



Karolinska Institutet

Future Learning Environments

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Photo: Erik Cronberg Design: Sofia Lindberg Print: E-print 2016

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Prologue

In June 2009, Stockholm County Council and Karolinska Institutet launched a project called Future Learning Environments in Health Professions Education. The ultimate goal of the project was to make sure that future graduates in all health professional programs would have the relevant training and competence for their future professional roles.

Healthcare has changed dramatically over the last decades. Average life expectancy has increased resulting in an older population; new lifestyle related diseases and resistances to antibiotics are creating new challenges. The characterization of the human genome at the end of the 1990's has opened up a completely new door for medicine to individualize treatments and to develop new more effective drugs. New medical devices and medical technologies are creating novel opportunities both for diagnostics and therapies.

- And

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with patients.

Advanced home care, preventive medicine and shorter hospital stays, are also important drivers of change in the healthcare sector. Patients are better informed and have access to advanced medical information through the Internet in a completely different way than they did some 10 years ago, changing the nature of encounters

Consequently, we must ask ourselves, if the healthcare sector is undergoing such a dramatic change, how well suited are our health professions programs to meet these needs?

In medical and health professional education we are experiencing a shift in pedagogy. A much stronger focus is now put on learning rather than the simple transfer of content. Learner-activating pedagogical methods are being used increasingly. Assessment practices are changing. New learning technologies and virtual classrooms make learning less synchronous and the need for physical co-location has changed. These are all curriculum changes, but what about the physical learning spaces? How well are these designed in order to accommodate the new aspects of the curricula? Does new technology change the need, and indeed the use of, existing physical learning spaces?

The overall aim of the Future Learning Environments in Health Profession Education project is to make sure that our physical learning environments are optimally aligned with new learning methods and learning technologies in order to train relevant and competent health professionals for today and tomorrow's society.

We would like to extend our gratitude to our collaborating partners: The LEaRN-project at the University of Melbourne; the Association of Medical Education in Europe (AMEE); the Wilson Centre, University of Toronto; the Journal of Interprofessional Care; and also our architects, White, Tengbom, Rosenbergs, LINK and Nyréns.

Welcome to the Future Learning Environments in Health Professions Education!

Stockholm 2015

Professor Jan Ygge

Vice Dean of Higher Education 2008–2014, Chair of the Steering Committee of the Future Learning Environments Project.



How it all started

"I always had a strong interest in education. To me it's critical that we equip our students with the right competencies to provide the best care for our patients, and in order to achieve this we constantly have to revisit our teaching methods."

Jörgen Larsson, MD, PhD, Professor of Surgery Dean of Higher Education 1999–2001, and Head of Education, Stockholm County Council 2007-2011.



For many years Professor Larsson had seen how faculty at Karolinska Institutet and from the Stockholm County Council had tried to increase active learning strategies in the curriculum. New training programs were initiated in order to improve the educational skills among the faculty. "It did not take too long to realize that there was a missing link in our education strategy. Faculty training programs and different incentives to

inspire faculty to try new active learning methods, like case-based learning, were necessary but not sufficient. Something was missing. For me it was obvious that most of our physical learning spaces were designed for lecturing, for the transfer of knowledge to receptive students taking notes and who might then perhaps ask questions at the end of a lecture. Such spaces did not serve well an active and dialogue based education."

In 2006, Professor Larsson initiated a study visit to Harvard University to learn more about how they were tackling the match between active classroom pedagogies and the design of physical learning spaces. Harvard was selected as a benchmark since the successful case method originates from the Harvard Law and Business Schools. At Harvard they met with architects, faculty and facility management staff at various schools. One of the architects responsible for the redevelopment of Aldrich Hall at Harvard Business School gave an in-depth introduction to how the design process for creating physical spaces for active, dialogue-based learning is both complex and sophisticated. Back in Sweden, Professor Larsson's group started to plan for new learning spaces at one of Stockholm County Council's Hospitals.

