits, Tight Labor Market, Aging Work Force, Working Place Psychology - Mobbing, Productivity Rates, Social Interactions at the Working Place, Household Services (Care-taking, transportation)	
Public Health	xyz Points
Personal and Family Health, Communal Health, Cultural and Social Value System, Prevention & Education (Alcohol, Drugs, Smoking, etc.)	
Policy	xyz Points
Organizational Development, Public Policy, Health Care Policy, Corporate Policies	
Medicine	xyz Points
Preventive Health Enhancement Strategies (Fitness, Herbal Medicine, Therapy, Massage,	
Psychology	xyz Points
Anthropology, Social Sciences, Psychological Background Information about Behaviour Studies,	
Disease Prevention Research	xyz Points
Education, Screening, Establishing Health Supportive Environments, Consulting, Productivity	
Quality of Life Indicators	xyz Points
Health, Life Style, Income, Mortality, Recreation, Social Interactions, Political Awareness, Mobility, Choosing between Opportunities, Equality	
Disease Indicators	xyz Points
Obesity, Hypertension, Heart Disease, Stress, Mortality Rates, Chronic Pain, Depression	
Project Totals	100%
Certified <40% Silver <55% Gold <75% Platinum <100%	

Fig. 5.6: Aspects within Health Promotion.



Factors in Health Care	
Improvement in the Health of Populations - addressing areas where performance improvement is likely to have a significant impact on the health of specified populations.	xyz Points
Explain goals of protecting and improving the health and health care of individuals or populations. Justify addressing important areas of health care. What factors are applicable to broad health care issues (e.g., disease prevention, screening, diagnoses and management)? What are the needs of the populations with diverse health care requirements?	
Clinical Measures	xyz Points
This evaluate the processes or outcomes of care associated with the delivery of clinical services. Clinical measures allow for comparisons within and across health care organizations; focus on the appropriateness of clinical decision making and the processes for implementing those decisions; and must be condition specific, procedure specific, or address important functions of patient care (e.g., medication use, infection control, patient assessment and patient safety).	
Health Status Measures	xyz Points
This address the functional well being of specific populations, both in general and in relation to specific conditions, demonstrating change over time (for example, physical functioning, bodily pain, social functioning, mental health).	
Patient Perception of Care/Service (i.e., satisfaction)	xyz Points
This measures focus on the delivery of care from the patient's/family's/care giver's perspective. patient safety, patient education, medication use, pain management, communication regarding plans and outcomes of care, prevention and illness, improvement in health status, etc.	
Standardizing Knowledge	xyz Points
This refers to the degree of: clear and understandable statements of what to measure; rules to identify specific targeted populations; defined data elements, corresponding data sources, and allowable values; a procedure for calculating the measure value or score; defined risk adjustment specifications; a description of the data quality evaluation process; documentation of satisfactory results; a description of the reliability evaluation process including testing history, frequency and settings.	
Project Totals	100%
Certified <40% Silver <55% Gold <75% Platinum <100%	

Fig. 5.7: Aspects within Health Care Delivery



Porposed Aspects of Health Care Facility Assessment in regards to its Architecture	
Changes/ Temporal	xyz Points
Increasing outpatient care; Increasing acuity of inpatient care; Reengineered delivery organizations; changing domestic treatment tools (largely activity); changing health problems.	
Change by designation, by furniture movement, by conversion, change in whole area function, time and cost savings in design and construction, ability to replace wothout disruption, space that appeals for non-health as well as health uses	
Universal Space Fields/ Space Blocks, Mechanical Electrical Distribution, Structure, Grouping Universal Building Modules, Universal Rooms, Modular Movable and Semi-movable Casework, Humanism/ Civilty/ and healing design ('Do not harm', 'Facilitate medical service', 'Contribute to healing')	
Causative Forces	xyz Points
Cost reduction, patient convenience technology/ advance; Acute care becoming outpatient, increasing capabilities; cost reduction, mobidity changes, healing design; Information technology, Midurization, genetic advances; Diminishing of some conditions through more effective diagnosis, treatment and prevention, aging population, reemergence of infectious diseases.	
Permanent/ Fixities	xyz Points
People arrival, movement, departure; Supply of materials, removal of waste; Distribution of energy, signals; Human needs of civilty, clarity, light, and air.	
Planning, design, air handling, people movement, horizontal piping/ powering/ signaling, horizontal logistic movement.	
Casestudies	
Design for a Norwegian Replacement Hospital	
Pomona Valley Hospital Medical Center, Pomona, California	
Swedish Medical Center, Seattle, Washington	
Project Totals	from 100%
Certified <40% **Silver** <55% **Gold** <75% **Platinum** <100%	

Fig. 5.8: Aspects within Health Care Facilities in regards to flexibility and humanity.

Proposed Aspects within Environmental Design Assessments - LEEDS - Leadership in Environmental Design, Checklist 2.1	
Sustainable Sites	**14 Points**
Erosion & Sediment Control, Site Selection, Urban/ Brownfield Redevelopment, Alternative Transportation (Public Transportation, Bicycle Storage, Alternative Fuel Vehicles, Parking), Site Disturbance (Open Spaces, Footprint), Stormwater Management (Quantity, Treatment), Landscape & Exterios Design to reduce Heat Islands (Roof, Non-Roof), Light Pollution Reduction	
Water Efficiency	**5 Points**
Water Efficient Landscaping, Innovative Wastewater Technologies, Water Use Reduction	
Energy & Atmosphere	**17 Points**
Fundamental Building Systems Commissioning, Minimum Energy Performance, CFC Reduction in HVAC&R Equipment, Optimize Energy Performance, Renewable Energy, Additional Commissioning, Ozone Depletion, Measurement & Verification, Green Power	
Materials & Resources	**13 Points**
Storage & Collection of Recyclables, Building Reuse, Construction Waste Management, Resource Reuse, Recycled Content, Local/ Regional Materials, Paridly Renewable Materials, Certified Wood	
Indoor Environmental Quality	**15 Points**
Min IAQ Performance, Environmental Tobacco Smoke (ETS) Control, Carbon Dioxide (CO2) Monitoring, Ventilation Effectiveness, Construction IAQ Management Plan (During Construction, Before Occupancy), Low Emitting Materials (Adhesives & Sealants, Paints, Carpet, Composite Wood & Agrifier), Indoor Chemical Pollutant Source Control, Controllability of Systems (Perimeter), Thermal Comfort, Daylight & Views	
Innovation & Design Process	**5 Points**
Innovation in Design, Leed Accredited Professional	
Project Totals (pre-certification estimates)	**69 Points**
Certified 26-32 points Silver 33-38 points Gold 39-51 points Platinum 52-69 points	
Certified <40% Silver <55% Gold <75% Platinum <100%	

Fig. 5.9: Aspects within Architecture in regards to sustainable architecture based on the LEED certification criterion.

Proposed Aspects of a Built Environment Assessment based on the Architecture of Erik Asmussen	
The Unity of Form and Function	**xyz Points**
Intergration of Form and Function: extensive involvement with user client groups, designing with physical models, shaping the building while expressing ist inner spirit and supporting the activities accuring in it. Contextual understanding of objects in space (stairs, culums, furniture, door handles,...)	
Polarity Metamorphosis	**xyz Points**
Polarity means more than duality, conflict, or opposition. Rather, it means: contrasts of color, form, and material occur at all scales, creating a richly textures and densely layered fabric of linked opposites.	
Metamorphosis: Goethe, Steiner ans Asmussen saw the nature in the process of constantly forming and transforming itself through the interplay of archetypical polarities of darkness ans light, contraction ans expansion. Fradual stepwise progression of changing forms. Developmental metamorphosis forms are different in shape but similar in kind, wherease polar metamorphosis forms and qualities are fundamentally ifferent.	
Metamorphosis of froms, surfaces and spaces to dreate invisible patterns of relationship that gives unity to buildings/ building parts that appear at first glance to be seperate and unrelated.	
Harmony with Nature and Site	**xyz Points**
1. Each building is placed and shaped so that it creates a positive and useable outdoor space in relationship to naturally occuring rocks and trees.	
2. Reflection of specific qualities of the environments.	
The Living Wall	**xyz Points**
Plastically continuous walls as a living membranes that reveals the play between up and down, inside and outside. Engaged into a diologue between expansion/ contraction, concavity/ convexity.	
Color Luminosity and Color Perspective	**xyz Points**
Light-filled, transparent color (natural pigments): lazure method which creates depth and quality of the color, revealing the texture of the material. Creating variable densities and hues, pnentrating and reflecting color layers, creation of a luminous veil of color (in contrast: opaque colors). If one moves through the space, the colors seem to move and flow, advance and recede. Warm and cool colors, differeing densities, depths, and hues; color climates. Color perpective rather than linear perspective. Spiritual effects of color on the body, soul and spirit. " Each building is like a living being; each room or space is like an organ that should have its own appropriate atmosphere ans 'color temperature'. Active spaces in warm colors, passice spaces more in cool tones. " Warm and coll illnesses". "objective reality & moral force of color" (Steiner & Goethe).	
The Dynamic Equilibrium of Spatial Experience	**xyz Points**
Using contrasts between in/ out, up/ down, front/ back, near/ far. Publi/ private, sitting/ standing, constancy/ change, symmetry/ assymetry (sameness/ difference, order-expectation/ direction-movement-surprise), sheltered intimany/ expansive opnness. Delicate and shifting balance through the alternating experiences of movement ans reast.	
Project Totals (pre-certification estimates)	**from 100%**
Certified <40% Silver <55% Gold <75% Platinum <100%	

Fig. 5.10: Aspects within Architecture in regards to healthy environments architecture based on the architecture of Swedish architect Eric Asmussen.

Proposed Aspcts of Landscape Architecture Assessments	
Opportunities to make choices, seek privacy and experience a sense of control	xyz Points
Opportunities which encourages people to gather and experience social support	xyz Points
Opportunities for physical moment and exercise	xyz Points
Engagement with nature	xyz Points
Visibility	xyz Points
Accessibility	xyz Points
Sense of Security	xyz Points
Physiological Comfort	xyz Points
Quiteness	xyz Points
Familiarity	xyz Points
Unambiguously positive design features	xyz Points
Design Themes in existing healing gardens: Building-enclosed courtyard, Cloister Garden, English Strolling Garden, The Urban Park, The (botanic) Glasshouse), The Palaza, The front porch/ garden & back garden.	xyz Points
Themes: Regional attributes, ecological, botanical, progession of disease/ stages in psychological healing	xyz Points
Project Totals	**100%**
Certified <40% Silver <55% Gold <75% Platinum <100%	

Fig. 5.11: Aspects within Landscape Architecture in regards to healthy gardens.

5.3. The Practice of Interdisciplinary Work

The practice of interdisciplinary studies and work has two aspects that are essential for the success of this collaborative endeavour. One aspect is the synthesis of disciplinary expertise and knowledge, producing new knowledge. The other aspect focuses on the quality of communication, exchange, and merger of the several kinds of expertise.

This chapter has attempted to propose ways to foster communication - the latter aspect of the interdisciplinary work. The communication guidelines as described in 5.1 give hints and suggestions regarding communication in a colloquium of diverse participants; part 5.2 offered disciplinary skills for subsequent cross-disciplinary use.

Although second in the description, accumulating professional knowledge is the starting point. Presenting perspectives and a variety of approaches enables team members to generate a common method for grappling with the ‘Health by Design’ project. It is essential to remember how to convey ideas when working together with people from diverse professional backgrounds.

And here lies the opportunity: interdisciplinary teamwork takes each individual’s capacities as the starting point, synthesizes them in ways that cannot be predicted, and produces alternative approaches to a given problem.

References to Interdisciplinary Communication Strategies:

Caruso, Denise; Rhoten, Diana. "Lead, Follow, Get out of the Way: Sidestepping the Barriers to Effective Practice of Interdisciplinarity." In: http://www.hybridvigor.net/publications.pl?s=interdis&d=2001.04.30. Accessed on July 09, 2004.

Klein, J.T. (2003). Bridging Research and Social Interest: The Challenges of Evaluation in Transdisciplinary Projects and Public Policy. *Unpublished text of Inaugural Address for UNESCO Summer School on Transdisciplinarity and Local Development and Governance. Punta del Este, Uruguay. 28 October..* http://www.claeh.org.uy/archivos/Most_Klein.pdf

Klein, J.T. (2003). Checklist for Evaluating Transdisciplinary Projects. *"Thinking about Interdisciplinarity," Colorado School of Mines Quarterly, 103, No 1: 101-114.*

References to Strategy planning:

Brand, Steward. How Buildings Learn. UK: Viking Penguin Books. 1994.

References to POE:

Preiser, W.F.E. Hospitals Activation: Towards a process model. 1997

Robert Sommer; The Fourth Dimension in Architecture: The impact of Building on Man's Behaviours. (1975)

Christopher Alexander, A Language Pattern. 1977

Baird, G., et al. (Eds.) (1996). *Building Evaluation Techniques*. London: McGraw-Hill.

Nasar, J.L. (Ed.) (1988). *Environmental Aesthetics: Theory, Methods and Applications*. Cambridge, Mass.: MIT Press.

Preiser, W.F.E. (1983). The habitability framework: A conceptual approach toward linking human behavior and physical environment. *Design Studies* 4 (No. 2)

Preiser, W.F.E. Rabinowitz, H.Z., and White, E.T. (1988). *Post-Occupancy Evaluation*. New York: Van Nostrand Reinhold.

Preiser, W.F.E. (1998). *Health Center Post-Occupancy Evaluation: Toward Community-Wide Quality Standards*. Sao Paulo, Brazil: Proceedings of the NUTAU/USP Conference.

Fig. 6.1: (a) A city viewed from above; (b) Exercise pathway in an urban environment

6. Conclusions

This report has been prepared as part of the lead-up to a curricular project 'Health by Design: An Experimental Interdisciplinary Curriculum at Ball State University', an interdisciplinary project questioning conventional health care models. This report attempts to challenge several questions: What is the scope of 'health by design'? Which disciplines can contribute to the endeavor of improving public health by redefining health delivery systems and the built environment? And how is communication between the professions facilitated in order to create a fertile learning and working environment? In addressing these and other questions, the findings presented underline the evidence of paradigm shifts within the debate about improving public health in a society with an epidemically increasing number of chronic diseases.

Together with speculations about the need for widening the professional scope for scrutinizing today's health care problems within modern societies, this report offers recommendations and guidelines for the actual practice of such multidisciplinary teams. Considering these insights, this report seeks to contribute to the discussion about interdisciplinary work, and about what contemporary health care delivery should encompass, theoretically and practically, in the context of the built environment, public policy, care givers and community action

6.1. Shifting Paradigms with 'Health by Design'

The World Health Organization defines the concept of health as a 'state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'. Therefore, health is not limited to the absence of disease and limited functions. Rather, it describes the relation between the individual and its environment, with its physical, psychological, and social aspects. Disease relates to the individual's discomfort within a wider context than the strictly technical or medical. In addition, disease is not considered as a two-state-condition where the individual is either healthy or sick; rather, disease implies a spectrum of conditions.

The consequences of this paradigm shift are manifold. Researchers start to see reasons for diseases not only in a malfunctioning body part needing to be extracted or "cured". Rather, a disease is a symptom for a much deeper problem based in the biological, physical, social, and/ or environmental surrounding of the individual. Disease can be the result of an unbalanced life style, a harmful built environment, or a stressful working atmosphere, or any combination. Consequently, professionals and experts beyond the traditional medical fields are simultaneously and diligently in search for disease relief. ([102]) Therefore, disease prevention, health maintenance, and wellbeing become essential accompanying elements of health recovery.

These considerations widen the scope of health and disease from the individual affected to the more public conditions shared by many. The public health discourse becomes a discussion topic for many professions because of its relationship between the individual and environment. This relationship makes it necessary to explain the interdependencies between the built and natural environments and health. Therefore, public health efforts increasingly focus on creating health supportive environments incorporating many different aspects of the individual's everyday life.

The hospital is no longer the only place for health delivery services. Since health care issues encompass a spectrum of conditions and locales, the conventional places of disease relief now spread within the social and communal life. The community as a whole receives an increasing importance in health prevention and health promotion tasks. Thinking about the places of health delivery and health promotion, alternative areas and spaces such as 'health malls', health booth, schools, etc. can be potential locations for supporting health. Also, alternative and contemporary forms of communication such as the media, internet, or education can underline and strengthen the new concepts about health care. The community capacity within the health discussion expands.

Health care delivery institutions recognize these developments. Hospitals as traditional places for disease and disease relief now try to escape from this narrow role. Contemporary health institutions, such as Ball Memorial Hospital and Cardinal Health Systems more generally, seek to reach out for new health care delivery models, incorporating education and wellness programs to their increasingly widespread service programs. Therefore, the hospital aims to become a stronger partner in multiple health care networks within the local community.

Many more people are involved in discussions about public health and health care than the classical medical professions. Alternative health care and healing paradigms are now evident and of growing interest and are supported by research showing their efficacy. Health care considerations have engaged many professions and have become an interdisciplinary issue.

Altogether, paradigm shifts are occurring in the definition of health, transitioning from an understanding of health as the sum of functioning or non-

([102]) For example, a person with a heart disease might get an appropriate treatment for his/her disease in the hospital by a physician. Yet, looking on heart disease as a chronicle disease which arise with under from inactivity my include health improvement considerations beyond the hospital's walls.

functioning parts, to a health definition embedded in the physical, psychological, spiritual and social contexts. Health is connected to the environment, extending the limited view of the sole individual responsibility of his/ her health to one that incorporates the communal responsibility and the built and natural environments. Here, the community not only embodies the public organizations, educational, cultural and political institutions, but also the corporate, economic and financial leaders. Health promotion faces a widening scope and the incorporation of many diverse professionals. This represents a cultural change since it is based on a wide spectrum of shared responsibilities and actions.

Naturally, it is appropriate to incorporate systems theory within the discussion of health related issues. As a relational theory that recognizes contextual interdependence and organizational regulations, systems theory opposes mechanical, functional thinking that assumes the possibility of substituting new parts for malfunctioning elements. This latter is of course only interested in the treatment of symptoms without considering the entirety. Health issues are not the sum of elements, changeable to improve performance. Rather, it is a contextual entity, influential and influenced by many factors, too complex to see as a simplified organization of separate sub-essentials.

Yet, this is also the problem of health related issues: the complexity of health. How can one approach it? How to find solutions? The answers lie in the possibility of multiple solutions by more than just one expert group. A one-dimensional solution is not appropriate. Therefore there is no recipe for a health issue. Rather, it needs to be analyzed and investigated by a diverse group of experts and community representatives to find the best, appropriate solution. Acting for the common good is the essential change within this discourse. However, this is not enough. 'Health by Design' invites the community itself to the solution finding process through community participatory involvement.

6.2. Shifting Paradigms with Interdisciplinary Work

Many professions incorporate health care issues into their spectrum of investigation. Community planning is interested in this topic because of its relevance to planning for elderly needs, for example; economics acknowledges the increasing demand for healthy life styles and wellness programs across everyday life routines; architects underline the importance of environmentally friendly design, construction, and materials within facility designs that can adapt to unforeseen uses and practices; and landscape architects stress the increasing need for planning and organizing natural, and recreational spaces within urban settings, as well as building sites. Dealing with health related issues invites many professions to answer questions of improving health for society at large.

The importance of public needs and the concentration on common goods effects the way disciplines work. Dealing with health related issues also means dealing with many disciplines on a professional basis. Interdisciplinarity is a necessary part of the everyday routine of health related professionals independent of their professional background.

These facts mean that experts need to step out of their professional comfort zones in order to find sufficient and long-term health solutions, leaving narrow professional priorities behind. Doing so will show that disciplinary approaches to health issues are often focused on treatment of symptoms, rather than sustainable problem solving. The reason is, as this report shows, that disciplinary perspectives and methods are too limited to cover the contextual background of an “unhealthy” state. The necessity of an interdisciplinary approach to complex problems is evident.

The very definition of interdisciplinarity is based on experts who leave their conventional disciplinary methodologies and approaches behind, in order to cross professional boundaries and exchange expertise with other experts with the goal to pull together for the same project objectives.

However, this stress on interdisciplinary fusion and blurred competence boundaries does not strive for the decline of the solitary discipline; the independent, autonomous, and highly specialized discipline is indispensable within the collaborative work of interdisciplinary teams. Rather, seeing both terms disciplinary and interdisciplinary in contrast, this report has attempted to demonstrate that the one elaborates the other in a complementary and thorough way. Interdisciplinarity establishes the context for specified research of disciplines, and disciplinarity gives complex issues a point from which to act.

Yet, the interdisciplinary project is fraught with obstacles. The institutionalized disciplinary worldview still dominates the practice of diverse expert groups. Although intentionally positive, individuals attest the evidence of professional silos by the absence of agreements on common goals and terminology, by maintaining hierarchical perceptions of other profession’s values, and by unwillingness to give and take knowledge among knowledge silos. The paradoxical documentation of experts has reasons buried within academic structures that are the basis for professional validity and reputation. The biggest barrier is mistrust based on diverging value judgements of professional methodologies, tests for validity, and references. As an expert, sharing one’s expertise with non-experts might be a reason for opposition. Therefore, it is quite expected to observe barriers to interdisciplinary practice.

These are some of the reasons that interdisciplinarity is not easy scholarship. By targeting the very basis of disciplinarity, it questions academic knowledge and challenges experts personally and professionally. However, performing successful interdisciplinary work leads to enormous results, which would be unreachable otherwise. By crossing professional boundaries, building up trust and new partnerships, each participant’s disciplinary research can be distributed to a wider audience, thus extending professional reputations. In addition, interdisciplinarity provides the ground for new knowledge and innovations. Interdisciplinary work is far too important for problem solving of complex assignments to be ignored by professionals as well as by academics.

6.3. Recommendations

In regard to the interdisciplinary curriculum project 'Health by Design: An Experimental Interdisciplinary Curriculum at Ball State University', it is essential to work together and make constructive contributions. This report suggests a way of understanding this endeavour by attempting to answer questions about what the scope of health is; which disciplines and fields of endeavor might be involved; what the disciplinary skills on the table are; and how to approach interdisciplinarity. Communicating interests, lingo, methods, and expectations is important for experts in diverse disciplines, in academia and practice, and in the community. Status, reputation and specific goals need to be put aside to frame the common question: how to improve our public health in all of its complexity.

However, this report is also an attempt to sensitize the faculty colleagues preparing the interdisciplinary curriculum. Their collaborative work is crucial for the collaborative student course itself. If these professors do not take health issues and interdisciplinary communication as seriously as they should, the probability for the failure of the student project is increased. Therefore, this report urges academics to consider the use of a discussion platform to exchange disciplinary positions and interests. This discussion platform would serve the role of preparing the disciplinary experts for the upcoming interdisciplinary discussion, negotiations and mediations. It can help to present each participant's position without compromising personal competencies, consciously or unconsciously. ([103]) It is still the case that the literature does not reveal a wide range of interdisciplinary practice analysis. Once in use, the evaluation of this discussion platform would be a fertile and rich basis for further studies in the practice of interdisciplinarity in the university environment.

After succeeding in the collaborative dialogue, the process rests on the synthesis of disciplinary priorities and skills. A fruitful interchange should lead to the development of a grading system for health supportive environments. Similar to the architectural tool LEEDS, this checklist for healthy environment might provide an opportunity to draw a sketch about the many and diverse aspects of such an endeavor. Surely, this tool would never be complete, nor would it be accurate enough to explain the many possibilities the design of a healthy environment offer.

Another promising outcome of this report and the interdisciplinary curriculum are ideas for evaluating, questioning and articulating improvements of the existing health care system. Although this expectation appears to be a huge undertaking, it is however a logical outcome of questioning conventional methods within health issues and disciplinary work. Newly instilled values to improve personal and public health through changing habits, moving beyond routines and making new partnerships have the natural consequences to redefine existing health care models. It is this mutual commitment for struggling together towards the common goal of creating not just a healthy environment, but also of creating a new reference frame, that makes our work more effective and influential.

([103]) Such a discussion platform is already established and accessible on: http://www.quicktopic.com/25/H/jCN6KdXSSsGHU

As the preparation for the student project proceeds, this report is one attempt to shed light onto the content and the processes of interdisciplinary curricular projects dealing with 'health by design'. It explores the topic and potential directions of knowledge production. The result will be finding a solution in the public health sector through designing the environment and policies related to it and to healthy communities. The focus of the interdisciplinary curriculum itself will be on the alternative futures for Ball Memorial Hospital. This question needs to be answered: what does it mean to be observers and critics of the real-time development of a master planning proposal, which is set for the advancement of a local hospital to become a regional medical center for health care delivery? The answer is the following: if a discussion platform works for interdisciplinary communication, if the collaborative work finalizes itself in a synthesis of skills, if the proposals suggested in this report will be implemented, it is likely that the university interdisciplinary curriculum could have an influence on projects done in practice. In other words, Ball State University can be the think-tank for the further development of BMH's and similar development plans.

7. Appendix

7.1. Interviews & Questionnaires

7.1.1. Interview a specialist from the Department of Wellness and Gerontology

In the interdisciplinary endeavor of dealing with health by design, how would you see the linkages towards other disciplines? Where do you see the boundaries?

Obviously, individual health, the process of living healthy and achieving well-being is obviously influenced by one's environment. The dilemma in our field is: How much responsibility does the individual have for his/ her health & well-being? And how much responsibility do governments, society, business, and organizations have? That has been a sort of a professional question dealing with politics, responsibilities, power, and resources.

Up until 20 years ago, the vast majority of professional information, beliefs, trainings, emphasis was on individual responsibility. The individual should be responsible to manage his/ her health and well-being in our culture. In other words: "You are the captain of your own ship." So you are responsible to live a good life and manage your well-being.

The single biggest example of a shift away from individual responsibility to cultural community responsibility or business responsibility for health has been the tobacco issue. Over the last 10 years a societal shift has been achieved. Away from assuming that the individual is a free agent in his/ her environment, the focus changed to broad base capabilities and responsibility for health. Health is part of organizational hierarchies, part of organizational responsibilities, and ultimately part of community responsibility.

Another major example that has emerged over the last 5 years is the issue of aging: Can you age well in our current society? Again, it is the issue of the individual's responsibility for his/ her behaviors. Yet, you need to ask also if the environment is structured in such a way that individuals can age well? The answer to that is: not really. Very little thought is been given to creating environments that are conducive to promoting health and well being. Very few cities, communities, towns, businesses, locations of any kind have consciously designed their work places for aging individuals, and their communities for aging individuals. That is a huge challenge that most communities and most organizations are just now waking up to.

There's a tremendous awareness on 'health by design' in our field. Communities and organizations have to be more receptive to creating environments that promote health and well-being. Simple things such as creating walking paths, having buildings that promote the daily exercise, or providing healthy food choices in those buildings and places of work are on task. All of those things are now consciously part of the thought process for a healthy community or healthy

organization. That has really emerged in my field. The journal American Journal of Health Promotion's (AJHP) latest issue focuses entirely on Health by Design. ([104])

The other thing that's absolutely permeates health issues today in our culture is obesity. The Centers for Disease Control and Prevention in Atlanta is our primary organization for public health at the government level. It has said that obesity is epidemic. ([105]) Currently, two third of the adult population is either overweighed or obese. That's happening faster than any other major public health issue that has ever emerged. In a 10-year-time-period, obesity rates almost doubled. It is a phenomenal increase. Obesity has trickled down to the youth, where we have over a third of our children obese. A study released last month showed that babies up to 18 month of age in the USA are already being overfed by about 30%. Already babies are obese, so we are creating a culture of dependency on food, a culture that will promote obesity literally from infancy on. This is a real crisis.

This is 'Food fight'. ([106]) This gentleman focuses on what he terms 'toxic cultures and toxic environments'. This is the current issue of our understanding of health and well-being: you cannot talk about individual health without talking about society, cultural responsibility, and environmental changes.

Are there comparisons to other cultures, societies, and nations?

Yes. The first chapter of this book talks about how every culture; all the emerging cultures are following our footsteps. We are exporting our cultures, our high fat diets, and our inactivity. Along with that you see India, China, and Japan. He is literally going around the globe and shows how this is happening all across the globe.

Is that also the case in developing countries? I guess, the way people eat and live there is much more indigenous, therefore healthier… Would you agree to that?

Sure, they eat lower fat diet typically When they do eat fats historically a lot of it is mono-saturated fats. They have a lot more physical activity, just working to survive. They do more physical labor. What we've done in terms of toxic cultures is that we have eliminated the opportunity for activity and we eliminate it in everyday life. When I go home and want to do the dishes, I punch a button on the dish washing machine and it does the dishes. I drive onto my drive way and I punch a button and the garage door goes up. The point is, literally everything we've done in terms of the design of our lives is for convenience.

([104]) American Journal of Health Promotion (AJHP): http://www.healthpromotionjournal.com/

([105]) Centers for Disease Control and Prevention in Atlanta (CDC): http://www.cdc.gov/

([106]) Kelly Brownell is the director of the 'Yale Center for Eating and Weight Disorders' at Yale. His latest book just came out. He is published in the journals extensively on this issue. So you can do author searches and come up with lots of resources, political comments, researches, pros and cons, that wall street has run, editorials against Kelly Brownell, because they disagree with him. Kelly D. Brownell, Katherine Battle Horgen. *The Inside Story of the Food Industry, America's Obesity Crisis, and What We Can Do About It.* New York: McGraw-Hill/Contemporary Books, 2004.

Some people have looked at that and have identified that a typical US-American today uses about 500 calories fewer for exercise a day than they did in the 1950's. So we are not burning as much calories for just doing our work. At the same time we are eating more calories than we did in the 1950's. So actually we are eating 500 excess compared to forty years ago. We structured environments so that they do not require us to use our physical body. Also, we structured environments such as that we are inundated with food, fast food, and pre-packaged food which is very calorie dense. You have to absolutely, consciously think about it all the time in order not to gain weight. And that has to guide lots of decisions. If you don't think about that, you'll pretty much gain weight in our culture.

We have a Chinese and a Japanese student in my foundations class in wellness. The Japanese student was saying that in her first year here, she began to put on weight. She was living in the graduate hall. She was living and eating, and having access to all the food. She was talking about the serving size. As a result she was eating more. In the second year she moved out, moved in with some other girls, who were controlling the portion sizes of cooking. Now she lost 20 pounds, back down to about where she began from Japan. The woman from China said the same thing. She is absolutely amazed by the portion sizes, and how often we eat. So really, it is a cultural phenomenon. That's an example of the environment. We create these environments where we inundate people with food. So you have to consciously think to avoid that.

> ***I recently watched a documentary about the government's attempts to reduce the weight-gain of school children. In day schools pops and sodas are served for lunch, whereas in Europe for example that would not be much the case.***

That's an example of culture. All the way down the school bad food is served with dense calories, sugars, and empty calories. At the same time they have eliminated physical activities from the schools. There is only one state in the United Stated, and that's Illinois, that mandates physical education on daily basis. All the other states don't do that. Indiana says that you've got it some time during the school week. There is no time for physical activities. So we're feeding them dense food, we are not having them burn off their calories. All we are making are obese children. That's pretty simple.

> ***Obesity leads to…***

Heart diseases, diabetes, hypertension (high blood-pressure), arthritis… The list goes on and on and on. In addition, about 30% of cancer is attributable to obesity. So we've created that culture that is toxic. It is a toxic culture and toxic environment. It does not make much sense in our field to talk just about individual behavior. We must focus on how we can be advocates to structure environments that are healthier. We need to increase the accountability of restaurants, fast food chains, the mega food corporations, and huge food companies, that produce very high fat, high density, high calorie foods, because there are such tremendous consequences.

At the work places it is estimated, that an obese individual is going to cost about 2000$ more of healthcare a year because of chronic disease. They are going to have more chronic disease and use more health care, because obesity leads to an increase in chronic health problems as mentioned earlier which are extremely expensive diseases. Even high blood pressure or arthritis is expensive diseases, because ones diagnosed, you'll treat them for the rest of your life.

> ***Let me just summarize that. Your profession is gerontology and wellness. What are you doing exactly and why do you feel the necessity to work interdisciplinary?***

Good question. We have two masters' degrees: one is wellness management. These students are trained primarily for work sites.

> ***So they are going to businesses and making recommendations on how to take care of the employees…***

These are companies that have hired our graduates. Our wellness management students go out and work in a whole range of corporation, some huge companies such as Oracle, Microsoft, Hewlett Packet, DuPont, Honda America, Toyota America,… Also, hospitals and health care systems hire our graduates. They do this to try to create healthy work environments and healthy employees.

> ***That reminds me to far eastern cultures where the employer provides exercise on daily basis for the employees. This seemed to be very uniformed and forced, but you see a reason behind it…***

You literally have to find a way to make people move. I am sitting here. What are you going to do when you leave? Are you going go back and sit down and write everything at the computer? There is my computer, I am going to go over there and sit. I will go to my next meeting and sit. Unless we force people to do something in their daily routine we will not change the obesity problem. And we can build environments that force people to do things, such as more accessible stairs. Our wellness management students go into work places and try to create environments that are healthy. Ultimately, wellness management tries to control healthcare costs for corporations, by trying to keep people healthy.

> ***So you are analyzing the people's health conditions and the circumstances they're living in, measuring them, making statistics, and then giving recommendations?***

Yes, we give recommendations, on how we can intervene by identifying the high risk employees, identifying where we can have the most impact in keeping people healthy, and where we can have the most impact in controlling our health care costs. That is what the wellness management students do.

Do you have building or built environment related case studies?

We do not have any built environment related case studies. Yet, one particular author in our field writes a lot about healthy cultures, creating and working through cultures. His name is Judd Alan.

So you are able to make a situation analysis but you need other disciplines to create those healthy environments.

Oh, yes. We have to work with other people who are experts. We have to facilitate change regarding health. ([107]) That's what wellness management students deal with.

The gerontology students are trained to primarily work with agencies that work with aging individuals, what we call 'Triple-A-Agencies'. These are state and federally funded agencies on aging. They serve multi-county regions, provide homecare services, and work with county and city governments on trying to help them think through the coming age wave. So they do direct services in education. They are trying to work on policy levels to create an infrastructure in communities to deal with aging related issues.

We always worked also with the nursing field. However, the reason why I am interested in working with the architecture and planning people is these broader issues. Health is a community experience. The original definition of wellness is that the environment you are is one of primary determinants of health and well-being. So obviously people who are concerned with building healthy environments, creating healthy environments, restructuring environments are a natural part of our field we have to be aware of. However, we are not experts in that. We need people who are experts. It makes sense to find a way to develop the language and the exposure, so our students will understand that. My interest in being involved is that I am going to learn a lot how planners and designers think about this problem. Our students will learn a whole new vocabulary, and a whole new world view as they look at the potential for creating health. I think that is critical for the coming world. Looking at the aging population I realize that in 15-20 years every town is going to be a retirement town. So we have to be prepared for that.

Is there a connection between gerontology & wellness and economics?

There is an obvious connection. Businesses would not hire us unless we can show them that they can save money. If you keep people well, you help people loose weight, then it does not cost as much. You help people stay healthy and productive in the work place and corporations make more money. So there is a very strong connection to economics. The best research data indicated that about 25% of all of the health care costs are lifestyle related. That might not sound like much but it is 25% of a trillion plus dollars which is life style related issues. So everything we do

([107]) The Human Resource Institute: assists business and community organizations in their efforts to create healthier and more productive cultures. http://healthyculture.com/

can be cost-effectiveness, cost-benefit, cost-outcome, or cost-efficiency evaluated. You can do these calculations if I know what its impact is. There is a lot of research literature on that.

What are the most exemplary cases you know about?

There is a series of studies called the HERO-Studies; the studies have been published in the Journal of Occupational and Environmental Medicine. ([108]I[109]) They have looked at the largest data base of health claims and lifestyle issues and have done cost-effectiveness studies. The author that has done most of this is Ron Goetzel. ([110]) He has done the best cost studies. D. Eddington looked at Cost-Effectiveness & Efficiency Studies looking at different work sites, what interventions can do, and what costs do they influence. ([111])

How would you measure a 'good healthy environment'? What are the factors?

You have to find 'bench marks. There are few, but in terms of full communities you would look at places like Bolder in Colorado. ([112]) So you ask, why is Bolder healthy? Why the people there have less obesity, fewer chronic diseases, and what is different about this place? There are other cities but not many: Olympia, Washington; Salem, Oregon. These are particular towns that have a pretty good health average compared to the nation. Well, it is a wonderful environment, they build all these running and biking paths, the environment offers outdoor activities, and they have a community infrastructure that supports these kinds of things. Those communities are doing a pretty good job. First analyze these very good communities, look at some commonalities, identify common bench marks, then take it back, and ask, how do we relate to that?

Do you know about case studies in other cultures and nations? How would you approach the project at Ball State University?

Some cultural anthropology studies try to find out why these cultures are healthier than others. So that's in the literature and we can look how different cultures have approached to health. Especially, the public health literature would have this information.
How would I approach to the project of Ball Memorial Hospital?

([108]) Health Enhancement Research Organization (HERO): http://www.the-hero.org/
([109]) Journal of Occupational and Environmental Medicine (JOEM): http://www.joem.org/
([110])Cost-Effectiveness Studies within the HERO-Studies: Ron Z. Goetzel. "The Role of Business in Improving the Health of Workers and the Community." September 2001. Accessible also on: http://www.simplywell.com/html/www/shared/article_role_of_business.pdf
([111]) D. Eddington, University of Michigan: He did cost-effectiveness studies looking at different work sites, what interventions can do, and what costs do they influence.
([112]) Boulder, Colorado. Official city website: http://www.ci.boulder.co.us/

1. I would try to get as much data as I could about the past (public health efforts, health care delivery efforts, our past problems we have tried to address, and known barriers in each of these areas). That should be the baseline.
2. And then, if I try to build something new, I would say: are there similar communities of size and type that have had some success in this, which would be the template.
3. So here are us and here are them: where are the most obvious gaps? Why do those gaps exist? Are those gaps we can address, that resemble the successes?
4. So we would discover areas of opportunity for us. To me the critical thing is, in a short period of time, as students are involved in that learning process, we would have to identify critical problems, critical leverage points and opportunities.

How do we move into these leverage points / opportunities? The only way we can do that is: a. knowing the history, b. knowing success stories of other communities and other health care systems, c. making some type of best estimate on which of these lists of priorities is most logical and do a role on them concerning their probability within the local constraints that were given.

Do you have major doubts between the relationship of health and design?

Of course, I never had any doubts about the importance of this linkage, but I have doubts about the pragmatism. In other words, we have people with different world of views, coming together. Can we all sit around the table and understand each other, respect our differences but appreciate our contributions? Can we find a new language that captures the complexity of all these disciplines in a way that makes sense, as we talk here about higher order synthesis? This is the challenge. This is not easy scholarship, this is pedagogical challenge to get people to come together from a functioning health care system, from 6-7 disciplines, strong personalities, egos, biases, expertise, to come and open up. I have major doubts about our ability to do that. I do not think that's impossible. It is a challenge, that's one of the things, which excites me, and I look forward to. But ultimately, I wonder if we are going to be able to, even if we are good at developing a really high quality of dialoguing, and at having high quality of ideas that really capture the diversity of the expertise, will we be able to communicate in a usable way to people who really need to make the changes?

To whom do you want to communicate this?

To Ball Memorial Hospital and our larger community, because it is not just the design of BMH, rather it is community design. Will we be able to articulate in a language that is acceptable to move forward? It becomes part of the operational plans for our future.

Isn't it logical to have a participant from the community also?

Even that does not guarantee it. I am trying to be a realist and say, that I have my doubts about the impact of this over above a wonderful learning experience. Stepping back even one step further I am positive about this wonderful learning experience. It is the 'end' part that I am worried most about which is that the synthesis at the very end, tying it up and finding the appropriate forum to launch it.

So you have doubts about how your results could be put into the Ball Memorial Hospital Project in a realistic and feasibility way…

Part of it is the timeline: their timeline is maybe a different one than ours. So we need to find a way to communicate these differences and see if we can understand their needs and they ours, and come up with some give and take. But the larger issue that we partially mentioned is that community design issue. It is not just BMH. Since Cardinal Hall System is not giving us any money, we should not be thinking about just BMH. If Cardinal Hall System would give us a lot of money for this project, I think it would be justified to really focus on Cardinal Health System, and you must know I am a board member. So I sit on both sites of this. But since we are not funding this project, we should think broader. We should look onto the larger community. A mayor has been elected for years. We should be thinking about working with the administration, we should be thinking about that community and Ball State University we call home. These things should be integral to what we thinking about. It is a broad task but yes, it is a complex problem. If we are talking about 'health by design', you do not get health by going to the hospital. Health is going to be experienced in the community. So we have to create a community and a health care system in concert working towards health.

Your definition of the environment is more than just the house…

That's too narrow. I do not want to be even in this when we are talking about just designing a hospital, that's completely irrelevant for the real future of health in America.

What is your definition of health?

Well, I want to have people which will be able to have the potential to live a full life. And a full life means having a full life span, maximizing the potential in each life phase. It means fully expressing themselves by the body, mind and spirit. Are our communities structured to that or not? We do some things right, we do some things wrong, let's be clear about that, but let's include that in our thought processes. Because if we do a lot of things right in our community in terms of its design and planning, we'll minimize the need for an acute care hospital facility. In essence, what is going to be the hospital response to health problems of a community? If we're successful in designing an appropriate community then the health care system

needs to change. You need to look on health and design together, there is no other way.

Is this endeavor a kind of critic of education?

Yes it is. It is a real journey of learning for all of us involved. I think, with the major people involved in that project, we're very upfront about that, we're willing to walk up to the edge, we're willing to be exposed, we're willing to learn from each other, and I think we're ready for that.

7.1.2. Interview a health care delivery specialist

What exactly you is a health care delivery specialist looking for and how you are related to the health care industry.

My responsibility is to look at the health care continuum. Basically, it is a variety of models of how to deliver health services to individuals, whether it will be an in-patient or an out-patient. You can be treated in your home, in doctor's office, at hospitals, in nursing homes, etc.

So your basic assumption is that people that need the health care are somehow not healthy?

We have the assumption that people seeking us are in some stage of an illness. That could be at the very beginning when you are being diagnosed, it could be before that which are routine health physicals, all the way through hospitalization and back home. The notion of disease is that it is a state of 'not at ease'. If you take 'disease' and break it down, there is 'ease' where you are healthy and everything's fine and there is 'disease' where your system is somehow out of balance. So basically our job in health care and health care delivery is to look at the whole picture of the continuum, to try to keep people well and as they begin to become ill we try to get them back to their pre-morbid state, to get them back to feeling 'at ease' again.