This study visit and these new insights further inspired Professor Larsson to think about the alignment of space and learning methods. He began to realize that many of the new spaces being built in the first decade of the 21st century were in fact already old-fashioned at their inception. They were based on old ideas about the curriculum from another time, when lecturing was much more predominant as the primary teaching method.



"It is critical that faculty or educational expertise provide input into the early stages of a brief. If the wrong input is given here, then everything else follows. My conclusion was that we had to take control of the visioning brief and the functional briefing: This should not be delegated to the architects or to the facility managers."

The Harvard visit enabled Professor Larsson to see the whole chain of professionals involved in the production and redevelopment process of physical learning spaces. He came to the conclusion that the key to the proper alignment between the curriculum learning methods and space was at the very early stages of any planning process. This approach to briefing was quite different from the standard operational procedures in the typical projects for learning space development. It was unique to involve educational expertise very early in the briefing process and to give them the lead in the programming effort. Professor Larsson managed to secure joint funding from Karolinska Institutet and Stockholm County Council in early 2009 for a pilot project aiming at revisiting the whole process of designing physical learning spaces.

"My idea was to develop new concepts for thinking about learning spaces and how these should be better aligned with our contemporary curricula and hence healthcare needs. My idea was that these new concepts – if proven to be successful – would guide all new developments and redevelopments of learning spaces at Karolinska Institutet and the Stockholm County Council's hospitals in the future."

Professor Larsson was keen to have the new project based on the best evidence in educational research and the best practices in other sectors outside the educational and school sectors. Could something be learned from building airports, hotel lobbies, restaurants, broadcasting, media or modern workplaces?



Early concept development

After the funding for the Future Learning Environment Project had been secured in the spring of 2009, the Board of Higher Education at Karolinska Institutet appointed Dr. Jonas Nordquist as the overall project manager. Dr. Nordquist received his Ph.D. in political science but had been involved in educational development full time since 2003 when he joined Karolinska Institutet. It was assumed that his expertize in interactive classroom methods, in particular case-based teaching, plus his extensive international experience would be valuable for this project.

"It was one of the important experiences that I had from South East Asia that framed my initial thinking on this project in mid 2009. Never, ever, base any new buildings or redevelopment programs on any one specific educational method. Methods tend to come and go, but buildings remain. The underlying philosophy of any building program cannot be based on any one method as such, but on the underlying principles or philosophy."

In one of the countries where he used to be a visiting educational consultant, the university had undertaken a major curriculum reform to change the school to a problem-based learning pedagogy. This required many tutorial rooms for 10-12 students per room. At this university, they therefore demolished the old building and created a new one with 20 tutorial rooms. Thus for a while the new pedagogy was aligned with the building. However, a few years later it was clear that the university could not afford to have 20 tutors for each class, and that a new modified version of problem-based learning was then needed. The school was once again in a state of misalignment; the newly built 20 tutorial rooms no longer aligned with the new curriculum.

Literature review

"Our first step was to study the literature carefully: what were the underlying ideas about the different trends in contemporary literature in health professions education? We had to find

those, cluster them and make them accessible for non-educational experts, like architects or people in the construction business. I saw our role very much as translating educational theory into a language understandable for a wider audience."

The literature review findings resulted in three principles. Any redeveloped learning space or newly produced space should be based on:

- **1. Dialogue.** Any space should enable dialogue between participants, and between participants and the faculty member.
- **2. Visualization.** Any new learning space should be designed in a way to enable all learners to visualize their previous knowledge and experience to other participants.
- **3. Peer-to-peer learning.** Any new space should foster peer-to-peer learning.



Study visits

A next step of the project's early phases was to visit different universities and sectors to learn more about their different approaches to space solutions. A number of global and national universities were visited. This provided input to different design solutions and created a broader frame of reference. Particularly important study visits were made to other sectors, such as media, hotels, theatres and airports, all environments where space is an important and strategic business asset.

The LEaRN-project

International collaboration

"I guess life is full of coincidences. I used to spend a lot of time in Hong Kong and a good friend of mine there was a professor of architecture. Upon my appointment he had become the Dean for the school of architecture at the University of Melbourne and started a new project called LEaRN – Learning Environments Applied Research Network. Their aim was to study how space pacts on learning across educational sectors and stages of learning."

The Future Learning Environment Project joined the LEaRN-network in 2010. This provided access to an important global network of architects involved in designing learning spaces. It also opened-up links to architects and consultants in the related fields of workplace-based design, hotel design, and the design of airport lounges for major international airlines etc. At this time, Australia and the UK, in particular, had for more than ten years been very active in trying to align the modern curriculum in higher education with the design of physical spaces. Access to these knowledge networks had a positive impact on the early development of the concepts for our projects.

Wilson Centre and the Journal of Interprofessional Care

Another important collaboration was also initiated in the early days of the project with the Wilson Centre at the University of Toronto and the Journal of Interprofessional Care which brought us closer to educational experts in interprofessional learning. This collaboration enabled us to have a deeper level of thinking about educational research and scholarship in this field.

"The collaboration with the Wilson Centre and the Journal of Interprofessional care was important to us since it really helped us understand the global drivers in current health professions education. We also initiated some significant studies ourselves. Our mission at Karolinska Institutet is to promote interprofessional learning therefore a close collaboration with this journal was very natural. They represented the curriculum drivers of the future curriculum and we were trying to develop spaces to match this kind of curriculum."

Ethnographic study

"Based on our literature review, the study visits and our international collaborations we were almost ready to begin developing the first concepts together with our architects. On the recommendation of White Architects, we asked a group of anthropologists to conduct a study of the use of learning spaces at Karolinska Institutet and the Stockholm County Council."

The anthropologists were not familiar with our organization. A few weeks later they returned with their findings.

"The findings clearly showed how space, power and status are interconnected. These data were very useful for us to develop the brief for the future projects, taking into account these kinds of relationships."

Initial contact with architects

After a public tender White Architects was selected to develop the initial concepts. They had a broad portfolio of projects in other sectors.

Informal spaces

"After our global scanning of the research and our conclusions from the literature review, it became obvious to us that we had to extend our thinking beyond the classroom-types of spaces, to also consider informal spaces. This had become especially important given what the new technology enabled us to do in terms of extending where students could learn and study. Space had not become less important given the rapid developments of information technology, it had in a sense become rather more important but in new and different ways." "It became obvious to us that we had to extend our thinking beyond the classroom-types of spaces, to also consider informal spaces. This had become especially important given what the new technology enabled us to do in terms of extending where students could learn and study." It seemed clear that the areas where there was an urgent need to do some new development and better align with the current curriculum were the informal spaces. These spaces had been more or less neglected. Typical of these were the empty corridors and other under-developed "social spaces" outside of the classrooms. We believed that all of these spaces could be very important for stimulating peer-to-peer learning.

White Architects then went on to develop a conceptual program for these kinds of informal spaces.

Formal spaces

The challenge with the formal spaces was that they were all more or less designed for monologue rather than dialogue. In order to define the new design concepts intended to enable dialogue, the visualization of learning and, wherever possible, peer-to-peer learning, a new design concept manual was developed.

This manual was developed by Rosenbergs Architects (now renamed Varg Architects).



The Conference

International conferences

The collaboration between the Future Learning Environment Project, LEaRN, the Wilson Centre and the Journal of Interprofessional Care resulted in a global conference "How Space Impacts on Learning" at the Nobel Forum in June 2012. Global experts from four domains were invited, all involved in the development of physical learning spaces; curriculum developers, architects, property owners and educators. The two day conference cutting across professional and regional boundaries resulted in a special issue on physical learning spaces in the Journal of Interprofessional Care.

Managing the process

"The one key to success in this project has been the tight collaboration between us at facility management and the academic vision of the project."

Peter Allestam is a project manager at the facility services at Karolinska Institutet. He has been in charge of the actual implementation of almost all parts of the project. He has been involved ever since the concept development phase of the project.