How does the hospital relate to this notion of healthcare delivery?

In the hospital (inpatient and your outpatient population) we have programs that people can come into for a specific service such as a therapy, or something that does not require for them to be in a bed. These are the walk-ins. The in-patients are actually in a bed for a brief period of time, receiving a variety of services (therapy, surgery, etc.). Their illness is such that they can not be at home. However, the whole notion of health, wellness, and sickness is very broad. So you can actually have programs within wellness to keep you healthy (education, services at your doctor's office, etc.). All this becomes a delivery system. You can have a variety of ambulatory surgery centers; there are many types of programs. The hospital is just

one of them. It has layers; it can be very intensive, but also minor (routine test, blood work). So, this is basically a continuum of health services. How people come in and out of this is probably what you are interested in. How do you get people interested in illness? How do you teach 6 year olds about health? How do you teach a 65 year old how to stop smoking? The doctor's office is the first contact for your annual physical, checkups, or flu shots. Ambulatory surgery is where people walk in, get surgery and go home at the same day. It is perceived that some of the stays that use to be long inpatient stays are now getting shorter and shorter, because of advancements in technology and medicines. Reimbursement is driving and pushing us to see an opportunity in moving a person through the hospital in a faster version.

The hospital itself is an economic institution. Isn't it of interest for the hospital to keep their patients as long as possible?

No, since reimbursement has changed. Reimbursement is how hospitals get paid. They get paid from a variety of sources (Blue Cross, Medicare, Aetna). All those payers have plans that reimburse hospitals a certain amount. Hospitals negotiate with plans for payments. ([113]) The hospital will give whatever service is needed based on what the patient needs for however long it is needed. There is a clinical course that the physicians follow, irrespective to payment. What we do is deliver the clinical care that is needed. Technology is advancing care too. Newer machines and procedures help shorten the clinical course of therapy.

… And if there are possibilities to intervene within the environment before people get sick…

If we are going to intervene before they are sick then we need to look at wellness programs. These programs are designed on projects based on community need assessment. The public is becoming very educated about their health needs. A lot of them come to us with lots of questions. So the environment that we invite them into to learn about their healthcare needs to be comfortable to come in and ask

([113]) Medicare has a part called DRG's (diagnosis related groups). There are over 400 diagnosis related groups. Services are coded. For a fractured hip there is a certain clinical tract that is followed, and hospitals are reimbursed a certain amount of money. For example, if you are reimbursed 10,000 US $ for a fractured hip, then hospitals have to do all of the services included in 10,000 US $. If you have a fractured hip, you will stay for 4 days in the hospital, which will cost 10,000 US $. On the other hand, if you stayed for 10 days because of complications, the hospital would only get the same 10,000 US $. The hospital is interested in putting a person where they need to be placed for a particular service. If a hospital can improve the clinical care and move people through the system faster, then that is a good thing. If it can't, it still has to deliver care irrespective of payment. If I was in the management of a hospital, I would try to see if there are any new achievements in hospital services deliveries in order to improve the service. At the end I would reduce the amount of money I would actually spend although I would get the reimbursement money of 10,000 Dollars. I would save a certain deficit which is actually the arbitrage. Now Medicaid has a whole different payment track. Aetna, Blue Cross, John Hancock have different reimbursements that they negotiate with each and every hospital, so is always different. Reimbursement is extremely complex in healthcare.

questions. First impressions count. In contrast, if you walk into a physician's office that is neat, clean and orderly and processes are such that you feel taken care of, people would feel in such an environment more relaxed.
Therefore, what we want to do is create environments that enhance the confidence level, that are soothing. Health care facilities can be a pretty scary place to go. Healthcare is one of the few places where if you have an emergency you can't go shopping around. Now, if you have a chronic condition you can begin to pick and choose where you want to go and people are doing that. People are driving where they think they can get the best service. People want to feel that you can deliver everything that they need. When you're walking through the door what you're going to be thinking about is your environment: Is it welcoming to you? Does it look organized to you? Does it meet your expectations of what you think healthcare should be? You are going to make your determination, maybe your choice based on what you see. Your going to make your determination to stay based on how people make you feel. When you are coming through the emergency door it is the same thing. If it looks like it is a modern place, its got technology, you will perceive that your healthcare here was better than if you go to a place that is outdated.
Additionally, there is literature that basically says that your environment actually helps your medical course (use of natural light and soothing colors, staff's dressing). You can get better faster or feel better about their disease. If the environment appears calm and you feel taken care of, then, studies have shown that the pain level will actually decrease without the use of drugs. Literally, if I am in a calmer environment where I can relax, my body is going to be able to heal. If I'm tense, because I am worrying about how this place looks ugly, because it looks dirty to me, then I am going to not be as relaxed and my body is going to make chemicals that will delay improvements. Colors and natural light is a big thing. In regards to their biorhythms, your body rhythms change when you are in a sterile environment under florescent tubes with white walls. When you do not perceive day light or you are hooked up to equipment where you really can't see these transitions, they really does affect a person, psychologically, emotionally, physically.
I guess that is the importance of design in each of these modes. So, when you come into a hospital it looks nice. When you go to your ambulatory surgery center it's calm. When you go to your doctor's office you have a sense of confidence. All of this is our healthcare continuum; it's our delivery system if you will. Within it there are subsystems. Does that sort of answer your questions?

> ***Yes, I think that answers my first question which is if there is a link between health and design.***

Let me go back a little bit… In addition, hospitals can be categorized into four groups: the primary, secondary, tertiary, and quaternary hospitals. They are not necessarily Hospitals that are primary care centers are your smaller organizations, whereas quaternary hospitals are doing the super specialized work. ([114])

([114])How a primary care hospital is designed is a lot different than a quaternary hospital. You are going to have elements from the primary care sites in your quantum area, but you will never have a quaternary element in the primary. What we are doing at Blackford is that we are building a primary

Do you see a certain grade of design interventions throughout these stages?

I'm going to say yes, because in a primary setting you are going to have a lot of sun light, have more one or two story buildings. In a quaternary the design is such that people are recognizing the environment's impact on people. So, these organizations are going to try to use a lot of colors, plants, softscape, carpeting, and substances to soften the hard edges. They want to make people as comfortable as in the primary care setting yet full well knowing that these individuals and families are very ill. They are going to want to put people at ease. They just have to do it with a lot of technology and people around them and a lot of people coming and going. How do you do that…

…Because the necessity in quaternary settings is first the technology and then the design, whereas in the primary organizations the technology is secondary…

Right… You still have technology, your MRI's, surgery, you still have your things and people want to go to these specialized hospitals. However, the hospital in the 80's got into the space age stuff. For example a person right after a bypass surgery is connected to a machine; the entire room in which the patient is located is like a machine. There are ventilators, keeping him/her breathing and monitors all over the patient. The nurse is right there with a computer so that she/he can track all of the bodily functions. So, when a certain function changed she/he would be right there to give a medicine to counter a malfunction. The nurse is in constant communication with the physician, so if anything changes the doctor knows right away. They let relatives go in just for a short period of time because the patient needs that intense care. As the patient begins to get off the ventilator and was moved to an intensive care unit for cardiac. Still on monitors, yet you know the patient is getting better because there was no ventilator anymore. Slowly the patient works his way through the different floors. As he/she got out of the intensive level the environment changes. It becomes less sterile, friendlier; more people are involved as it was when the patient has been in that high critical level treated by just one nurse. It is not unusual to count 25 people coming into the room during an eight hour shift, all doing different things to the patient. So the environment has to accommodate for that feeling of to be out of control. These spatial settings are basically now encouraging families to come in and spend the night. They are encouraging people to make these

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care environment (friendlier, easier to access, small with15 beds). People in those communities are going to want parking by the door. They don't want to walk miles to get services. However, you are also going to look for technology that is going to make your stay successful (machines, staff, etc.). At Blackford there is going to be a fireplace in the lobby, you are going to see homier colors, and your room is going to be a private room. Your family is going to be encouraged to visit. You are going to get a lot of the same things in a quaternary setting but it is going to be able to care for much sicker patients.

environments as friendly as possible with waterfalls, a lot of plant life and natures which is infused in the intensive care environment now.
Additionally, hospitals were very loud. So, you are seeing more places to retreat to as in the past it used to be a chapel for quiet time. Now you are seeing serenity gardens, walking paths around the hospital, benches outside where people can go and sit and just be quiet for a period of time. Hospitals are getting outside of their 4 walls. I guess if there is a message that is the message. Hospitals have campuses where people can go and sit under trees. They have serenity rooms for quietness. They understand that the time in intensive care is much shorter time in the hospital. So how do we deliver care in a shorter amount of time and where can we deliver care. Hospitals are scary places so how do you create environments that are calmer.

> ***I would like to ask you what the link between health and design is. This is obviously there; many conference topics are held in order to discuss this relationship. Apparently, health and design is very much interdisciplinary. So how do we find other disciplines that are related to our interests and how is it possible to keep up boundaries if necessary.***

I think architects are getting an education in health design. There are certain architectural firms across the nation that only specialized in health design. Nurses, social workers and therapist are coming to realize that environments are important and they want to talk to the architect about designing their work space and their clinical space. Doctors are concerned with the space that they work in. They are there 24 hours a day sometimes, so they want their environment to be compatible with them. I think getting people sitting down around a table when you are designing a new facility is the key. More and more those hospitals understand that it is a multi-disciplinary process. It is not an architect saying here is your building. It's basically an architect listening through bubble diagrams etc. what the needs and the use of that building are, then trying to build the space consistent to the needs and rules. So the health department has certain rules and regulations as to how the surgery room has to be. It is the architect's place to know those rules and regulations, to listen to what the clinicians are asking for, and translate that into something that into some sort of a design that works for that need.

> ***How do you see urban planners and economics involved?***

I think urban planners need to be working with hospitals to look at health delivery, getting back to the continuum. Urban planners need to understand that a hospital is going to put an outpost 20 miles away. How do people get there? What is the transportation like? Do we have busses or trains? How do you get people from one place to another in a timely fashion? How can hospitals need to understand that they need to get out of the box? You're looking more and more delivering healthcare at malls, churches, in schools. As urban planners how do you design your city around those needs? The urban planners need to understand what the health needs are and how technology is changing. In regards to computer cabling and fiber optics

within the city design designing, where might a hospital go? So, urban planners are getting together with clinicians and architects. That creates some really dynamic possibilities. As you put easy access healthcare in place and state of the art healthcare then you attract businesses. Businesses want to go where communities can deliver good healthcare services for their employees. You really begin to get this synergy that is created with urban planners wanting to attract business.

What do you generally understand by design?

I think of place that is pretty, functional. To me, pretty has to do with colors, comfort, and a calming sense. It has to do with making people feel welcome. It has to do with textures and materials, soft versus hard, wood. It has to do with sound and smell. Now, when you walk into a health setting you see plant life, waterfall, gathering places because people are coming and going. Design is trying to make the environment so people are comfortable there. You are seeing artwork, coffee, like they have in malls kind of a coffee cart that goes with a garden cart kind of look, a latte-stand kind of a look. You're seeing gift shops. These things are basically there to pull you in and make you feel like you're in a warm environment. That's what I mean by pretty. Color and textures are a huge part.
Then, once you go past that you go to the waiting rooms. I like them to be calm and settle people down because it is a very stressful time. Even if you are only getting flu shot you are sitting there you wonder if this is this going to harm me. The other part is that you have your main public space and the waiting room space and then you get into the medical rooms (surgery, etc.). Those places need be pretty in color, with more pictures. They need to have ways of diverting people's attention. If you are just laying on a bed with white sheets and you are white because of florescent light makes you just paler, it is really kind of a not good environment.
I worked in a system that had a hospice program. The hospice program at that time was a new concept for health care. They had a fireplace and soft lighting. We even went so far as to tint the mirrors because when you have cancer, your skin takes on a gray paler. So people could look a little bit more natural. That's what I mean by pretty, just the whole environment works. The same thing happens when you are in a hospital bed. Do you have to have white sheets? However, color is very important as big modifier of feelings. So, I think hospitals need to instill that. So you can paint wall beige or pink and people are going to react differently. I would say you need to understand the psychology of color. Healthcare institutions were not worried about the psychology of color. They were worried about the technology and having the best of the best. Now, they understand that colors count. They are taking into account curtains that have patterns and design as opposed to a beige curtain on beige wall and beige sheets.

So the definition of the meaning of health changed? I think there must be a difference in seeing a patient just as a body which needs the latest technology whereas seeing this body as a human which needs more than just technology…

Yes, and I think that healthcare is sensitive to that and evolving into that. They are looking at the total patient – body, mind, and spirit. They are taking into account not just the body and what we do with it but rather how the environment affects the mind. I really think that health design and planning for health delivery is much broader than just the box, the hospital. In addition, the hospital is more than just taking care of the patient's body.
The baby boomers expect more than my grandparents did in the 40 and 50's. This is a brief historic evolution. In the 17.th and 18.th century, care was delivered in the home. The wealthy had people coming in to take care of them. In the late 18.th or 19.th century, hospitals were places where only the poor went. It became a sanitarium kind of a place. In the 1920's, hospitals became sterile. In the 1940's, healthcare became huge multiple floors facilities, where people went for days. After WWII, there is still the box mentality (penicillin, x-ray). Vietnam seemed to be a huge change. Vietnam brought in the MASH units and technology to change rapidly. Technology of the machines, the MRI, the PET scanners, came into these hospitals. People's expectations were beginning to change. The expectations of the baby boomers are: if I break something of my body I want it fixed now, I have disposable income, I want to know about wellness and my disease. Now, with the baby boomers getting sick with heart attacks and cancer, the expectations are even more, in terms of educate me, get me better, and get me medicines, with shorter lengths of stay. The box is taking on ambulatory surgery, outpatient, hospice, and a social environment. We need to address social issues. How do we address domestic violence? How do we address other social issues that affect wellness? That is sort of an evolution of healthcare. It is almost getting back to being taken care of in your home. It's almost as if we are coming full circle. Computers can allow this. There are software programs now for specific diseases. You are able to take care of congestive heart failure, diabetes and other diseases right in the house.

> ***… Coming back to your personal position and profession, what is your profession about? You have certain responsibilities in a certain frame. What I am trying to understand is the practice. Where do you see the boundaries and connections of each discipline with your fields?***

Right now we are building Blackford Community Hospital and in order to build it we brought a variety of people to the table because none of us had the expertise to do this alone. My job as vice president is to keep those people at the table, and ask what the community and the doctors want and what the architects can deliver? I facilitate different parties who need to describe what kind of environment they want and that they need to explain it to the architect or to the planner.

> ***You are making the linkages then?***

I am making the linkages. I'm using my awareness of my profession, my journals, my experience, my expertise of having built another hospital. So, I have to be able to pull all those people together and get them working.

How do you get them to the table? How do you get them to talk to each other without prejudices and the own profession's glorification?

That's the art of my job. Basically you listen. You really look at the group process. I am there to facilitate the conversation. I just need to keep asking questions and helping people translate what they are trying to get done into something an architect, a planner, or a budgeter can understand, and get that done.

What do you think about each professional's ability to talk to each other?

People can describe what they want if they are asked in terms they understand. People can interpret each other in within their own expertise. For example, if a nurse says, that he/she needs a surgery room for working, this is first of all not understandable for example an architect who needs to design this space. A nurse is a great nurse but does not know how to make a room. Knowing an architect can build a great room but has know understanding of how it's going to be used? Both of those the nurse and the architect can build a phenomenon room if there were know budget restraints. This example shows that professional translation is needed. I can help translate that with what I bring to the table: social communication, business, and knowledge of hospitals and healthcare environments. It's basically linking people. Hopefully, by the fall of 2004 we will open the new Blackford Community Hospital. You need different people at different times. When I am talking about designing a new facility I need board members, physicians, budget folks, and planners. When I'm down to looking at general space, the 'bubble diagram', I need clinicians, physicians, the users of the space. And then, when I get close to moving in I need a whole different set of people; I need the movers, the equipment folks, housekeeping staff.

How do you know who you need when?

Every project has a time line. When you are thinking about the concept of a new hospital you have a certain group of people you are dealing with. As you get into your timeline, it gets to dictate who gets to be involved. Also the design timeline dictates who is involved.
So, in the early stages we identify with what we are going to do with the space (surgery needs to be close to ER., ER needs to be close to radiology and inpatient, etc.). So you begin to create a 'bubble diagram'. Then at some point you have to get the nurse and the food service worker designing their own space because they have got to get it to work. As a leader you have to let those people in to design that space. Surgery can be just gorgeous and can be inviting make you feel good but if it doesn't flow like the team needs then it doesn't work. You have to get those people involved in the project when that project is being designed. Then, when it is being built, the construction folks are there. When that building gets closer to opening then you have

to develop enthusiasm for it. You want to take your nurses back in to show them what it is going to look like. You're going to want to encourage the public to get involved. Your going to want to move so you want to get your moving team involved. You need to get your housekeepers to clean the place up. At different times of the project you need different people.

The topic is complex. We are talking about overcoming professional silos, the understanding of health which is not limited to the hospital...

You mentioned silos which is a good word. In hospitals prior to probably 1980, 1990 organizations were structured so that you had a nursing, finance, and a dietary division. Problems were approached within the professional division or silos. In the 1990's, the whole notion of continuous quality improvement (CQI) came along, saying you can't work in silos anymore. ([115]) So we began to use multidisciplinary groups. If you have a problem with billing, get your finance, nursing, and your supply purchasing folks together. Get them around a table and begin to use the CQI process. You can brain storm, diagram flow charts, diagram the issue in order to get everybody commonly understand it. Then let's look at, how to solve the problem. You're forcing these people together. They will be a better understanding of the problem and you will get a better solution. The reason is that now it is not just the vice president who is talking, but the people that have to deal with the problems are talking. The silos begin to break down with the multidisciplinary approach. Multidisciplinary approach is evident by dealing with the patient; it is not just the doctor or the nurse, but so it is a social worker, chaplain, and therapist. The same is true in how to run a hospital. You still have people that are responsible for nursing and for finance, but as they come together to solve problems. That is an evolution in health care. As we come together their expertise rubs off. We work as a team. Together everybody is achieving a lot more than if everyone was working in individual silos. Those silos are breaking down. You have to be very prudent on how you use your resources. People, schools, and institutions are beginning to look on teams working together who know the problem in the same room. Those barriers are breaking down. It makes it a lot easier to solve problems.

I agree. How do you see the involvement of Ball State University in the alternative futures of Ball Memorial Hospital?

Well, I see that CHS is reaching out to different specialists or professions that are at Ball State. I see the hospital being a place where the different students can come together. I think there is a place for the architectural designer and urban planners in the hospitals. I think there is a place for us at Ball State through real life experiences. So I think we can help give the practical side. Come on in, spend a day in a hospital and see what it feels like, walk through the halls of a hospital with a dietitian, nurse,

([115]) Edward Deming, The Edward Deming Institute: http://www.deming.org/

or maintenance worker, and see how your physical plant works. I think that it is more fun learning.

How do you see the relationship between practice, academia and silos?

Their silos or our silos? ... I think that there is an understanding among all of us that we have to get a job done, and we have to have the best at the table to get the job done. So, there are more acceptances to get people to a table, get them to talk, and problem solve. It is going to be a struggle because people want to go back and say, that it is MY area of responsibility. If we can break down some of those boundaries I think you are going to get a better education process, and a better health care product, you will have more rounded students. But I think it is going to be always an effort because the people want to say that this is my turf, I am staking it out. You have to rise above it and say, but what are we trying to get done.

Are you saying that about the silos of practitioners or to silos of professors?

I say that both, to the professors that they have to work outside of their comfort levels and I say that to the professionals because you don't take care of a person in isolation. You take care of the whole person. Moreover, you just don't take care of that one individual, but rather you take care of the person in their environment and their families. Patient and family become one word.

Do you need to have a specific body of knowledge first before you pull in others?

I think you have to set a base and then make sure everyone understands what your profession is about. Once people understand their profession, their ethics, then you bring in others so they know what they know and they don't know and where they can pull. First, you have to define who you are and what your job is. Then bring in others.

You are trying to build silos in the first place and then you are trying to break it down?

I think you have to have some kind of a body of knowledge to identify with before you say I am all to all people. You have to understand who you are, what your profession is about. I have to understand what is important. You have to have a sense of your own self otherwise you will never know what you are about. So, yes there is a silo. I prefer to think of it as a discipline because in my world a silo is a negative thing. To me a silo is something where you need to get out of, whereas a discipline is something that you grow and develop it to understand, so that you can go out, represent it, and pull other people into it.

Do you know exemplary cases about good health care facility and a bad health care facility?

I know that there are architectural digests. I know that there are places that you go for the expertise you want. When we have to develop a surgery center or have to develop a new program, there are ways of finding the bench marks. There are exemplary hospitals and we do sight visits. So if we are looking at the best hospice design, or the best hospital design, we would do research, then we would go to that site. Then, we would take it back to our environment, and pick/ choose/ modify to make it our own. In addition, it depends on what you are looking for in exemplary healthcare. You go, you observe, and then you translate it into your culture. You make it your own.

You talked earlier about the continuum of health. Do you know about a community example?

Pretty much every large hospital that you are going to walk into is going to have all of these components in it. The hospital is going to have an education program, doctor's practices, ambulatory surgery buildings, a communal urgent care outpost, inpatient care unit and outpatient programs.