"We started by developing the concept manuals for the informal and formal spaces and then we started the implementation in different pilot projects, one by one. We closely monitored the outcomes to further inform the next pilot phase. Over the last few years we have redeveloped just over 100 classrooms and over 15 informal learning spaces at our two campuses."

Academic Vision

Mr Allestam underlines the importance of having a clear view on what to build and produce, which has not always been the case.

"My experience is that we at facility management have not always have had a clear commissioning party for our projects. We have often been the party communicating with architects and all the consultants in the building project, and there has often been quite a low level of academic involvement. This project has been very different – a clear academic vision was developed. We have been an integrated part of this process from the start, but our specific role has been to translate the educational vision into technical terms."

Peter Allestam says that it has been very much appreciated by all the architects and consultants involved across the different phases of the project to have a very clear picture of their roles and what the end product is expected to look like.

Technical

Expertise

"Anyone, from people doing the lighting programs, to the electrical consultants, understands the three principles of the project. It has been easy for us to communicate what we expect from a technical perspective to implement the vision."

Peter Allestam, Project Manager Facility Services

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Built Environments or Currently Under Construction

	Redevelopment	New Production	
ska Institutet Learning	>100 classrooms at Campus Solna and Campus Huddinge	3rd and 10th floors Biomedicum Laboratory, Campus Solna 5th floor Neo Laboratory, Campus Huddinge	Karolinska University Hospital, Huddinge Informal Learning Environments
ska Institutet al Learning	>15 informal learning environments at Campus Solna and Campus Huddinge	3rd and 10th floors Biomedicum Laboratory, Campus Solna 5th floor Neo Laboratory, Campus Huddinge	Stockholm South General Hospital (Jägargatan) Formal and informal Learning Environments
w Karolinska sity al, Solna Learning aments		All classrooms in the student- and conference centre plus all classrooms, meeting rooms and conference rooms on the patient wards and in the outpatient settings	Stockholm Eye Hospital Formal and informal Learning Environments
w Karolinska ;ity al, Solna al Learning iments		Student- and conference Center; formal learning environments in clinical areas	Stockholm North General Hospital Formal and informal Learning Environments

Planned but not yet built

	Redevelopment
Karolinska University Hospital, Huddinge Informal Learning Environments	2 large informal spaces
Stockholm South General Hospital (Jägargatan) Formal and informal Learning Environments	>20 classrooms >10 informal learning spaces
Stockholm Eye Hospital Formal and informal Learning Environments	1 learning hall 1 large informal learning environment
Stockholm North General Hospital Formal and informal Learning Environments	3 classrooms 1 large informal learning environment





process.

Therefore learning environments at the Karolinska Institutet and the Stockholm County Council should be designed in a way that they enable dialogue, visualization, and peer-to-peer learning.

Concept

The Future Learning Environments in Health Profession Education project is based on three principles as the core concept.

"We have tried to 'translate' educational research and theory into an understandable and accessible language for non-educational experts."

Learning is always an active process. Learners are not empty vessels but have instead lots of experience and prior knowledge in most learning situations. New learning departs from what you already know. By discussing with others and making learning visible to others, we all learn better. This visible learning activates higher cognitive functions. Active learning is also much more fun! Educational research has also shown the importance of peer-to-peer learning in the learning

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Dialogue

Learning is an active process. To learn something new you need to be active in relationship to your previous knowledge and experience. To discuss with other peer-learners or with the learning facilitator is an important aspect of high quality learning. Therefore physical learning environments have to be built in a way to enable dialogue; dialogue between the learning facilitator and the individuals in a group, and of course between peer-learners. Traditionally many physical learning spaces have been designed for monologue with a focus on the expert who transfers knowledge to the less knowledgeable students. The new learning environments, particularly at the classroom scale, focus instead on dialogue.