But that is in the box. What happens when you are outside the box?

You are going to have health programs which get back to wellness. It's only limited to by how creative the person heading that up is. If I want to have wellness programs in a hospital then that is all I'm going to look at. If I am a director of wellness and I want to have it in a shopping mall because that might be where I can get it to most women then I am going to approach a shopping mall. It's only limited by your creativity.

What happens when the community itself is concentrated on health? Do you know of an example?

I don't believe that people are focused on wellness. We smoke too much, we eat too much, we don't exercise enough, our cholesterol is sky rocketing, it is easy for me to take a pill, that will bring my cholesterol down and I can still continue to eat in fast food restaurants. People can live a health lifestyle, they can jog, eat, do what is right and they can fall down with a heart attack. So I don't know of any city that is a model for the program.

However, I would think that there are cities that are coming together and are looking for health needs. There is business coming together with the cities to look at the health needs, for example in terms of water treatment or transportation.

I think that people aren't aware of it so they feel that they need to go elsewhere. I think its going to be faced with looking at other sites for delivery. We are looking at an x-ray area office hospital campus, so that it's easier access, park their car close,

come in for radiology treatment and services, and go home. Planners have got to understand that we need bus routes and we need to pick land that is on the bus route. I mean traffic around here is atrocious.

> ***Perhaps another approach is to decrease car accessibility and out-spread and focusing more to bus routes and density...***

…It could be developing an access system, a transportation system which picks me up at my house, deposits me at my health care facility, and then transports me back. It could be a healthcare facility that has a pharmacy in it, that when I am 70 years old with an ailing husband I don't have to go so many places. Maybe we need to think about a health mall, so that you can drop you laundry off, get your haircut, fix your shoes, and have your health services. You can have a restaurant that focuses on healthy meals, so that diabetic or a congestive heart patient can get food that they need. You maybe have a small mini mart for some groceries on the way home. All in one place so that I can get picked up, taken here, get what I need, and taken home. I can get closer to my ease state. You begin to think about that and you go, wow, where can we then put health care?

> ***The prospective is interesting since the observation is on people with or without a disease…***

In the past hospitals were place to go when you have a disease. As the population views health care in its broader terms you begin to look at the wellness component with its social issues (smoking, obesity, exercises, etc.). These people that are perfectly healthy in their mind are not going to access us. We have got to get away from the box and go to where those folks are. We've got to attract them in ways that will keep their interest.

> ***On one hand you have the ill person where everything needs to be accessible and concentrated (hospital – pharmacy – groceries). On the other hand you have healthy people that need a certain daily exercise, so facilities shouldn't be so concentrated, or should they?…***

It doesn't need to be concentrated. It needs to be where people are. If you are trying to keep people healthy they are not going to come to the sick box or go to a doctor's office because they don't think there is anything wrong. However, they want to stay healthy. How do you access them as a healthcare provider? When you are 70 and have a lifetime of habits, it is really hard to change. When you are 40 you may have the desire to stay healthy, so you are motivated to do things differently but it is still going to be hard. As teenager or younger, you are just beginning to develop your habits. If we want people to not smoke, to exercise, and to instill those values we have to get kids while they are young, when they are in kindergarten, preschool. It is not enough to approach kids when the child is sick, but rather teach the child to

exercise, teach them to brush their teeth, and value that as something that is important enough for a lifetime.

> ***How would you measure the health facility? How would you be able to put up characteristics or grading systems? There are examples in architecture, where you have the LEED metric. This system looks on buildings that are environmentally sustainable…***

The closest I think that comes in healthcare are some national firms that look at hospitals nation wide and they grade those hospitals based on clinical factors and financial factors. One of them is called the HCIA, appointing the top 100 hospitals. ([116]) They are only looking at hospitals, how hospitals are organized today and to survive into the futures. That's going to be clinical and financial focused. It's not going to be environmental or social. The joint commission of accreditation of healthcare organizations would be pretty close. ([117]) They would grade the clinical and the environment. In addition, there is Press Ganey that display customer satisfaction studies with hospitals, and there are tools for that…([118])

> ***That would be a challenge for BSU to come up with a grading system incorporating many different aspects of a hospital, just discussed...***

It could be an interesting process to try to develop something like that to grade hospitals. However, there are hospitals that are 100 years old and people are working in them and doing marvelous things. There are also hospitals that are 10 years old and people are doing the same thing. Really, is would be a phenomenal tool if you could create something like that. There are all kinds of benchmark measures but you have to go to that specific discipline for that.

> ***Do you have major doubts about tying design and health together?***

No, they need to be even better tied together. Healthcare executives need to look at the environment. I think the time has come for healthcare and design folks to be in the same room, at the same table talking about the delivery models. However, you

([116]) HCIA-Sachs looks at the top 100 hospitals in the nation every single year. There are 6200 hospitals in the nation. 5000 of them meet these folk's criteria. They have 8 different categories that they measure in significant detail. Out of those 5000 hospitals they come up with the top 100. So those would be your benchmark hospitals, giving models for health service delivery or organization. Cardinal was a top 100 system for 2 years in a row. http://www.100tophospitals.com/studies/national00/methodology.htm

([117]) Joint Commission of Accreditation of Healthcare Organizations: http://www.jcaho.org/

([118]) Press Ganey is asking for the customer's perception of billing, the room, or the clinical. http://www.pressganey.com/

have to move fast in order to not have years of studying an issue. You figure out what you need and gather the information to make decisions. ([119])

> ***Can you suggest some journals or books or some organizations that deals with these issues, especially the connection between health and design?***

You're going to have to read up on healthcare environment. I was in a retreat last week and the surgery nurses were telling me that they have done some research about the surgical environment and how patients respond to it. The cancer treatment group have looked at the environment that they have found themselves in. You go disease by disease. Social work journals are looking at the environment and the practice of the therapies.

> ***Do you know about literature which deals with breaking down silos?***

I would reference you to Edward Deming and Robert Juran. They are talking about teams. Your buzz words are going to be CQI (Continuous Quality Improvement) or TQM (Total Quality management). Other literature would be anything on Multidisciplinary thinking. A lot of that is going to be clinical. Yet, I think you can look at multidisciplinary teams, multidisciplinary management functions those would be some words to look up.

7.1.3. Questionnaire a Specialist from the School of Nursing

> ***Many conferences are being held in order to discuss the link between health and design (International Academy for Design and Health (www.designandhealth.com), an international conference at the University of South Carolina (http://www.sc.edu/sustainableu/),...), and so on. Many funding sources such as the Robert Wood Johnson Foundation now identify the link between the designed environment and human health. The interdisciplinary nature of these meetings and groups is apparent, but also can be confusing because the boundaries of the subject are elusive. Do you think (your field) has a place within these dialogues? What professional issues might be interesting to you, in this wide field, based on your professional experience and interests?***

The nursing profession has a significant role in being part of the interdisciplinary team that discusses health and environment in conjunction with design. The nursing

([119]) What you will do is go into a discipline, you go outside the discipline, and you come back into the disciplinary specialization. For sure, the time has come for hospitals to not be such frightening places and to recognize the body-mind-spirit of the patient-family.

discipline addresses the seven dimensions of wellness, including physical, intellectual, social, spiritual, emotional, occupational, and environmental. Nursing is not limited to providing individual patient/client care in acute settings, but rather includes health promotion and disease prevention activities in collaboration with families, aggregates, and communities to ultimately improve their wellness. Nursing faces the challenge of preparing nursing practitioners to conceptualize and collaborate with the micro and macro socioeconomic systems.

> ***If we see the man-made environment - in relation to "human health" - as operating on certain levels of decision-making (e.g. community level, building level, near environment-interior level) what are some of the most exemplary "cases" in which your field has made a contribution? What makes them exemplary from your viewpoint, and how did the knowledge base in your field play a part in making them outstanding?***

Healthy People 2010 provides a framework for augmenting interdisciplinary collaboration for education and practice. The leading health indicators in *Healthy People 2010* could be used as the framework to create the interdisciplinary education and practice for creating innovative wellness and environmental solutions. Each of the leading health indicators include objectives/outcomes to be met by 2010. An example of a local, state, and national health indicator cited in *Healthy People 2010* is overweight and obesity. Overweight and obesity are associated with biological, behavioral, and environmental factors. Consequences of obesity may include high blood pressure, high cholesterol, heart disease, diabetes, and stroke. In 2002, the U.S. Surgeon General requested the nation to collaborate in finding solutions to the obesity and overweight problem. "In October 2000, the Division of Nutrition and Physical Activity initiated a program to support state health departments and their partners in developing and implementing nutrition and physical activity interventions in an effort to prevent chronic diseases, especially obesity. States were encouraged to us a social marketing approach in designing their population-based strategies, particularly policy-level and environmental interventions."

> ***A lot of discussion can be heard about the various kinds of "metrics" by which the performance of built environments can be assessed. LEED is one such tool, used to assess the environmental and sustainability rating of buildings. Is it conceivable to develop a "metric" to assess the characteristics of healthy designed environments? What might be some of the items or characteristics in such a check-list in your field, and how would they be measured? Do you know of any such effort?***

In the community health arena, there are specific instruments that evaluate external and internal environments.

What are your major doubts about tying DESIGN and HEALTH together? Do you think the causal links are directional or bi-directional? Do you think this is just another bandwagon that is now in currency and will soon wane? Have we seen attempts to make such a link before, and if so, what happened?

It is salient for design and health to be integrated in an interdisciplinary approach. The link between design and health assists in lowering health care cost through reducing the number of hospitalized days, number of events that need physician office visits, reduce number of employment lost days, and others. The link between design and health are directional.

Can you recommend journals, books, organizations to which you belong or which are central to your discipline in which these questions, issues and connections are made?

Journals: Journal of Community Health, American Public Health Association

7.1.4. Questionnaire a Specialist from the Department of Landscape Architecture

Many conferences are being held in order to discuss the link between health and design (International Academy for Design and Health (www.designandhealth.com), an international conference at the University of South Carolina (http://www.sc.edu/sustainableu/),...), and so on. Many funding sources such as the Robert Wood Johnson Foundation now identify the link between the designed environment and human health. The interdisciplinary nature of these meetings and groups is apparent, but also can be confusing because the boundaries of the subject are elusive.

Do you think (your field) has a place within these dialogues?
There is no question that landscape architecture has a place within these dialogues. Because we (people) are inherently connected to natural environments (air, water, food, etc.) and elements, and study and design in landscape architecture focuses on these spaces, it is impossible to separate the two. Landscape architects bring to this dialogue includes intellectual and intuitive understandings of how humans relate to the environment, built or otherwise. We also have training and practice in the skills of marrying the science of landscape with the art of design.

What professional issues might be interesting to you, in this wide field, based on your professional experience and interests?
At this time my interests are touch on many aspects of this topic, though I definitely enjoy studying the wellness/health benefits of design of the outdoor environment,

and the integration of the outdoor environment to the indoor environment (atria design, views, etc.). For me this study is important at many scales (regional, community, site, etc.), and would lack depth without this understanding.

While physical health is certainly an important facet of this study, my interest extends beyond this to the emotional and psychological well-being of users. Currently I am exploring the study of how our brains interpret and effect our perception of space (and therefore impacts our emotional health).

> ***If we see the human-made environment - in relation to "human health" - as operating on certain levels of decision-making (e.g. community level, building level, near environment-interior level) what are some of the most exemplary "cases" in which your field has made a contribution? What makes them exemplary from your viewpoint, and how did the knowledge base in your field play a part in making them outstanding?***

Here are a few:

Central Park, NY, NY – it has served the communities of NY in many ways, providing access to more natural spaces for visual and physical enjoyment. No doubt has had a dramatic impact on the quality of life of the users, including the contribution to reducing the heat island effect and cleaning the air. The "founding father" of landscape architecture designed this park. His knowledge of the environment, plants, people, art, landform, water, soil, etc. contributed to the making of this masterpiece.

The Play Yard, Enid A. Haupt Glass Garden, Enid A. Haupt Perennial Garden and the Alva and Bernard F. Gimbel Garden at the Howard A. Rusk Institute of Rehabilitation Medicine, NY, NY – Represents a diverse environment in which to study the value of horticulture therapy for people. Designed by landscape architect (Martin H. Cohen) in collaboration with experts from various fields.

> ***A lot of discussion can be heard about the various kinds of "metrics" by which the performance of built environments can be assessed. LEED is one such tool, used to assess the environmental and sustainability rating of buildings. Is it conceivable to develop a "metric" to assess the characteristics of healthy designed environments? What might be some of the items or characteristics in such a check-list in your field, and how would they be measured? Do you know of any such effort?***

Systematic post-occupancy evaluations have not taken place on many gardens or outdoor areas, much less ones targeting health concerns. There are efforts in this direction, however. Of course the Ulrich study is fundamental to this discussion, and currently Dr. Jo Westphal (Michigan) is completing a study of blood pressure/anxiety

responses in gardens with elderly. Claire Cooper Marcus and Marni Barnes have developed more general protocols for studying the success of outdoor spaces in supporting health-related goals.

What are your major doubts about tying DESIGN and HEALTH together?

I don't know that I have major doubts. These are already inextricably linked. The question is: How do we move this study forward?

Do you think the causal links are directional or bi-directional?

Everything, when working with people, is bi-directional. It cannot be any other way.

Have we seen attempts to make such a link before, and if so, what happened?

Yes, of course. Hospitals and care for the infirmed historically had a direct physical link to the outdoors and natural elements. "Science" happened. This is why unless it can be empirically proved, to many people; it is just an "extra" to have a garden.

Do you think this is just another bandwagon that is now in currency and will soon wane?

For some this is a bandwagon and for them it will wane the as soon as there is no money or prestige in pursuing this line of inquiry.

Can you recommend journals, books, organizations to which you belong or which are central to your discipline in which these questions, issues and connections are made?

Therapeutic Garden Design Professional Interest Group: *http://host.asla.org/groups/tgdpigroup/*

Indiana Healthy Cities and Communities Network: *http://www.iupui.edu/~citynet/cnet.html*

Healing Landscapes Database: *http://www.healinglandscapes.org/bibliography.html*

Cooper Marcus, C., and M. Barnes. Healing Gardens: Therapeutic Benefits and Design Recommendations. New York: John Wiley, 1999.

Cooper Marcus, C., and C. Frances, eds. People Places: Design Guidelines for Urban Open Spaces. New York: Van Nostrand Reinhold, 1990.

Gerlach-Spriggs, N., R. Kaufaman, and S. Warner. Restorative Gardens. New Haven, CT: Yale University Press, 1998.

Kaplan, R. and S. Kaplan. The Experience of Nature: A Psychological Perspective. Cambridge, England: Cambridge University Press, 1987.

Kaplan, R. and S. Kaplan. With People in Mind: Design and Management of Everyday Nature. Washington D.C.: Island Press, 1998.

Lewis, C. Green Nature, Human Nature: The Meaning of Plants in Our Lives. Champaign, IL: University of Illinois Press, 1996.

McLaughlin, J., J. Beebe, J. Hirshfield, P. Lindia, and D. Gubanc. "Duke University's Bird Garden." In Proceedings of the 1996 Annual Conference of the Society for the Arts in Healthcare. Durham, NC: Durham Arts Council and Duke University Medical Center (1996): 49-63.

Shoemaker, C. A. ed. Interaction by Design: Bringing People and Plants Together for Health and Well-being. Ames, IA: Iowa State Press, 2002.

Tyson, M. The Healing Landscape: Therapeutic Outdoor Environments. New York: McGraw Hill, 1998.

Ulrich, R.S. "View through a window may influence recovery from surgery." Science, 224 (1984): 420-421.

Ulrich, R.S. "Visual Landscapes and Psychological Well-being." Landscape Research 4.1(1979): 17-23.

7.1.5. Questionnaire with a Specialist of Economics

> ***Many conferences are being held in order to discuss the link between health and design (International Academy for Design and Health (www.designandhealth.com), an international conference at the University of South Carolina (http://www.sc.edu/sustainableu/),...), and so on. Many funding sources such as the Robert Wood Johnson Foundation now identify the link between the designed environment and human health. The interdisciplinary nature of these meetings and groups is apparent, but also can be confusing because the boundaries of the subject are elusive. Do you think (your field) has a place within these dialogues? What professional issues might be interesting to you, in this wide field, based on your professional experience and interests?***

Some of the economic issues about health and design are: Tradeoffs: 1)More resources to design and build buildings mean fewer resources in other areas. 2) Who will pay? Taxpayers, voluntary contributions. If taxpayers, have the disincentive effects of higher taxes been calculated?

> ***If we see the man-made environment - in relation to "human health" - as operating on certain levels of decision-making (e.g. community level, building level, near environment-interior level) what are some of the most exemplary "cases" in which your field has made a contribution? What makes them exemplary from your viewpoint, and how did the knowledge base in your field play a part in making them outstanding?***

I assume this means case studies. Though often used in business, in economics we normally follow more of a scientific method developing a hypothesis and testing it using real world data. There are many different studies looking at various aspects of health economics. Given the size of this question, I am not sure that I would say certain studies are the exemplary cases.

> ***A lot of discussion can be heard about the various kinds of "metrics" by which the performance of built environments can be assessed. LEED is one such tool, used to assess the environmental and sustainability rating of buildings. Is it conceivable to develop a "metric" to assess the characteristics of healthy designed environments? What might be some of the items or characteristics in such a check-list in your field, and how would they be measured? Do you know of any such effort?***

To determine whether a project was worth doing relative to other projects, we normally would use cost benefit analysis. We would want to quantify the benefits and the costs. Determine how long the benefits would last. Determine how long it would cost to build. We would also want to find the net present values of the future benefits and costs using an appropriate interest rate.

> ***What are your major doubts about tying DESIGN and HEALTH together? Do you think the causal links are directional or bi-directional? Do you think this is just another bandwagon that is now in currency and will soon wane? Have we seen attempts to make such a link before, and if so, what happened?***

Design and technology obviously affects health through how much exercise do people get in their daily lives. Is walking the easiest way to get around or is it by car? Or even how does the design affect people's stress? Then, health also affects design. If there are more people who are in wheelchairs, there is a larger demand for houses with wheelchair access. If there are older individuals that is also likely to affect how things are built. Finally, much of the current interest in this topic has much to do with the large amount of "advertising" that various groups have provided. Design and health will continue to compete for attention with various other causes or problems.

> ***Can you recommend journals, books, organizations to which you belong or which are central to your discipline in which these questions, issues and connections are made?***

This topic is related too much of the literature on health economics, urban/spatial economics and environmental economics.

7.1.6. Interview with an expert in architecture

> ***Before we start, perhaps you can tell me a little bit about what your position at BSA is, what your responsibilities are, and how you see the link between health and design.***

Ok my name is Doug Reddington. I am a principal here at BSA Life Structures. Our firm's primarily focus is health care, we have some other focuses of education, research, laboratories, and institutional work, but I would say 90-95 percent of our work is in health sciences. My company is related to design. We do some project management, in which we will assist the owner in actually building the structures. Yet, primarily our focus is on the design of them. That is from the beginning where we do planning to building design and standard architectural design to post occupancy evaluations and facility management.

> ***What kind of health care facilities are you designing and supervising?***

We are dealing with the full gamut: hospitals, inventory care facilities, physicians' office buildings. We do not really get too much into nursing homes and long-term care facilities because we consider them more as housing projects, though we do health care projects.

> ***What do housing projects mean exactly?***

Well, in nursing home what you are really doing is housing a population that is older and needs more care. You are not necessarily providing them with treatment, which is a distinction of health care: you are treating a patient for a sickness. So, we do the health care part, we do the hospitals.

> **Many conferences are being held in order to discuss the link between health and design (International Academy for Design and Health (www.designandhealth.com), an international conference at the University of South Carolina (http://www.sc.edu/sustainableu/),...), and so on. Many funding sources such as the Robert Wood Johnson Foundation now identify the link between the designed environment and human health. The interdisciplinary nature of these meetings and groups is apparent, but also can be confusing because the boundaries of the subject are elusive. Do you think (your field) has a place within these dialogues? What professional issues might be interesting to you, in this wide field, based on your professional experience and interests?**

Actually, the AIA has recently funded a grant with a group of physicians and neurologists to determine what effect good design has on people and how people

interpret design. So, I think that our field is actually on the cutting edge of trying to figure some of those things out. I say that in the same light, that the general population does not think that there is a strong link. We have found very few who are willing to pay additional money to accomplish some of those things. I would say there is a link. I think, we have ways to go to convince the general public that this is going to happen to the advantage to society as a whole.

How do you convince the client that the link between design and health is necessary to think within organizing and designing a hospital?

Well, early in the 90's the hospitals had banded together and decided that they were going to ban smoking in their buildings. They were the first to do so and were doing so because they believed that their institution should foster a healthy environment. They were not doing that by permitting smoking. I think that the same argument can be made for good design, for a healthy design, and for a profession is supposed to foster health. In addition, if you are not in a healthy environment, how can you expect to be healthy? Now, we have not been able to convince anyone about that yet. There are some initiatives out there like LEED…

…which focus more with the environmental concerns…

That is true but that all ties back into a healthy environment or one part of the healthy environment. That group yet has not defined what a lead certified building would be as a hospital. So there are still a little bit behind.

Therefore, your definition of design relates to the creation of a healthy environment. Does it relate to aesthetics, such as light, colors, etc.?

I think they all tie together. I think a healthy environment does involve interior design and requires light and color, etc. All those things are tied together. I do not think you can separate any one of those per se.

Back to the question, what was here important is the question, how you see the interdisciplinary focus of health and design in your profession as an architect. Is it possible to separate all other professions out of that design process of a healthy environment? How is the linkage between other professions important?

I think that it is very important. Let us just take LEED for example, not that that is best, but there are all sorts of different tangents. You can get into the lighting concepts, where the electrical people are involved to talk about natural day lighting in order to decrease the overhead lighting. You can decrease the amount of HVAC by doing so. Therefore, they are all linked together so there is no one that is overriding. They all have to work together to make it work.

…Can you explain again…You sit together with many different professionals at one table. You have a certain function; the others have a certain function. How can you tie everything together to get a product of a healthy design?

I do not know. I do not think that there is one simple way of doing it. I guess, my simple answer would be to be an architect. The reason is being an architect is to solicit input from different disciplines and to challenge that input, and than you need to turn it and leave it and see what comes out, see what you can develop. In engaging that particular discipline, maybe the other disciplines will have some input that will alter or change a shift.

Do you see any direct links to specific professions?

I do not understand the question.

The question is related to professional silos and where they are located. Out of conversations with professors came out that they were defining their own profession and discipline as very important, more important than others. Are silos located just in the university environment or do they exist also in practice? How do you see that as a practitioner? Can you distinguish your professional silo in practice or is that not possible?

Well, in architecture, our silo is rather big. It has a bunch of other silos in it, as I understand the concept of silos. I do not know what you are referring to.

In this conversation, silo means that this is my filed, here are my boundaries, and nobody understands my silo because I am the expert so you cannot interfere with my silo. That means also that I cannot interfere with your silo. In regards to the topic health and design, the interdisciplinary contribution leads to a healthy product. However, in our interviews, each profession was arguing that this particular profession was more important than others were.

I once worked with a construction engineer, which was from Russia or somewhere in that area and his opinion that you built the structure and then an architect came in and around it. In my opinion that just is not the case. For example, we do not but a space out in the middle of a field for a mechanical engineer to go out and heat. It starts really with the users and what their needs are, and everything is built around that… So where was I going with this…

The thing is that other professions will have a certain perception of for example architects and they will say that we will do the

most important aspects first and then you can come with your beautiful stuff.

That's true, yes.

This is a certain perceptions that others will have of your profession and you will have your own perceptions of others as well. How do you relate to this?

You have to teach them…

…Again, when you sit together in an interdisciplinary group, how is it possible to have a … dialogue that leads to the production of a healthy environment?

Well, I think its give and take on all of the designs professionals. Truly, if you have someone who is too stringently defining or defending their silo, then maybe they are not capable of doing a healthy environment. Anyway, I still think it is a matter of dialogue; it is a matter of teaching. On every project we ever do you go into it knowing that the beginning is a discovery phase. I do not ever go into a project knowing the solution or knowing all the things. You cannot do that. It is a learning process; you start learning about the problem, about the needs, and the mission vision of the client and go from there.

… it is just a little bit difficult to understand how an interdisciplinary platform can be establish first as a pre-requisite for a fertile product…

Well, we here at BSA are a full service firm. Therefore, we have all the disciplines in here and yes, it is a challenge sometimes, to figure out how to work with other firms. However, it is kind of a two fold; number one I am a businessperson and want them to be profitable. Therefore, I am going to teach them how to do their job, not make mistakes, and still be profitable and yet work well with everyone else. That over time has taught me even better how to deal with out of house consultants which is probably more a bit of a problem because they are definitely built in silos and there are more fences up.

So, you can find fences and silos in practice, or do you think, they are just located in academia?

No, I think you can definitely find them in practice.

If we see the man-made environment - in relation to "human health" - as operating on certain levels of decision-making (e.g. community level, building level, near environment-interior level) what are some of the most exemplary "cases" in which your field

has made a contribution? What makes them exemplary from your viewpoint, and how did the knowledge base in your field play a part in making them outstanding?

First, from a health care perspective, I think from a community standpoint you can clearly sit back and say this function or this institution wants to make people healthier. Now, the fact that some of the things they do to make that person healthier may make the overall environment less healthy. It is something that we need to get beyond, for example, certain medicines that they produce are very costly or certain procedures may take a lot of input or energy in order to get it accomplished and is not really worthwhile doing. Those are overriding issues with which the profession needs to deal with. However, in overall, I think that a hospital in a community is a healthy thing and it represents a healthy thing.
The next level is the building level that evolved over time. For many years a hospital looked like a certain kind of building. You went in and you knew you were in a hospital, which had ceramic tile walls and trazeau floors and shiny ceiling. It was a very sterile environment. Over time they have developed analysis and done studies. They determined that people get well quicker when they are in a more comfortable environment and under less stress. So that has led them to create environments that I guess you would call more healthy in terms of maybe more less stress. We already discussed the fact that they were not up to the point of being LEED-certified. Therefore, they are not contributing in that way. Generally, the buildings are healthy. Interior level, I do not quite understand…

…It is the space the room itself…

Ok, that kind of what we went over. I think in terms of how has our profession made contributions. Clearly, we were the ones who demonstrated that patients get well quicker if they have natural light, and do the requirement of natural light. Moreover, we're the ones who run the forefront in developing the research for how much fresh air do you really need and how many times you need to turn that air over. In addition, we researched about what you should do in regards to infectious patients or to surgeries. Therefore, I think we have led some of that.

…With 'we' you are referring to your company…

With 'we', I am referring to our profession of architecture. Now the health care environment generally is focused on getting patients well, not necessarily in creating a healthy environment for a healthy person to live. I think, they are really two separate things. Maybe over time they will not be separate things. Ok what makes the exemplary case …..

The question focuses any case studies or any examples you can refer to.

Yes, there have been many studies in lots of books. I do not know them off the top of my head but they have looked at light, color, overall environment, including family, not including family, noise, finishes. Those are documented studies.

What is your definition of a healthy environment? What is health for you?

Well, I think it is something that number one that sustains whoever is in that environment in a healthy way and number two is in creating a healthy environment doesn't detract from the health of other areas. As the population gets bigger we can't grow necessary for what we need here.

What is meant with the 'building environment' for you? I am just asking these basic questions because each of my interview participant has had differently defined what 'health', 'healthy environment', or ''built environment' is.

Ok… I look at the build environment as anything that man has touched. However, as I look more specifically from our profession it is generally buildings. In other words although landscape and self-scape are part of the environment, they are not part of what I can look at professionally.

And a healthy environment would be a building to you.

Well, no. A healthy environment would be all of it. The environment would be everything.

I'm just asking because earlier you said that you are looking on the building which tries to make people well who are not well. That refers to the hospitals.

Right, so in that case I'm referring to the building.

Can you think about other levels of decision making power or other levels of intervention in order to create a healthy environment, such as on community level?

Yes but that would not be necessarily a hospital or a healthcare facility which is what we focus on. If you look at 'Celebration' by Disney and there is one in northern Indianawhere we actually did some of the master planning on the health care component of it. ([120]) They are in quote 'healthy environments'. What they're doing is starting down the road of creating a sustainable areas that are going to be long term healthier to the people who will live in them. These two examples are looking from the macro level on healthy environments.

([120]) 'Celebration', Florida: http://www.celebrationfl.com/

A lot of discussion can be heard about the various kinds of "metrics" by which the performance of built environments can be assessed. LEED is one such tool, used to assess the environmental and sustainability rating of buildings. Is it conceivable to develop a "metric" to assess the characteristics of healthy designed environments? What might be some of the items or characteristics in such a check-list in your field, and how would they be measured? Do you know of any such effort?

Yes, LEED is one way of measuring it… Let's start within my building type. The way they would look at the measurement would be the increase in the better clinical outcomes. That means, people getting well sooner, shorter times of stays, maybe less pain drugs or narcotics, fewer fall rates. Those start defining the success of healthier environments for patients. LEED is one of the few that started documenting them… Probably it is conceivable to develop a matrix. LEED has quite a few checklist items. I think you would probably want to go from macro down to micro. However, I think one of the keys is that the building of this quality does not upset the environment somewhere else.

To say that 'I want to make a healthy environment' is a concept; therefore, you have certain characteristics that you are trying to focus on while building up the building. How do you approach such health care facilities? Do you have a checklist?

Yes, it is a multidisciplinary approach because each discipline can do certain things at certain levels. Moreover, again, it comes back to the users, how they would rate the success. We have done some work directly with users to help that. In general we just study the literature to find out what the latest thought is to maximize those successes. Do we have an actual checklist? No.

You said earlier that this company is doing post occupancy evaluations. Therefore, there will be certain success and failure stories. How do you use this knowledge for your next project?

We have in our firm continuing education. The idea is that we get the post occupancy evaluation results together in a session and present it to whoever is interested. Do we have a formal plan? No, we do not. We are starting down the road of developing a knowledge-based database that we can use and everyone can access. Yet, we do not have that knowledge management kind of asset. Although, we have some ways of doing it, but we do not have a formal measuring tool. We have looked at many different ways to organize it. In our field you can organize it around sicknesses disease, and the way the federal government asks for reimbursement because that is many times the way hospitals are organized. These are probably the two main ways.

What are your major doubts about tying DESIGN and HEALTH together? Do you think the causal links are directional or bi-directional? Do you think this is just another bandwagon that is now in currency and will soon wane? Have we seen attempts to make such a link before, and if so, what happened?

No, I believe that there clearly is a linkage. Everything we know points to the fact that there is a linkage.

At the very beginning, you said that many people do not realize that linkage. How can one present that there is actually a linkage?

I do not know. I think that it is kind of a one on one trying to convince people. You do it in every project. Whether you would succeed, I do not know. I think, in our profession or particular discipline we have advantage to deal with fairly educated people that have seen many of these studies. When we start getting into the periphery, when we were in the developing world, when there are some people maybe are not as focused on health care they maybe are less likely willing to spend money to have improvement that would add to a healthy environment. Therefore, there is probably a linkage between education, in other words enlightenment, and those who think whether there is a link.

So would you suggest an early design education?

Design as much as just any education that leads to enlightenment.

7.1.7. Interview with a Specialist from the Department of Architecture

Beginning with our conversation about 'Health and Design', can you give us an overview about how you understand your profession, and what your interests in the topic 'Health and Design' are from your professional prospective?

Well, my background includes work as a practicing architect in healthcare design. When I was an architect in a firm, we did a lot of hospital work. I remember vividly the difficulties and the complexities and challenges of working on big hospitals, both new projects and additions to old buildings. Constant negotiations between the hospital administrations, the architects, the engineering consultants are necessarily. Briefly, the dynamics of those projects were just overwhelming. I also remember an experience in which the hospital for whom we were serving as consulting architects, hired another firm to do the programming for the new building. I remember also how the job captains of our firm were not happy with the hospital for having hired somebody else to do the programming and we would do the design work. Then, something happened in which the program, which was a big expensive document, was somehow, almost put aside and ignored by our people doing the hospital. So, I

have memories of complexity and change, dynamics and multiple stake holders, the constant ebb and flow of designing and how difficult it was to pin down finally the design that could actually be put in working drawings that could be sent to the contractors.
Additionally, I remember that after the contractor left, things would change. The designers would be asked by the client to modify some aspect of the project that we had already put out for bid. We told the client: "Well, if you do that, you are going to have to pay a lot of change order costs and the contractors are going to sock you for a lot more money."
Later while here at BSU, the INO hospital project in Switzerlandcame to my attention. ([121]) In this project, the participating architects and project managers tried to develop a new strategy for the delivery of healthcare projects. The memories of my experience in practice came back vividly. It was very interesting that this open building approach could potentially solve the problems of distributed control and change that hospital facilities are always facing. Those experiences converged.
A third tangent also came into view with those other experiences. The idea that you can fix a program of requirements for a building and make a tightly fitted piece of architecture for that program seems to inevitably fail. The failure of that notion was already evident when I was in practice. Yet, it was never explicit. When I discovered the INO-project in Switzerland, their commitment to designing for change vividly made the failure of conventional design strategies evident. This concept of designing a building that could contain many programs over time was very exciting. A lot of the assumption, presumptions, and principles of modernist architecture were questioned. Many interesting things came together.

> ***According to you, your interest lies in the strategy of organizing the different interests within the building construction over time. Do you connect that interest to healthcare facilities, in particular hospitals? Alternatively, would see similar problems and challenges within large building projects in general?***

Well, the fact that buildings change to remain useful is certainly a general condition. Everybody knows it but maybe we do not have good theory to help us understand that phenomenon. Everybody makes money and does architectural contracts to change buildings that somebody else built before. Yet, we somehow always feel embarrassed in explaining that because some people think that it indicates a failure of the original design if you have to go back and change it. Therefore, the principle that buildings change over time if they are going to remain useful and stay with us, is broadly applicable. However, in regards to hospitals, they are extremely complex that the phenomenon of change just presents that many more difficulties compared to an office building, which remains relatively trivial in comparison.

([121]) INO – hospital project in Switzerland

You mean that tenant spaces in an office building change perhaps in every 2-5 years but a hospital changes more frequently according to the new hospital development...

The point seems to be that complex buildings experience cycles of change…some parts change faster than other parts, in response to a variety of forces. These include changing demographics, new health care policies, new insurances, new regulation, new practices, new doctors who come and want different things… Health care is a competitive world, it is about life and death, and it is very expensive. Most hospitals constantly have contractors in them, constantly repairing the building, constantly fixing, revising, adding, modifying, or remodeling. So that's one side of my interest in healthcare architecture, having a social, public policy dimension together with a competitive market orientated a technical dimension.

Moreover, the idea that healthcare environments ought to support a kind of a spiritual or an emotional dimension of people in the sense of being curative, interests me. I had been always skeptical about a tight and predictable relationship between human behavior and physical environments because of some very deterministic claims that certain kinds of environments could have certain objectively and measurable effects on human behavior. Then I visited a project - a hospital project as part of a community - in Sweden that turned my mind around about this. ([122]) I came to see that certain kind of architectures might have a curative and homeopathic effect on people. So that skepticism is still there but I am more open to consider environments having somehow a curative effect. I saw examples in Japanand in Sweden in particular, where that skepticism has been tempered.

In concluding, two points are personally important for me: how do you make an architecture that is adaptable and changeable with respect to how healthcare is been delivered. On the one hand, how do you make those environments inherently effective as instruments to cure sick people?

> ***So, on one hand you want to figure out the actual construction of the physical space, and on the other hand you want to find out about the influence of that built environment on feelings.***

Well, at least see them together. They are big questions. How to design hospitals are only to handle the dynamics of both permanence and change is one question. The effect of built form on the psyche, on emotional condition, on the healing processes is another question.

> ***Do you see a connection between built environments and its influence on humans?***

The paradoxical problem is, that the buildings that I've mentioned – in Japan and Sweden, seem to have a powerful capability of helping people to get better, yet do not seem to be the kind of environment that can change easily. They seem to want to be stable settings in which the formal aspects (light, color, geometries, patterns of

([122]) Hospital Project in Sweden: Eric Ammunsen...

spatial order) are carefully crafted to be just so. If these environments have to constantly change – or at least in cycles - it seem to disrupt the qualities of curative effect. Maybe there is a conflict. The INO-hospital for example is a very high-tech project. The interiors look unbelievably sterile, hard, and to me very inhuman. In contrast, the buildings we saw in Sweden were warm, welcoming, and somehow humanistic. There is maybe a collision. I am just curious about it.

What does health mean for you? We talked about healthcare facilities and you have directly mentioned hospitals. What other kind of healthcare facilities do you see in regards to the meaning of healthcare, and your definition of health?

Health is a huge spectrum of concerns, from good air to good lighting to injuries to surgery to caring for the elderly and infirm and so on. It is encompassing issue that have to do with human relations, physical environments, mental states, and continuing care and good diets. And there are public policy and economic dimensions. The topic 'health', similar to 'sustainability', is a huge topic. However, from an architecture point of view it is a little bit more tractable because you think about built forms and built environments. Even within these areas, it is large because we have elderly housing, nursing homes, clinics, and outpatient facilities. It is a big field.

Do you see other forms of healthy design beyond healthcare facilities (hospitals)?

Sure, that is why we have urban planners and landscape architects who tend to their scope of concerns. That is why we are doing this interdisciplinary project because no discipline can handle the scope of the issues. Therefore, we need many different experts thinking and working together. We need experts in special fields because we need deep knowledge and that can only grow when it is constrained. Nevertheless, we need to figure out how to get all this knowledge to work in harmony to solve problems.

That leads me to my first question…

That wasn't the first question?

No, that was not the first that was just a warm up...
Many conferences are being held in order to discuss the link between health and design (International Academy for Design and Health, the International Conference at the University of South Carolina, etc.). Many funding sources such as the Robert Wood Johnson Foundation now identify the link between the designed environment and human health. The interdisciplinary nature of these meetings and groups is apparent, but also can be confusing because the boundaries of the subject are elusive. Do you think

(your field) has a place within these dialogues? What professional issues might be interesting to you, in this wide field, based on your professional experience and interests?

Somebody identifies a problem or a situation that needs attention through experts to help frame the issues and find resolutions to the problem. Sometimes those issues do not require architectural expertise, sometimes they do. Sometimes a client, a hospital, a nursing home, or a public agency will frame their difficulty in terms that suggest an architectural solution, such as a building or a renovation. It is often the case that this is not the problem. Rather, it is first a management, a resource allocation, a public policy, or a regulatory problem. Therefore, everybody needs to get outside his or her professional role and look with clear eyes at the situation because it may not require what the first impulse suggests. There are stories, in which a client hired an architect to do something and the architect wisely counseled the client to do something that would not require the hiring of an architect. That is a good thing to recognize. Buildings are not always the solution. When they are, then you need people who know what to do. When an urban planning issue is at hand you need somebody that knows those issues.

Therefore, you are saying that an architect dealing with a certain question could help to find a solution where an architect is not needed. Can an architect still be involved because an architect is already involved in the whole issue?

The point is not to waste energy on a path that is out of touch with the reality of the situation. So, do not hire an architect if the problem setting is not calling for architectural knowledge. It is just that simple. I am happy to identify the kinds of architectural knowledge that are going to be helpful in resolving the issues. Sometimes it is architectural knowledge, sometimes it is not, sometimes it is economics, and sometime it is not. It takes some good thinking to determine what kind of knowledge is needed. Thus we need interdisciplinary teams.

Because one cannot be expert in everything, so one cannot know what is really needed.

Yes, we might be blind because we always tend to frame things from our discipline's point of view. Inevitably, architects tend to frame things as architectural problem, in architectural problem setting, and in terms of architectural knowledge. That might be irrelevant and harmful.

Therefore, at the very beginning of a project, a good solution would be to have a group of different experts framing the assignment and then the client might decide who is going to be employed.

Yes, yet it is difficult for a client also: how are they supposed to know? It is a catch 22 and that is why it is complex. The challenge of an interdisciplinary setting in which to explore these things is quite difficult. Without a spectrum of knowledge, you cannot expect to solve these complex problems. Yet, on the other hand, experts tend to frame everything that they see in their own terms. Therefore, you start arguing about what is the nature of this situation and where does it fall within known bodies of knowledge.

> ***Coming back to the question from your professional background and from your prospective, where do you see connecting professions, where a partnership would be easy? Can you say, you have a certain assignment to which an urban planner would fit because you more or less know what an urban planner does and therefore you would need this professional's expertise?***

Well, that's a problem of who is called upon to form the team of people who together can come to grips with the felt need of the client. That is really an interesting problem because clients need to go to somebody, who can give them sound advice. If it's a landscape architect hired initially to help form the team, then you might expect certain things to flow, as compared to if hiring an economist to lead the team, then you might expect other things.

> ***So that means that the built environment is made by others besides the architects, too.***

Sure. In fact, in the case of Ball Memorial Hospital in their recent decision, they hired HDR as their planning consultant to make a new master plan. It is not completely self evident that a master plan was the first thing that needed to be made. After we went to one of those meeting that was what Bruce and I were thinking: the hospital skipped a step that would be important prior to hiring a consultant to do a master plan. And that was the idea of alternative futures which would be an interdisciplinary discussion which might lead to a master planning process but not necessarily.

> ***How you would have started? You were saying that they missed something. That means you would have started differently…***

I would have started with some scenario mapping, some scenario building. There are organizations (Institute for health or Institute for the future) that help clients chart alternative futures by looking at multiple influences and conditions and issues.

> ***So that means when you have an interest in landscape architecture they would show you what a scenario with a landscape emphasis would be?***

No, that is already discipline-based. I am talking about scenarios of a broader sort. Once a broader scenario is defined, it would be possible to identify what expertise is

needed to take that path. It is a search for a future direction, not necessarily a building.

Can you give an example?

I can only explain the idea in the abstract. For example, the hospital campus here may decide that it should distribute its functions into the community rather than consolidating them all in one place. That already suggests two scenarios: one is a physical distribution, another one would be an organizational distribution. According to their definitions of key economic business entities, they could create collaborative links with other entities in a business model sense. They already do that. They lease out space on their campus to other providers. Therefore, they are in competition with providers outside of the campus who lease space to their competitors. They are somehow in the real-estate industry and somehow in the healthcare industry. Anyway, there are probably a number of different ways in which future scenarios could be charted. Maybe BMH did that but what we saw in there strategic planning documents were not very rigorous in respect to the idea of charting alternative futures. In addition, their alternative futures have a five-year time horizon, which is extraordinarily short. Anyway, those are not first of all architectural issues, but when they come into the question of architectural knowledge then I know something but again not very much.

The second question is following. If we see the man-made environment - in relation to "human health" - as operating on certain levels of decision-making (e.g. community level, building level, near environment-interior level) what are some of the most exemplary "cases" in which your field has made a contribution? What makes them exemplary from your viewpoint, and how did the knowledge base in your field play a part in making them outstanding?

I have already mentioned a few that are outstanding in those two areas where I am personally interested in, the INO and the community in Sweden. There are dozens of books that tried to chart best practices. In our work here, we are trying to find out if there is a common language for identifying the best, excellence, quality etc. It is very amorphous as to what is 'a good case'.

How about a strategy which analyzes various post occupation studies and tries to figure out general guidelines?

Yes, that may be just a preliminary assumption that you could identify 'quality'. There is a recent issue of the magazine called 'Building Research and Information'. ([123]) Its special issue is on design quality, which I have been asked to review and comment on it. Their purpose is to seek for a way of measuring design quality in the built

([123])David Gann, editor. Building Research and Information'. London: The Imperial College of London.

environment. It says: “Imagine a world where our homes, cities and work places embody good design, where the built environment is convivial, improves our quality of life, and adds quality to your businesses. Such a vision sets a grand challenge to those, responsible for designing and producing the built environment, not at least because we do not have a well developed understanding about what design quality means or how to measure it.” The whole issue is in regards to a management of value and quality, and proposes an approach to measure design quality. A design quality indicator as a tool for thinking is proposed. In reading this I found it completely obscure. Maybe our question is impossible to answer.

> ***However, to figure that out is part of our profession as an architect in order to know what we can teach, learn, and do in practice… What are our expertise and the quality of design we bring into?***

This is an interesting question. I do not know the answer, but that is part of my motivation for wanting to do this interdisciplinary thing. It is to admit that I do not know many things and see if the others admit the same thing, then maybe together we can find something new.

> ***You already have mentioned methods of how to evaluate an environment. A lot of discussion can be heard about the various kinds of “metrics” by which the performance of built environments can be assessed. LEED is one such tool, used to assess the environmental and sustainability rating of buildings. Is it conceivable to develop a “metric” to assess the characteristics of healthy designed environments? What might be some of the items or characteristics in such a check-list in your field, and how would they be measured? Do you know of any such effort?***

Well, I referred to this design quality issue as an effort to build a metrics and checklist. David Gann is the editor and he is at the Imperial College, London. I do not know of other metrics than LEED for the healthcare environment.

> ***How did the Swiss hospital project management approach to this topic? Prior to the beginning of that project, they must have been certain expertise in the hospital building in order to develop such a big facility. Do you know about any metrics system, any checklist they were using at least as a base?***

Well, in the INO project Swiss government imposed very strict ecological and environmental constraints that had to be met. Therefore, in the area of building performance from energy standpoint there was an unambiguous set of metrics. They are already in the arena of openness, flexibility or long-term adaptability. There is not a clear road map to follow and that is partly why they are running into difficulties now. In the area of adaptable housing design, there has been enough experience over the

last 30 years. There is a kind of a checklist that a colleague in Finland developed to help declare with certainty that a certain project is more or less "open". Therefore, there are several items in three or four categories within a checklist. In terms of office buildings, there are many people over the years that have been developing extraordinarily complex measuring tools for the behavior of office environments. ([124]) There is a mature literature about office buildings but it tends to be extremely complex to go through the checklist. ASTM, the American Society for Testing and Materials, has a sub group on building performance indicators. There is lots of work; specifically tuned to medical facilities, I think, its maybe a little bit in the adolescent period of development for such metrics.

> ***What are your major doubts about tying DESIGN and HEALTH together? Do you think the causal links are directional or bi-directional? Do you think this is just another bandwagon that is now in currency and will soon wane? Have we seen attempts to make such a link before, and if so, what happened?***

It is exciting. It is a good thing to do. It raises all kinds of questions. There are so many smart people making that connection plausible that it is worth of it for the rest of us who are so starting to pay attention and to look into the questions that are being posed. Cause-effect relationships are very difficult to be sure of. I guess, all of us who are involved in environmental design must have some deep seated assumptions, that what we do matters to the well-being of people. Otherwise, we are just technicians who push buttons. It is exciting to raise those questions. Especially, in an educational institution, we have to help frame challenging questions and not just teach how to do things.

> ***So, do you have doubts or what? I am asking this question in prospective to the disciplinary course where students need to figure out within one or two semesters about all these questions we are raising. Perhaps it would be helpful for those students to start with a preliminary solution, which needs to be tested.***

Well, you have to have a hypothesis to start with. There are many sub-questions that we want to bring up and encourage students to bring up, and then to pursue them in a thoughtful way.

> ***When there is evident, there is a connection between the built environment with the help of humans, what would it mean for architects?***

Well, I just say the same thing that Professor Arijit Sen and I are telling our research methods classes: ask good questions, withhold judgment, look into the questions in an organized way, and try to provide useful answers that other people can

([124]) Francois Sergatti in Canada, Frank Duffy in England, Fransi Delft in the Netherlands

understand. That is a useful way of seeing the questions that architects should ask. Of course, with an architect you always have to get answers because you have to get things done…

> ***…because you are dealing with a three-dimensional object which will stand 30 or 40 years. That means you need to answer the questions you are raising in a healthy way, assuming the architect has a direct influence on the people's health.***

Therefore, the profession as a whole has to do better at building a knowledge base for its part and so do the other professions. Of course, architects are notoriously bad at withholding judgment and looking into things in an organized way and communicating well. We do not have a built-in mechanism for building a knowledge base because we are always thinking of ourselves as pre madonnas, interested in self-expression and one-off projects. It is not bad to start with your own impulses, of course. Since you are making proposals, you have to start somewhere. You had better not limit what you do to what you personally know, however, because you never can know enough. You have to look beyond yourself. That is a challenge. It is too often the case that our educational habits are navel-gazing and superficially harvesting and building on the work and the knowledge of others. Because of that, we are doing less effective work than we could in this field.

> ***How would you start the interdisciplinary project of searching for alternative futures for Ball Memorial Hospital? What would be the method you would apply?***

You mean, if I was hired by Ball Memorial Hospital. Oh my goodness. I would call up this futures institute and ask them what to do, because I do not know. I just know that that is needed but I do not know how to do it.

> ***Then, would you ask for the different alternatives and then would you decide on one?***

No, I do not decide. The hospital has to decide. However, they need to make available to themselves some clearly articulated alternative futures from which they can make a judgment. At least, they have to present some alternatives in order to make a good choice.

As an architect, I would wait, because I am interested in the open, accommodating building based on the problems of change. I would bring evidence to bear on the importance of thinking about that as one aspect of their future planning. Whomever they would pick to lead them might then want to consider what I have to say

7.1.8. Interview with a specialist in architecture

Before we start with questions, I would like to ask you what you think is health, what you think is the built environment, and how health and the built environment fit together.

Health would be general sense of well being. It is both physical and psychological – a sense of tranquillity or comfort that enables one to think about. It is the absence of stress or absence of things that would make it difficult to do one's tasks. That would be the health measure. The environment might be both the immediate environment within arms reach and the more general background environment, which includes the peripheral vision and the acoustical background. It a more general sense of where you are.

What is your basic interest to this project?

It is just general interest in trying to understand the way people use space and environment. At one level, it is a very generic architectural question. It ranges from things like the proportionality of the space including dimensional fit, to other metrics such as the illuminations level, acoustical level, temperature level and humidity level; all of the things that affect the body's metabolic behaviour. Then, more generally the notion of how inspiring the space might be, giving one a sense of repose or general ability to concentrate and to work on what they're doing. To the extent that all of those things are architectural, they directly or indirectly affect the sense of health. That is what interests me.

Do you think that people outside the architectural profession understand that relationship between the built environment and health?

No, many people do not understand the relationship between the built environment and in an external or objective way. I do not think anyone as a rule is very good at stepping outside of his or her situation and talking about it. Probably for mixed reasons; one would be that they do not have a reference system or a kind of academic categorization by which to describe their environment. They are so immersed in it they cannot really see the fish-in-water-syndrome. Therefore, in terms of verbal communication or a rational construct, I do not think as a rule that the average person is able to present a conversation or take issue with frames of reference that would be very architectural or that might even be medical. On the other hand, I think everybody has very strong senses of environment. They know if they are more comfortable or more inspired, or more effective, or more at repose in a space. They might not be able to say why, but they know a sense that it just feels good to them.

I think, that is difficult to convince people, who are not architects, that architecture is actually inspirational and influential.

It is a classic problem for our profession. It is not just related to health.

> ***Many conferences are being held in order to discuss the link between health and design (International Academy for Design and Health (www.designandhealth.com), an international conference at the University of South Carolina (http://www.sc.edu/sustainableu/),..), and so on. Many funding sources such as the Robert Wood Johnson Foundation now identify the link between the designed environment and human health. The interdisciplinary nature of these meetings and groups is apparent, but also can be confusing because the boundaries of the subject are elusive. Do you think (your field) has a place within these dialogues? What professional issues might be interesting to you, in this wide field, based on your professional experience and interests?***

Well, I think there is a real strong connection. If you are referring to my field being architecture or if you referring it to being building technology specifically, in either case, yes, there is a strong connection. One of the things that I have been presenting in workshops around the country reference the Hechsong Mahome study on the importance of day light in buildings. This study examined 21,000 schoolchildren in three elementary school districts, located in Orange County, California, Seattle, Washington, and Fort Collins, Colorado. They were able to prove scientifically with very tight certainty that students that were being schooled in spaces that had windows or spaces that had top light day lighting performed better on math-tests and had higher reading skills. They measured and gave a metric to it. I think the numbers were something like 20% or 26%. So, there is a case where it is been proven that the quality of the environment in this case, the presence of daylight, has a stimulating and influential effect on students' abilities to focus, be interested in, and become better in a particular skill such as reading or mathematics. They have also done a study of retail sales. They found that facilities that have daylight have higher rates of sales, and the consumer is more inclined to shop and buy. Therefore, the whole connection to daylight is important. Then, related to that are many studies that are more on the medical end that deal with the circadian rhythm and the biological clock that is linked to metabolic behaviour. The fact is that we need daylight because it has a direct impact on the skin, providing vitamin D and has an impact on our psychology. In addition, there is a whole body of research on seasonal affect disorder, which is a study of how folks who are deprived of daylight; actually go into states of depression.

> ***Do you view the connection between health and design more from the daylight perspective?***

I think it is principal. But there are other connections: again these are quite technical but have to do with the air quality as connected to temperature, humidity, and

pollution. Again, the most recent work shows that displacement ventilation systems are more effective at controlling a sense of thermal comfort but more importantly, it is a more effective ventilation technique for controlling the spread of communicable disease through air-borne pollution. If you have a standard room like this one where you have air coming from above and exhaust going out there, as the air blows in, it circulates the room and mixes clean air with dirty air. The air that goes out is partially clean, partially dirty. The room never is completely evacuated. You have zones or pockets in the room that are never entirely ventilated. With displacement ventilation, the air comes in low in a space, moves up uniformly through the space and gets removed at the top. It totally cleanses the body of air in the room. If a person sneezes, their sneeze is taken away from them, whereas with the delivery system in this room if a person sneezes the sneeze is spread around. There have been some studies using computational fluid dynamic techniques that show a sneeze and how it migrates. It proves that the air handling system and the way in which it controls temperature and moisture control, is linked to the pollution and air quality issues as a health dimension.

Another dimension in the health arena has to do with visual acuity, quite separate from daylight being a full spectrum illumination the actual quantity of foot-candles or lux falling on the surface, is significant to one's ability to see, to concentrate on the task. Therefore, although the illuminating and Engineering Society has set some standards for lighting of tasks types that are quite high, they have recognized issues of contrast and visual noise as factors linked to the illumination level. All those come back to health and the function of the human body.

Where do you see overlapping fields of professions beyond your own professional realm?

Well, some of the things I have already described overlap with engineering, interior design, product specification, and the medical field itself, directly and indirectly. If you are designing a health science or health facility building then there is a direct link to what the purpose of the building is. Yet, if you are just designing any other type of building structure there are health implications. The out-gassing of material, which can cause the sick-building syndrome or building related illness, can become significant. There is a strong overlap with the medical community. Building commissioning is another area that overlaps.

If we see the man-made environment - in relation to "human health" - as operating on certain levels of decision-making (e.g. community level, building level, near environment-interior level) what are some of the most exemplary "cases" in which your field has made a contribution? What makes them exemplary from your viewpoint, and how did the knowledge base in your field play a part in making them outstanding?

The exemplary cases are classical and contemporary; a classical one would be what Alvar Aalto did in his sanatorium for TB patients. ([125]) He designed a building, where the detailing was driven by the medical needs of the occupants. The detailing was driven by the medical purpose of the building: sink detailing to control the noise of water, the window system detailing to control the draft effect of fresh air ventilation, the programmatic decision to put a terrace on an upper level so folks could lie out in the sun and feel the cool air during the day. This was to bring people back from the edge of this disease. Contemporary examples would be the ones that I have mentioned. The Heschong/Mahone study deals with schoolchildren performance and behaviour. Of course, many studies are in the air quality arena. There is a new recognition of air quality as being only one component of indoor environmental quality that makes up human comfort. You are looking at the particulate density of different pollutants, temperature, humidity, the linking of those things to mold and mildew growth, the air stream management with displacement ventilation. All of these things come together. The indoor environmental quality (IEQ) which includes lighting is now seen as the wholeness of the problem; whereas just a couple of decades ago the indoor air quality (IAQ) was the only measure of the interior issue that had been made by the scientists or engineers.

> ***That means in day lighting studies focus more on one space. All the measurements are being done in one space. Is this the level of intervention from your profession? In the example of Alvar Aalto the level of intervention went into the level of detailing. Can you explain again on which levels your profession can intervene?***

Yes, the mentioned cases are examples of the room itself or the more general program of the building. Certainly, in day lit buildings, the introduction of atria, top-lit schemes, or side lighting schemes, sometimes relate only to the particular space but sometimes relate also the more general arrangement of the plant (the building is understood as a power plant, able to harvest and generate energy out of the environmental circumstances). The building footprint becomes thinner that allows the daylight to get deeper into the footprint. The introduction of atria allows balancing of light, the relationship of top lighting and side lighting is used to create balances. Therefore, it is sometimes space specific; sometimes it has an influence on overall building arrangement. Therefore, what makes these things exemplary is that they are breaking new ground in capturing and illustrating the importance of the issues.

> ***A lot of discussion can be heard about the various kinds of "metrics" by which the performance of built environments can be assessed. LEED is one such tool, used to assess the environmental and sustainability rating of buildings. Is it conceivable to develop a "metric" to assess the characteristics of healthy designed environments? What might be some of the***

([125]) Alvar Aalto did in his sanatorium for TB patients: http://www.designmuseum.org/designerex/alvar-aalto.htm

items or characteristics in such a check-list in your field, and how would they be measured? Do you know of any such effort? What would you suggest to incorporate into these categories?

LEED is limited. It tries to do many things. It tends to be incomplete in terms of how LEED measures human comfort or air pollution. In terms of the specifics of your question there could be more metrics derived from the way human comfort is evaluated. For example, there is nothing in the LEED rating system that talks to rating energy exchange in terms of temperature. There is only discussion of the quantitative luminous values and the energy density of lighting, but there is no discussion of the visual field. There is some reference made to the removal of tobacco smoke and the control of the air quality by bringing in fresh air. There could be more information provided on filtration techniques, on the relation between natural ventilation and mechanical ventilation, or on the out-gassing of products. Now, there is a materials section. LEED has five categories and one is on materials and resources. In that category, they have checklist items for using green material. If you use material that is locally sourced or manufactured within a several hundred-mile radius of the site you get points for that. If you use materials that have recycled content or which are themselves are recyclable, you get points for that. However, there is no tight metric tied to the out-gassing of those products. In theory, if you use more green material then it is less polluting to the occupied spaces. Therefore, since LEED is trying to serve so many missions it really does not dive into any of these missions very fully. There could be more required measurements of the polluting effect of the out-gassing of materials. A way to do that would be to link it to the commissioning function. One of the prerequisites in LEED is commissioning a building. That means you have to go into the building after it is completed. That would be the time to measure the kind of out-gassing from the materials and construction. There is a requirement that the building is supposed to be flushed with natural ventilation for a period of a couple of weeks and cleansed of primary pollutants, but you still have a residual pollutant effect. Measuring that would be an important thing to do.

Therefore, the categories in LEED need to be more specific. Would you also suggest other categories?

Yes, there could be some other categories. The LEED structure as a checklist is good because it has categories, it has prerequisites, it has points, yes and no switches that you pick from. Structurally, it seems all right. Any one of the sections could be expanded to include more items and prerequisites. It might be appropriate to be clearer about the ways that commissioning could play a role so as to assure that certain metrics be met.

What are your major doubts about tying DESIGN and HEALTH together? Do you think the causal links are directional or bi-directional? Do you think this is just another bandwagon that is

now in currency and will soon wane? Have we seen attempts to make such a link before, and if so, what happened?

Well, there is always the chance that any new perspective can be seen as a fad. Certainly, this topic can be seen as such. I think, the question turns on how well informed people can become. If the question is reduced to just a few checklist items or if it is treated as another mandated requirement, then there is no educational function or enlightenment going on. Therefore, the person building the building, the owner, the occupant, the non-professional, all can certainly see that this as having been just a fad or just a momentary interest. Therefore, without an effort at education, without an effort of making more transparent the link between the complexity of design and health, then it could fall off the table. It could become a less important thing in time. Nevertheless, I think it should be embraced and pushed because it offers architects one more opportunity to leverage their technical knowledge and their design contribution.

Do you know about the project, which is proposed by some professors here at BSU? BMH wants to extend itself, and wishes to incorporate the community. A firm is doing a master plan. The professors however, are trying to propose a new interdisciplinary class where professors and students can think about looking for future alternatives for BMH…How would you approach such a project? Imagine, you had 20 students who want to be part of the project, they all come from different disciplines, and now they need to work together. How would you do that?

Yes, I know a little about it. It's a management issue how well the parties that are involved can become clear about one another's work and how they conceive the unity of what they're doing. It is a challenge. I think it is a good idea. Initially, you have to work to get a common language established. There is a challenge to get folks to reveal their metrics, to explain them, and then to reflect on them as having some overlap or relationship. Once that common ground is established, you can go to the next exercise. However, first, you need some kind of transparency an exposure activity at the beginning to get the conversation going. It is kind of what we did in studio. Although we were all in the same field, we all come from different parts of the world and have different perspectives.

Can you recommend journals, books, organizations to which you belong or which are central to your discipline in which these questions, issues and connections are made?

Diane & Dean Heerwagen ([126]), Diane & Thaddeus Godish ([127]), Vivian Loftness ([128])

([126]) http://depts.washington.edu/archdept/welcome_arch/creative/research/research_heerwagen.html & http://arch.ced.berkeley.edu/vitalsigns/inf/acknow.htm

([127]) Diane and Ted Godish: They are indoor air quality experts. http://www.bsu.edu/physiology/profile/0,2017,4962-816-54315,00.html

7.2. Chart

In the following the questionnaires conducted with Ball State University professors and practitioners are represented. (This chart represents the results of the interviews conducted with on and off campus specialists. The results are not the exact word choice of the survey participants. Rather, the content of the chart attempts to reflect the essential ideas and arguments gained out of the survey. The survey was conducted in form of an interview and/ or in form of a questionnaire.)

([128]) 'Vivian Loftness': http://www.arc.cmu.edu/cmu/people/bio.jsp?id=85

		Question I	Question II	Question III
	Discipline	**Definition of 'Health'**	**Definition of 'Physical/ Built Environment'**	**Main interest in Health and Design**
A	**Urban Planning**	Beyond individual health I am interested in how to encourage community health by supporting political aware organizations which are able to make own decisions.		Primary Healthcare means maintaining and improve health. My interest lies in the professional promotion and development of communal health.
B	**Wellness & Gerontology**	Healthy people are those which will be able to have the potential to live a full life. A full life means a full life span, maximizing the potential to be fully expressing oneself in terms of body, mind and spirit.		Health is a community experience, rather then individual responsibility. Therefore, we need to create healthy environment. If we are successful in this, we'll minimize the need for an acute care facility (Hospital). Then, the health care system needs to change. Therefore, a community and a health care system need to be restructured in order to work in concert towards health.
C	**Health Care Delivery Specialist**	Basically, we assume that people seeking us are in some stage of an illness. The whole notion of disease is that this state is a state of 'not at ease'. If you take 'disease' and break it down, there is 'ease' where you are healthy and everything's fine and there is 'disease' where your system is somehow out of balance... The definition of health is related to the 'whole person', which is the health condition of the body, the mind, and the spirit. (Health Care Delivery Continuum)	In the hospital setting, the immediate environment affects the confidence level based on colors, textures, natural light, natural features, technology and the overall first impression of the space (weather it is warm and comfortable, or sterile and cold). According to the spatial impression, individuals are making choices and are having expectations towards the health care delivery facility. Additionally, the environment affects the course of health improvement.	We are trying to keep people well and as they begin to become ill we will try to get them back to get them back to feel 'at ease' again.
D	**Architecture (1)**	1. A healthy environment is something that sustains whoever is in that environment in a healthy way. 2. The healthy environment doesn't detract from other areas. As the population gets bigger we can't grow necessary for what we need here.	It is anything that man has touched. However, as I look more specifically from our profession it is generally buildings. In other words although landscape and self-scape are part of the environment, they are not part of what I can look at professionally.	If you are not in a healthy environment, how can you expect to be healthy? Architects are very much involved in the creation of healthy environments in terms of day lighting, color, fresh air, materials, overall environment, including family, not including family, noise, etc. Architecture is in serve of public health, welfare
E	**Architecture (2)**	Health is from good air to good lighting, also human relations in the environment, mental states, continuing care, good diets, elderly & nursing homes, clinics, outpatient, etc.		My main interests are located in: 1. the construction of the adaptable and changeable physical space, in particular the hospital which demands a constant adaptability and changability due to social public policies, the market, and technical advancement; 2. the effect of the physical environment as an influential instrument in order to cure sick people.
F	**Architecture (3)**	Health would be just some general sense of well being in both physical and psychological sense of tranquility or comfort that enables one to think about. A sort of the absence of stress or absence of things that would make it difficult to do one's tasks. That would be the health measure.	The environment might be both the immediate environment within arms reach and the more general background environment which is in the peripheral vision and the acoustical background. It has a more general sense of where you are.	Its just general interest in trying to understand the way people use space and in terms of relating to their environment. Architecturally, it ranges from proportionality of the space to dimensional fit to other metrics like the illuminations level, acoustical level, temperature level to humidity. All of the things that affect the body's metabolic behavior. More generally the notion of how inspiring the space might be giving one a sense of response or general ability to concentrate and work on what they're doing.

Fig. 7.2.1: Survey Question I, II, III about Definitions

		Question 1
	Discipline	***Many conferences are being held in order to discuss the link between health and design (International Academy for Design and Health (www.designandhealth.com), an international conference at the University of South Carolina (http://www.sc.edu/sustainableu/),...), and so on. Many funding sources such as the Robert Wood Johnson Foundation now identify the link between the designed environment and human health. The interdisciplinary nature of these meetings and groups is apparent, but also can be confusing because the boundaries of the subject are elusive. Do you think (your field) has a place within these dialogues? What professional issues might be interesting to you, in this wide field, based on your professional experience and interests?***
A	**Urban Planning**	Urban planning tries to solve problems of place, without limitations & boundaries. We deal with post construction evaluation, analyzing the impact of the built environment onto the community. The goals of the community are the most important for our profession, unlike architects who serve the client's interests, we serve public interest. Also, giving physical outlines beyond design also encourages choices of the market place (putting pollution taxation). The problem of silos is evident: How would I alter the discourse in order to break down silo visions? Through communication (ability to think in other disciplines = measure of competence), utilizing knowledge in more than one course of silos completes education, seeing problems within other professions. Boundaries are a sign for arrogance, it acts against problem solving. Beyond making personal decisions, UP rather thinks for collective needs, that's unlike how economist works. Planning decisions are made external from market decissions.
B	**Wellness & Gerontology**	Individual health is influenced by one's environment. Dilemma in our field: How much responsibility does the individual have vs. governments, society & business? Conventionally, the emphasis was on individual responsibility. Shifts away from it to a community/ business responsibility have been the tobacco, aging, and obesity issues. So promoting health by creating healthy environments has become important in our field: 1. wellness management: analyzing the people's health conditions in relation to their work places. 2. Gerontology: work with agencies on policy level that deal with aging related issues ('Triple-A-Agencies'). So obviously people concerned with creating, building, restructuring healthy are part of our interest, but we are not experts. It makes sense to develop a language, exposure so we will understand how other experts (urban planners, designers) think about this problem. In addition, connecting to business, we can help people stay healthy and productive in the work place and co-operations make more money. So everything we do can be cost-effectiveness, cost-benefit, or cost-efficiency evaluated.
C	**Health Care Delivery Specialist**	When a hospital is getting built many disciplines need to come together because one profession does not have the expertise to do it alone. The community, nurses, social workers, physicians and therapist are coming to realize that environments and they want to talk to the architect about designing their work space and their clinical space. Healthcare executives need to look at the environment. I think getting people sitting down around a table when you are designing a new facility is the key. It is a multi-disciplinary process. In regards to the interdisciplinary communication, a project facilitator is there to make professional translation possible. Knowledge in social communication, business, hospitals and health care environments is important.
D1	**Architecture (1)**	Actually, the AIA has recently funded a grant with a group of physicians and neurologists to determine what effect good design has on people and how people interpret design. So, I think that our field is actually on the cutting edge of trying to figure some of those things out. I say that in the same light, that the general population does not think that there is a strong link but there are ways to convince people. The interdisciplinairy nature is very important. LEEDS for example incorporates all sorts of different tangents. You can get into the lighting concepts, where the electrical people are involved to talk about natural day lighting in order to decrease the overhead lighting. You can decrease the amount of HVAC (heating - ventilation - air conditionaing) by doing so. Therefore, they are all linked together so there is no one that is overriding. They all have to work together to make it work.
D2	**Architecture (2)**	important to work interdisciplinairy because the topic is very large and needs many different experts. Need to figure out how to work in harmony to solve problems. Depending on the problem setting different experts are needed. It takes some pretty good thinking to determine what kind of knowledge is needed.
D3	**Architecture (3)**	Referring to architecture or building technology, yes there is a strong connection. In reference to the Hechsong Mahome study the connection to daylight is really important (school children performance and behaviour or sales rates in relation to daylight). Then, there are other studies that are more on the medical end (circating rhythm, biological clock, metabolic behavior). The fact that we need light daylight because it has direct impact on the skin with vitamin D it has impact on our psychology (lack of daylight leads to depression). There are other technical connections: air quality (temperature, humidity, pollution, displacement ventilation systems, thermal comfort). Another dimension in the health arena has to do with visual acuity quite separate from daylight (contrast and visual noise). All those again come back to health and the function of the human body. Overlap with engineering, interior design, product specification, medical community. A building commissioning is another area that overlaps so quite a few.
E	**Economics**	Some of the economic issues about health and design are: Tradeoffs: 1) More resources to design and build buildings mean fewer resources in other areas. 2) Who will pay? Taxpayers, voluntary contributions. If taxpayers, have the disincentive effects of higher taxes been calculated?
F	**Nursing**	The nursing profession has a significant role in being part of the interdisciplinary team that discusses health and environment in conjunction with design. The nursing discipline addresses the seven dimensions of wellness, including physical, intellectual, social, spiritual, emotional, occupational, and environmental. Nursing is not limited to providing individual patient/client care in acute settings, but rather includes health promotion and disease prevention activities in collaboration with families and communities to ultimately improve their wellness. Nursing faces the challenge of preparing nursing practitioners to conceptualize and collaborate with the micro and macro socioeconomic systems.
G	**Landscape Architecture**	There is no question that LA has a place within these dialogues. Because people are inherently connected to natural environments (air, water, food, etc.) and elements. The study & design in LA focuses on these spaces, it is impossible to separate the two. Together with skills of marrying the science of landscape with the art of design, landscape architects bring to this dialogue intellectual and intuitive understandings of how humans relate to the environment, built or otherwise. At this time my interests are touched on wellness/health benefits of design of the outdoor environment, and the integration of the outdoor environment to the indoor environment (atria design, views, etc.). For me this study is important at many scales (regional, community, site, etc.), and would lack depth without this understanding. While physical health is certainly an important facet of this study, my interest extends beyond this to the emotional and psychological well-being of users, so the study of how our brains interpret and effect our perception of space (therefore impacts our emotional health) gain importance.

Fig. 7.2.2: Survey Question 1 and its results about the experts' position towards interdisciplinarity

		Question 2
	Discipline	**If we see the man-made environment - in relation to "human health" - as operating on certain levels of decision-making (e.g. community level, building level, near environment-interior level) what are some of the most exemplary "cases" in which your field has made a contribution? What makes them exemplary from your viewpoint, and how did the knowledge base in your field play a part in making them outstanding?**
A	**Urban Planning**	Community planning with the contribution of the community is a powerful decision making tool, because it forms & develops political organizations, it discover and implement public interest, and emphasis on longterm development & comprehension. Oregon: the planning process begins with a public forum: identify problems, searching for options, design possibilities, implementation. David Kuehl: giving power away to community groups; reception of plans by the community is important. Conditions of effective communicative planning: a. integrity, b. sincerity, c.experience/ competence.
B	**Wellness & Gerontology**	There is a series of studies called the HERO-Studies, looking at the largest data base of health claims and lifestyle issues and have done cost-effectiveness studies. D. Eddington looked at Cost-Effectiveness & Efficiency Studies at different work sites, what interventions can do, and what costs do they influence. In terms of full communities, which can be defined as a healthy place, where the people are less obese, and have fewer chronic diseases there are Bolder/ Colorado, Washington and Salem/ Oregon.
C	**Health Care Delivery Specialist**	Almost every large hospital can be mentioned in terms of an exemplary case for a healthy envinroment solution on community level.
D1	**Architecture (1)**	First, from a community standpoint you can say this institution wants to make people healthier. Now, the fact that some of the things they do to make that person healthier may make the overall environment less healthy (produced certain medicines are very costly, or too costly or energy consuming procedures). It is something that we need to get beyond (Project in Northern Indiana). The next level, the building level is evolved over time. For many years a hospital looked like a very sterile environment. You went in and you knew you were in a hospital (ceramic tile walls, terrazzo floors, shiny ceiling). Analysis and studies were developed, determining that people get well quicker when they are in a more comfortable environment and under less stress. So that has led them to create environments that you would call more healthy because of less stress. Our profession made contributions, when we demonstrated that a healthy environment does involve interior design and requires day light, color, fresh air, noise, finishes, etc.
D2	**Architecture (2)**	Sweden as a positive example: warm, welcoming, humanistic. Japan. Switzerland (UNO-Project) as a negative example: high-tech, sterile interiors, hard, very inhuman
D3	**Architecture (3)**	The exemplary cases are classical and contemporary; a classical one would be what Alvar Aalto did in his Sanatorium for TB patients. Actually he designed a building, he was detailing was driven by the medical needs of the occupants. Contemporary examples would be the ones that I have mentioned the Mehome's study that deals with school children performance and behavior. Studies in regards to the components of indoor environmental quality (IEQ) should be seen (air quality, air mass, humidity, air stream management). Also, arrangement of the building in relation to its environmental effects
D4	**Architecture (3)**	distance & architecture, 'doc-in-the-box' (data-gathering, sensitive), community based projects at BSU with health care issues, special attributes: security-walk, room, community
E	**Economics**	I assume this means case studies. Though often used in business, in economics we normally follow more of a scientific method developing a hypothesis and testing it using real world data. There are many different studies looking at various aspects of health economics. Given the size of this question, I am not sure that I would say certain studies are the exemplary cases.
F	**Nursing**	*Healthy People 2010* provides a framework for augmenting interdisciplinary collaboration for education and practice. The leading health indicators in it could be used as the framework to create the interdisciplinary education & practice for creating innovative wellness and environmental solutions. The leading health indicators include objectives/outcomes to be met by 2010. An example of a local, state, and national health indicator is overweight & obesity (associated with biological, behavioral, and environmental factors; with possible consequences of: high blood pressure, high cholesterol, heart disease, diabetes, stroke). The U.S. Surgeon General requested the nation to collaborate in finding solutions to the obesity & overweight problem. "In October 2000, the Division of Nutrition and Physical Activity initiated a program to support state health departments and partners in developing & implementing nutrition & physical activity interventions in an effort to prevent chronic diseases. States were to develop a social marketing approach in designing their population-based strategies, particularly policy-level & environmental interventions."
G	**Landscape Architecture**	Here are a few: Central Park, NY, NY – it has served the communities of NY in many ways, providing access to more natural spaces for visual and physical enjoyment. No doubt has had a dramatic impact on the quality of life of the users, including the contribution to reducing the heat island effect and cleaning the air. The "founding father" of LA designed this park. His knowledge of the environment, plants, people, art, landform, water, soil, etc. contributed to the making of this masterpiece. The Play Yard, Enid A. Haupt Glass Garden, Enid A. Haupt Perennial Garden and the Alva and Bernard F. Gimbel Garden at the Howard A. Rusk Institute of Rehabilitation Medicine, NY, NY – Represents a diverse environment in which to study the value of horticulture therapy for people. Designed by landscape architect (Martin H. Cohen) in collaboration with experts from various fields.

Fig. 7.2.3: Survey Question 2 and its results about case studies..

		Question 3
	Discipline	***A lot of discussion can be heard about the various kinds of "metrics" by which the performance of built environments can be assessed. LEEDS (Leadership in Environmental Design) is one such tool, used to assess the environmental and sustainability rating of buildings. Is it conceivable to develop a "metric" to assess the characteristics of healthy designed environments? What might be some of the items or characteristics in such a check-list in your field, and how would they be measured? Do you know of any such effort?***
A	**Urban Planning**	The following questions are important: How to identify community health? What is the most desirable place to live? Madison, Bolder/ CO. Cost of living, cost of becoming ill & costs of staying healthy are other aspects to take care of. Quality of community health and environmental racism (noxious facilities, located least powerful communities) detract from health and other life qualities. Measurement of stress: traffic (Planner), pollution, noise
B	**Wellness & Gerontology**	Calculations: Cost/Benefit-, Cost/Outcome-, Cost/Effectiveness-, & Cost/Efficiency-Studies, looking at different work sites, what interventions can do, and what costs do they influence. Casestudy analysis & proposal development: 1. Analyze very good communities. 2. Look at some commonalities, what are the common bench marks. 3. Then take it back, and ask, how do we relate to that?
C	**Health Care Delivery Specialist**	One of them is called the HCIA, appointing the top 100 hospitals. They are only looking at hospitals, The Joint Commission of Accreditation of Healthcare Organizations would be pretty close. They would grade the clinical and the environment. In addition, there is Press Ganey or Arbor that display customer satisfaction studies with hospitals, and there are tools for that...
D1	**Architecture (1)**	The way they would look at the measurement would be the increase in the better clinical outcomes. That means, people getting well sooner, shorter times of stays, maybe less pain drugs or narcotics, fewer fall rates (post occupancy evaluations). I think you would probably want to go from macro down to micro. it is a multidisciplinary approach because each discipline can do certain things at certain levels. LEEDS is a good example. Developing a knowledge-based database in order to manage gained knowledge (Knowledge management).
D2	**Architecture (2)**	formal aspects: light, color, geometries, patterns, stable envirnment in contrast to an unhealthy condition of an individual
D3	**Architecture (3)**	LEEDS is limited, because it is trying to do many things. Adding metrics to LEEDS is necessary (add tighter metrics to: human comfort, rating energy exchange, visual field, indoor air filtration techniques, relation natural/ mechanical ventilation, measuring out-gassing values of materials & buildings, comissioning a building.) computational fluid dynamic techniques
D4	**Architecture**	exercise + health care facilities -> look at retirement facilities.
E	**Economics**	To determine whether a project was worth doing relative to other projects, we normally would use cost benefit analysis. We would want to quantify the benefits and the costs. Determine how long the benefits would last. Determine how long it would cost to build. We would also want to find the net present values of the future benefits and costs using an appropriate interest rate.
F	**Nursing**	In the community health arena, there are specific instruments that evaluate external and internal environments.
G	**Landscape Architecture**	Systematic post-occupancy evaluations have not taken place on many gardens or outdoor areas, much less ones targeting health concerns. There are efforts in this direction, however. Of course the Ulrich study is fundamental to this discussion, and currently Dr. Jo Westphal (Michigan) is completing a study of blood pressure/anxiety responses in gardens with elderly. Claire Cooper Marcus and Marni Barnes have developed more general protocols for studying the success of outdoor spaces in supporting health-related goals.

Fig. 7.2.4: Survey Question 3 and its results about metrics systems and assessment tools.

		Question 5
	Discipline	***Can you recommend journals, books, organizations to which you belong or which are central to your discipline in which these questions, issues and connections are made?***
A	**Urban Planning**	College of thematic study - univ. Pennsyvania (utopia construction, critique each other, discipline's perspective, crossfire, evaluation, survey). Missing links: White & Jane Jacobs
B	**Wellness & Gerontology**	The journal American Journal of Health Promotion (AJHP) : the latest issue focuses entirely on Health by Design. Some cultural anthropology studies which try to find out why these cultures are more healthy and why they are not, and how different cultures have approached to health. Especially, the public health literature would have this information.
C	**Health Care Delivery Specialist**	
D1	**Architecture (1)**	1. AIA - Studiesabout the effects of design on people & how people interpret design. 2. Studies related to environments with more less stress factors and their effects on people. 3. Documented studies about the effects of day lighting, color, fresh air, materials, overall environment, including family, not including family, noise, etc. on people. 4. Casestudies: Celebration in Florida, BSA-project in Northern Indiana.
D2	**Architecture (2)**	
D3	**Architecture (3)**	Diane & Dean Heerwagen, Diane & Thaddeus Godish, Vivian Loftness
D4	**Architecture (4)**	Jane Malkin, Health based initiatives, desirable places to live, green buildings, Ressort communities, cruise ships, Rocky Mountain Institute
E	**Economics**	This topic is related to much of the literature on health economics, urban/spatial economics and environmental economics.
F	**Nursing**	Journals: Journal of Community Health, American Public Health Association
G	**Landscape Architecture**	C. Cooper Marcus, R. & S. Kaplan, C. Lewis, M. Tyson, R.S. Ulrich

Fig. 7.2.5: Survey Question 5 and its results about reverences.

		Question 4
	Discipline	**What are your major doubts about tying DESIGN and HEALTH together? Do you think the causal links are directional or bi-directional? Do you think this is just another bandwagon that is now in currency and will soon wane? Have we seen attempts to make such a link before, and if so, what happened?**
A	**Urban Planning**	I do not have any doubts all. Rather, there are other linkages missing: Psychologists, socioliogists, politic scientists, anthropiogists (examining huamn behaviour perspective from the collective to disciplines = against disciplines) are missing. The most important groug are the anthropologists which are missing. They are the absorbers of world, they see linkages between the impact on human behaviour and their health. They see connections between the human pattern of behaviour (beyond pollution control devices) and their lifestyle consequences. Serious of incentives, providing a culture (pattern of behaviour) to become healthier must be the goal.
B	**Wellness & Gerontology**	I have no doubts about the importance of this linkage, but the pragmatism. We have people coming together with different world views, disciplines, strong personalities, biases, and expertise. Can we all sit around the table and understand each other, respect our differences but appreciate our contributions? Can we find a new language capturing the complexity of all these disciplines, as we talk here about higher order synthesis. This is the challenge, to get people from a functioning health care system come together and open up. Yet, even if we are good at developing a really high quality of dialogue and ideas, will we be able to communicate in a usable way to people who really need to make the changes, namely to BMH and our larger community. It is not just the design of BMH, rather it is community design. So it becomes the hospital's restructuring the health care systems change. If we're talking about health by design, you do not get healthy by going to the hospital. Health is experienced in the community. So we have to create a community and a health care system in concert working towards health.
C	**Health Care Delivery Specialist**	No, they need to be even better tied together. Healthcare executives need to look at the environment. I think the time has come for healthcare and design folks to be in the same room, at the same table talking about the delivery models. However, you have to move fast in order to not have years of studying an issue. You figure out what you need and gather the information to make decisions. What you will do is go into a discipline, you go outside the discipline, and you come back into the disciplinary specialization. For sure, the time has come for hospitals to not be such frightening places and to recognize the body-mind-spirit of the patient-family.
D1	**Architecture (1)**	Everything we know points to the fact that there is a linkage between health and design. The diffictuly is to convince people that there is this link and that it is worth to pay for it. I think, in our profession or particular discipline we have advantage to deal with fairly educated people that have seen many of these studies. When we start getting into the periphery, when we were in the developing world, when there are some people maybe are not as focused on health care they maybe are less likely willing to spend money to have improvement that would add to a healthy environment. Therefore, there is probably a linkage between education, in other words enlightenment, and those who think whether there is a link. Design as much as just any education that leads to enlightenment.
D2	**Architecture (2)**	It is exciting. It is a good thing to do. It raises all kinds of questions. There are so many smart people making that connection plausible that it is worth of it for the rest of us who are not so smart to pay attention and to look into the questions that are being posed. Cause-effect relationships are very difficult to be sure of. I guess, all of us who are involved in environmental design must have some deep seeded assumption, that what we do matters to the well-being of people. Otherwise, we are just technicians who push buttons. It is exciting to raise those questions. Especially, in an educational institution, we have to help frame challenging questions and not just
D3	**Architecture (3)**	Well, there is always the chance that any new perspective can be seen as a fad. Certainly, this topic can be also seen as such. I think, the question turns on how well informed people can become. If it is reduced or maintained to just a few checklist items or if it is treated as another mandated requirement, then there is no educational function or enlightenment going on. Therefore, the person building the building, the owner, the occupant, the non-professional, they all can certainly see that this having been just a fad or just a momentary interest. Therefore, without an effort at education, without an effort of making more transparent the link between complexity of design and health, then it could fall off the table. It could become a lesser important thing in time. Nevertheless, I think it should be embraced and pushed because it offers architects one more opportunity to leverage their technical knowledge and their design contribution.
E	**Economics**	Design and technology obviously affects health through how much exercise do people get in their daily lives. Is walking the easiest way to get around or is it by car? Or even how does the design affect people's stress? Then, health also affects design. If there are more people who are in wheelchairs, there is a larger demand for houses with wheelchair access. If there are older individuals that is also likely to affect how things are built. Finally, much of the current interest in this topic has much to do with the large amount of "advertising" that various groups have provided. Design and health will continue to compete for attention with various other causes or problems.
F	**Nursing**	It is salient for design and health to be integrated in an interdisciplinary approach. The link between design and health assists in lowering health care cost through reducing the number of hospitalized days, number of events that need physician office visits, reduce number of employment lost days, and others. The link between design and health are directional.
G	**Landscape Architecture**	I don't know that I have major doubts. These are already inextricably linked. The question is: How do we move this study forward? Everything, when working with people, is bi-directional. It cannot be any other way. We seen attempts to make such a link before. Hospitals and care for the infirmed historically had a direct physical link to the outdoors and natural elements. "Science" happened. This is why unless it can be empirically proved, to many people, it is just an "extra" to have a garden. For some this is a bandwagon --and for them it will wane the as soon as there is no money or prestige in pursuing this line of inquiry.

Fig. 7.2.6: Survey Question 1 and its results about the experts' doubts about the linkage between 'health by design'.

		Question 6
	Discipline	How would you approach to the project of Ball Memorial Hospital?
A	Urban Planning	Analze: 1. What are the local needs: Promoting health care delivery might be an option, which can be away from campus because the community health is in the foreground not the hospital or the campus. 2. Avoiding building a facility: the solution does not focus just building another building. 3. What happens to me during the day: Stress. Society promotes stress. What are ways for relieve from stress at traffic, work place, design of homes, other methods than providing a hospital. The hospital itself is not a solution. Keeping out of the hospital means keeping away health costs. At the same time a hospital is an economic institution: it needs patience, overdiagnosis, overexaminig, prescriptions...
B	Wellness & Gerontology	Mapp different scenarios to chart alternative futures by looking at multiple influences, conditions, and issues.
C	Health Care Delivery Specialist	
D1	Architecture (1)	Traditionally what you would do is develop some focus groups, have some community leaders come in and give their input, find out what they are interested in, what their likes and dislikes are.
D2	Architecture (2)	Mapp different scenarios to chart alternative futures by looking at multiple influences, conditions, and issues.
D3	Architecture (3)	Initially, you have to work within a diverse team to get a common language established. There is a challenge to get folks to reveal their metrics, to explain them, and then to reflect on them as having some overlap or relationship. Once that common ground is established, you can go to the next exercise. However, first, you need some kind of transparency in exposure activity at the beginning to get the conversation going. It is kind of what we did in studio. Although we were all in the same field, we all come from different parts of the world and have different perspectives.
E	Economics	What should be accomplished? How? Is the focus on a building.Make a checklist.

Fig. 7.2.7: The various experts stated different approaches to the interdisciplinary project. The reasons are simple though problematic in regards to mutual understanding and approach. In addition, the expert's answers reflect the acknowledgement of the interdisciplinary difficulties as the need for a ‚common language' is mentioned.

7.3. BIBLIOGRAPHY

1. The American Institute of Architects. *Guidelines for Design and Construction of Hospital and Health Care Facilities.* 2001.

2. Architectural Record Book. *Hospitals, Clinics, and Health Centers*. Greenwood Publishing Group. Reprint edition: June 1972.

3. Boix Mansilla, V., Gardner, H., & Miller, W. „On disciplinary lenses and interdisciplinary work." In: *Disciplinary Encounters.* P. Grossman & S. Wineburg (Eds.). New York: Teachers College Press. 1999.

4. Casper, Dale E. *Health care facilities: recent trends and projects*. Monticello III: Vance Bibliographies. 1986.

5. Chivian E, McCally M, Hu H, Haines A (editors). *Critical Condition: Human Health and the Environment*. Cambridge, MA: MIT Press. 1993.

6. Critchlow, Keith. *The whole Question of Health: Enquiry into Architectural First Principles*. Prince of Wales's Institute of Architecture. January 1996.

7. Daily, G.C. (ed), *Nature's Services: Societal Dependence on Natural Ecosystems.* Island Press. 1997.

8. Frank, Lawrence D.; Engelke, Peter O.; Schmid Thomas L. *Health and Community Design: The Impact of the Built Environment on Physical Activity.* Island Press. 2003

9. Gibbons, Michael, Limoges, Camille, Nowotny, Helga et al *The New Production of Knowledge.* London: Sage Publications. 1994.

10. Gibbons, Michael / Nowotny, Helga: The Potential of Transdisciplinarity. In: Thompson Klein, Julie, et al. (eds.): Transdisciplinarity: Joint Problem Solving among Science, Technology, and Society. Basel: Birkhäuser. 2001. Pages 67-80.

11. Gökalp, Iskender (1994). Intellectual cooperation between research and design in engineering sciences. *G. Gemelli (Ed.) Big Culture. Intellectual Cooperation in Large Scale Cultural and Technical Systems.* Bologna: CLUEB. 1991.

12. Hardin G. "The Tragedy of the Commons." In *Science*. 1968; 162:1243-1248.

13. Hosking, Sarah; Haggard, Liz. *Healing the Hospital Environment: Design, Management and Maintenance of Healthcare Premises*. Routledge mot EF & N Spon. August 1999.

14. Kennedy, D. "Sustainability and the Commons." In *Science*. 2003: 302:1861. http://www.med.harvard.edu/chge/course/introduction/why/Sustain.pdf

15. Killingsworth RE. "Health promoting community design: a new paradigm to promote healthy and active communities." In *American Journal of Health Promotion*. 2003; 17: 169-170. http://www.activelivingbydesign.org/index.php?id=51

16. Klein, J.T. „Bridging Research and Social Interest: The Challenges of Evaluation in Transdisciplinary Projects and Public Policy." *Unpublished text of Inaugural Address for UNESCO Summer School on Transdisciplinarity and Local Development and Governance. Punta del Este. Uruguay.* 28 October 2003.

17. Klein, J.T. „Checklist for Evaluating Transdisciplinary Projects." In *Thinking about Interdisciplinarity."* Colorado School of Mines Quarterly, 103, No 1: 101-114. (2003).

18. Klein, Julie Thompson. *Interdisciplinarity: History, theory, and practice.* Detroit: Wayne State University Press. 1990.

19. Klein, Julie Thompson. *Crossing Boundaries: Knowledge, Disciplinarities, and Interdisci-plinarities.* Charlottesville: University Press of Virginia. 1996.

20. Klein, Julie Thompson. „The dialiectic and rhetoric of disciplinarity and interdisciplinarity." In *Issues in integrative studies.* 1983. *2 : 35-74.*

21. Klein. J. & al. (eds). *Transdisciplinarity: Joint Problem Solving among Science, Technology, and Society Society.* Basel: Birkhäuser. 2000.

22. Leibrock, Cynthia A. *Design Details for Health: Making the Most of Interior Design's Healing Potential*. John Wiley & Sons.1999.

23. Lipp, Martin R. *Medical Landmarks Usa: A Travel Guide to Historic Sites, Architectural Gems, Remarkable Museums and Libraries, and Other Places of Health-Related*. McGraw-Hill Professional. January 15, 1991.

24. Lattuca, Lisa R. Nashville. *Creating interdisciplinarity: interdisciplinary research and teaching among college and university faculty.* Vanderbilt University Press. 2001.

25. Marberry, Sara O; (ed.). *Innovations in Healthcare Design: Selected Presentations from the First Five Symposia on Healthcare Design.* John Wiley & Sons. October 1996.

26. McMichael AJ. *Population, environment, disease, and survival: past patterns, uncertain futures.* Lancet. 2002 Mar 30; 359(9312):1145-8. http://www.med.harvard.edu/chge/course/introduction/why/science.pdf

27. McMichael AJ. Planetary Overload: *Global Environmental Change and the Health of the Human Species*, Cambridge University Press, Cambridge, England. 1993.

28. Myers N. "Environmental Unknowns". In *Science.* 1995; 269:358-360.

29. Nowotny, H., Scott, P., Gibbons M. *Re-Thinking Science. Knowledge and the Public in an Age of Uncertainty.* Cambridge: Polity Press. 2001.

30. Pol, Enric. *Environmental Psychology in Europe: From Architectural Psychology to Green Psychology (Ethnoscapes)*. Avebury. 1993.

31. Ponting C. *A Green History of the World: The Environment and the Collapse of Great Civilizations*, London: Penguin Books. 1991.

32. Somerville, Margaret A. / Rapport, David J. (eds.). *Transdisciplinarity: Recreating Integrated Knowledge.* Oxford: EOLSS Publishers. 2000.

33. Stehr, N. and P. Weingart (eds). *Practising interdisciplinarity.* Toronto: University of Toronto Press. 2000

34. Verderber, Stephen; Fine, David J. *Healthcare Architecture in an Era of Radical Transformation.* Yale Univ Press. 2000.

JOURNALS

35. American Journal of Health Promotion: www.healthpromotionjournal.com

36. Journal of Healthcare Design: http://www.healthdesign.org/resources/

37. Health Expectations: http://www.blackwellpublishing.com/journal.asp?ref=1369-6513

7.4. ADDITIONAL INFORMATION

7.4.1. FOUNDATIONS

1. **Robert Woods Johnson Foundation (RWJF):** the largest philanthropy devoted exclusively to health and health care in the United States. We concentrate our grant making in four areas: access to quality health care at reasonable cost; quality health care against chronic diseases; promotion of healthy communities and lifestyles; and reduction substance abuse. Some of their programs are: Active Living, Obesity and Nutrition; Building Human Capital; Quality Health Care; End-of-Life Care, Public Health, Reducing Racial and Ethnic Disparities in Health Care, etc. http://www.rwjf.org/index.jsp
2. **Health department of John D and Catherine T. MacArthur Foundation:** It is a private, independent grantmaking institution, fostering the development of knowledge, nurtures individual creativity, helps strengthen institutions, helps improve public policy, and provides information to the public, primarily through support for public interest media. Among other programs, the Program on Human and Community Development primarily within the United States, focuses on community development; regional policy; affordable housing, education, juvenile justice, and mental health. http://www.macfdn.org/
3. **National Science Foundation (NSF):** It is an independent agency of the U.S. Government. It promotes the progress of science, advances the national health, prosperity, and welfare, and secures the national defense. Its 'crosscutting programs' include interdisciplinary programs and workshops with focus on science. http://www.nsf.gov/home/crssprgm/

7.4.2. GOVERNMENTAL DEPARTMENTS

1. **World Health Organization WHO:** A subdivision of the WHO is Environmental Health. This page provides links to descriptions of activities, reports, news and events, as well as contacts and cooperating partners in the various WHO programmes and offices working on this topic. Also shown are links to related web sites and topics. http://www.who.int/topics/environmental_health/en/
2. **The Centers for Disease Control and Prevention (CDC)**: Located in Atlanta, Georgia, USA, it is an agency of the Department of Health and Human Services.

It is recognized as the lead federal agency for protecting the health and safety of people, providing credible information to enhance health decisions, and promoting health through strong partnerships. CDC serves as the national focus for developing and applying disease prevention and control, environmental health, and health promotion and education activities designed to improve the health of the people of the United States. http://www.cdc.gov/

3. **CDC's ACES: Active Community Environments Initiative**: This initiative encourages environmental and policy interventions that will affect increased levels of physical activity and improved public health. http://www.cdc.gov/nccdphp/dnpa/aces.htm
4. **US Department of Health and Human Services (HHS):** is the United States government's principal agency for protecting the health of all Americans and providing essential human services, especially for those who are least able to help themselves. It covers many activities in health and social science research such as preventing disease; assuring food and drug safety; improving maternal and infant health; pre-school education and services; substance abuse treatment and prevention; services for older Americans; comprehensive health services for Native Americans; and medical preparedness for emergencies. http://www.hhs.gov/
5. **The National Institute of Environmental Health Sciences (NIEHS):** Human health and human disease result from three interactive elements: environmental factors, individual susceptibility and age. The mission of the National Institute of Environmental Health Sciences (NIEHS) is to reduce the burden of human illness and dysfunction from environmental causes by understanding each of these elements and how they interrelate. The NIEHS achieves its mission through multidisciplinary biomedical research programs, prevention and intervention efforts, and communication strategies that encompass training, education, technology transfer, and community outreach. http://www.niehs.nih.gov/

7.4.3. DATABASES

Health

1. **The Active Living by Design Program (ALbD**): This site provides a diverse spectrum of information in regards to active living. This program establishes and evaluates innovative approaches to increase physical activity through community design, public policies and communications strategies. www.activelivingbydesign.org and www.activeliving.org
2. **The American Journal of Health Promotion (AJHP):** As the largest journal in its field, it's belief is that most deaths in the USA and around the world are preventable through change of life style and health promotion. The goal is to raise the standard of health promotion research and practice through publications, meetings and public service. http://www.healthpromotionjournal.com/
3. **The District Health Council (DHC):** This Ontario-based organization focused on communal organization within policy development in regards to

health concerns. It helps assessing community needs, planning a coordinated health care system to meet those needs, advising the Minister of Health as to specific changes required in the community and implementing its plans. http://www.seo-dhc.org/reports.html

4. **The Health Council of the Netherlands:** This council is an independent advisory body whose task is to advise Ministers and Parliament in the field of public health. It addresses questions relating to health and healthcare, the relationship between health and nutrition, and the relationship between health and environment. http://www.gr.nl/missie.php. Besides this, the webpage provides international sites concerned with health. www.gr.nl/linksint.php
5. **Healthfinder:** This is a web-guide with health information. http://www.healthfinder.gov/orgs/HR2609.htm
6. **The International Academy for Design and Health:** This site offers an inter-disciplinary network dedicated to stimulating research and the application of research on the interaction between Culture and Design and Health. http://www.designandhealth.com/index.html
7. **Tri Fit Inc.:** This consulting company specialized in design and management of workplace fitness and wellness programs. It provides a list of resources in regards to organizational health, active living, nutrition,and fitness. www.trifit.com/links.html
8. **The Warwick Law School**: This webpage gives infomation about the Law School's Legal Research Institute for research and development associated with housing conditions and health, and housing standards. It provides useful knowledge for environmental health indicators and provides a list of papers about health housing. http://www2.warwick.ac.uk/fac/soc/law/research/shhru/conference/
9. **The World Health Organization (WHO):** This site focused on the European countries tries to give hints in how to provide an environmental health indicator list. http://www.euro.who.int/EHindicators/Indicators/20040311_1

Interdisciplinarity

1. **New Directions:** This is an interdisciplinary research group which aims to develop new models for interdisciplinary collaboration, where physical scientists, social scientists, and humanists work together with public science agencies, the private sector, and communities to deepen our understanding of and develop effective responses to environmental problems. http://newdirections.colorado.edu/resources/
2. **International Center for Transdisciplinary Research (CIRET):** The aim of the French organization is to develop research in transdisciplinarity, focusing on the nature and characteristics of the flow of information circulating between the various branches of knowledge. http://perso.club-internet.fr/nicol/ciret/english/indexen.htm
3. **Union of International Association (UIA):** This webpage provides sources for transdisciplinary research. “The challenge for the international community to provide some form of conceptual integration across disciplinary and cultural

boundaries has resulted in a continuing series of studies on integrative approaches, interdisciplinarity and configurations of insights." http://www.uia.org/documents/biblio/resknow.php

4. **Interdisciplines:** A website for where known social scientists, philosophers, historians, anthropologists and cognitive scientists share their experience on the matter and focus on the impact of new forms of communication on interdisciplinary research. The topics range is manifold, yet there is a specific link to a conference directed on the issues of disciplinarity and interdisciplinarity. http://www.interdisciplines.org/interdisciplinarity

7.4.4. REPORTS

1. **Centers for Disease Control and Prevention (CDC):** Behavioral Risk Factor Surveillance System (BRFSS). This system is the world's largest telephone survey, conducted by the Centers for Disease Control and Prevention (CDC) and state health departments. Mainly, it tracks general health risks in the United States. http://www.cdc.gov/brfss/
2. **Centers for Disease Control and Prevention (CDC):** Statistics about the physical activity levels in U.S.A. The BRFSS physical activity questions attempt to measure a person's physical activity in leisure-time, household, and transportation. http://www.cdc.gov/nccdphp/dnpa/physical/stats/us_physical_activity/index.htm
3. **Healthy People 2010:** This document is the prevention agenda for the Nation. It is a statement of national health objectives designed to identify the most significant preventable threats to health and to establish national goals to reduce these threats. http://www.healthypeople.gov/Publications/
4. **ACES: Active Community Environments Initiative:** This document answers the question of how you can work towards active community environment. http://startwithyourheart.com/tools/aces.pdf

7.4.5. ORGANIZATIONS & RESEARCH CENTERS

1. **The Academy of Architecture for Health (AAH)**: This webpage aims to improve the quality of healthcare through design by developing, documenting, and disseminating knowledge. It tries to advance the practice of healthcare architecture and to improve the design of healthcare environments. http://www.aia.org/aah/aah_default

2. **The Center for Health Design:** It has been actively engaged in promoting the use of evidence-based design to create healing environments in hospitals, clinics, physician offices, nursing homes, and other healthcare facilities. Their Pebble Project has the goal to provide documented examples of how using evidence-based design has improved the institution's quality of care and financial performance. The center published six research reports and

produced together with the Picker Institute a Healthcare Design Action Kit', an environmental assessment tool. Yet, it is only to buy. www.healthdesign.org

3. **The Environmental Design Research Association (EDRA):** is an international, interdisciplinary organization, with the purpose of advancement and dissemination of environmental design research, thereby improving understanding of the interrelationships between people, their built and natural surroundings. http://www.edra.org/
4. **International Academy for Design and Health**: As an inter-disciplinary network, it is dedicated to stimulate research and its application on the interaction between culture, intellectual capital, design and health. www.designandhealth.com
5. **International Association for People-Environment Studies (IAPS):** This organization *aims to improve the physical environment and human well-being and* facilitate communication among those concerned with the relationships between people and their physical environment. Also it wants to stimulate research and innovation for improving human well-being and the physical environment. It collaborates with similar organisations (EDRA (N. America); MERA (Japan); PAPER (Australasia)). Maintains study networks. http://www.iaps-association.org/networks.html
6. **International Hospital Federation (IHF):** It representing over 80% of global hospitals. Every two years we organize an International Hospital Congress, the largest world conference on hospitals and health service management, embracing health policy, economics, facility design and construction issues.
7. **Hybrid Vigor Institute.** As an "institute without walls" that both produces knowledge by and develops processes for crossing disciplinary boundaries, the Hybrid Vigor Institute has three main goals: to support of extra disciplinary research and collaboration; to establish metrics and best practices for interdisciplinary research; and To develop and deploy cutting-edge collaboration. http://www.hybridvigor.org/
8. **The Center for Interdisciplinary Research (ZiF):** It is an institution of Bielefeld University. Being an Institute for Advanced Study, it is open to scientists from all disciplines and all countries to organize interdisciplinary projects, conferences or workshops. http://www.uni-bielefeld.de/(en)/ZIF/index.html. http://www.uni-bielefeld.de/iwt/pw/
9. **The Picker Institute:** Specialized in patient assessment, this institute works with health care providers throughout Europe using scientifically validated instruments and rigorous survey methodologies to evaluate the quality of their services and provide them with actionable feedback. They carry out research and educational activities on healthcare quality improvement and methods for promoting patient-centred care. http://www.pickereurope.org/default.asp.

7.4.6. SYMPOSIUMS & CONFERENCES

1. **Symposium on HealthCare Design:** The National Symposium is the premier industry event serving as a communication interchange for all healthcare design professionals - architects, healthcare practitioners, interior designers, healthcare executives and facility managers & planners - to collaborate and

share the most progressive thinking. The Symposium educates and enables you to create healthier, user-centered healthcare environments in line with a facility's strategic objectives. http://www.hcaredesign.com/hcd/index.asp?eid=ba5002

2. **The Healthcare Market Series: Places That Heal**: The sessions are about: The Future of US Healthcare: Directions in Health Care Delivery; Trends in Medical Practice & Technology; Project Planning and Execution: Specialty Facilities; Healthy and Safe Hospitals; Design Trends For Better Care; Marketing and Proposal Techniques That Work; Elements of the Healing Environment. http://www.seeuthere.com/rsvp/invitation/invitation.asp?id=/m2c4f7-371335410646
3. **Conference dedicated to the conscious creation of health environments:** The goals are to improve the effectiveness of design decisions affecting human, community, and environmental health. This conference is hosted at the University of South Carolina. http://www.sc.edu/sustainableu/HealthByDesignGenInfo.htm
4. **Health by Design:** This conference is hosted at the Ball State University. http://web.bsu.edu/capweb/healthbydesign/index.html

7.4.7. UNIVERSITIES

1. Clemson University: College of Health, Education, and Human Development. http://www.hehd.clemson.edu
2. McGill University Heath Centre (MUHC / CHUM), Montreal. http://www.medicine.mcgill.ca/
3. University of California, Irvine. UCI Health Promotion Center, School of Social Ecology. http://www.healthpromotioncenter.uci.edu/
4. University of Illinois. http://www.herl.uiuc.edu/index.htm
5. University of North Carolina, 'Active Living By Design' Initiative. http://www.sph.unc.edu/about/
6. University of Maryland, College Park: National Center for Smart Growth. http://www.smartgrowth.umd.edu/announcements.htm
7. University of South Carolina, Environmental Health Sciences: http://www.sc.edu/sustainableu/HealthByDesignGenInfo.htm
8. University of Wisconsin-Milwaukee: http://www.uwm.edu/SARUP//phd/