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3 Peer-to-peer learning

To learn from the master teacher who transfers his or her knowledge through lectures and seminars is a traditional way of providing learning and it of course remains important. Peers also have to be recognized as an important source for learning. Peer-to-peer learning can be facilitated in a formal classroom situation but peer-to-peer learning also occurs many times outside the limited time of a specific scheduled class; in the gym; during the lunch break; in corridors or at cafes, just to mentions a few places. Informal learning spaces for students to use at any time of their choice is important to create the physical spaces where peer-to-peer interactions can be facilitated. These spaces need to be inviting, attractive and accessible with good WiFi and access to power.



Signature environments



our campus in Solna".

The 'Cottages' have become a popular place for students to work outside of their classroom time and a 'cottage' provides both privacy, power, and



"We aim to provide learning environments that are as attractive as possible for our students. Outside of the scheduled classroom time, we compete with a number of other potential spaces which students might use for learning or collaborating." Jonas Nordquist mentions, for example, the popular cafes in the close-by urban area.

"We tried early in the project to create unique and memorable features for specific places, like the 'cottages' in one of the linking corridors at

proper light, as well as access to people passing-by in the corridor.

"We are now trying out two new concepts at our other campus in Huddinge. One concept is the "back streets" where we are trying to create a dense and intense urban informal learning space for our students".

Density is an important concept that the project has borrowed from the design of public space. Density is key to making public spaces attractive given that people attract people. The opposite is also unfortunately true: lack of density often results in dead places: if the place does not attract people to stay, others will not stay either and the place will become empty.

"Ultimately we are here to facilitate peer-to-peer learning. We like our students to stay and socialize in our learning spaces. It's all about creating a community of learners and to foster collaborative learning. The informal spaces are significant in this respect."

"The second new concept we now are building is the 'Crazy Library' at our campus in Huddinge. This is a rather small informal space that will be designed as a combination of a library of Harry Potter's Hogwart's and CS Lewis' Narnia. It will provide the students the opportunity to be collaborative and also to work in solitude."



Epilogue – towards a networked learning landscape

This project started as a result of Professor Jörgen Larsson's reflections and observations on the performance of learning spaces at the Karolinska University Hospital in Huddinge in the middle of the first decade of the 21st century. His idea and vision were to better align classrooms with learner activating methods.

The three driving principles - dialogue, visualization, and peer-to-peer learning – have not changed since the start of the project. What has changed is the way we perceive and analyze learning spaces. Today, the concept of the networked learning landscape has become an established terminology. Learning still occurs, of course, in classrooms but technology and virtual learning environments have changed the way we perceive and analyze space, and indeed how we understand the performance of space.

There is a close parallel between learning spaces and workplaces. The office is no longer seen as a

valid unit of analysis to understand where and how people work, given that technologies enable office workers to work almost anywhere. In the world of workplaces, we see that in a sense the city has become an extension of the office. The coffee shop or the hotel lobby – and many other informal spaces – have become places for work. The parallel is quite close to learning at the university. We can increasingly observe how more and more materials are being made available on-line, such as streamed, on-demand lectures; library resources are available 24/7 and students can communicate with faculty, or peer-students in a new non-synchronic way.

All of this has far reaching consequences for the way we think about and develop future learning spaces. We at the Future Learning Environments for Health Professions Education project started off by focusing on individual classrooms but the way we are now thinking in terms of a networked learning landscape at various scales: To create a comprehensive strategy for learning

we need to take the entire networked learning landscape into account and to see the integration of various scales, from the local classroom to the wider urban landscape.

No one could believe at the beginning of this project that six years after the launch of the project we would have redeveloped over 100 classrooms and 15 informal spaces at Karolinska Institutet's two campuses; that the concepts developed would guide the development of all learning spaces at the new Karolinska University Hospital, as well as the conference and public spaces at the two new Biomedicum and Neo laboratories. The level of international interest in the projects is amazing. The interest from the academic medicine and health professions education has further been cultivated by the active engagement of the Association of Medical Education in Europe (AMEE) and journals such as The Journal of Interprofessional Education, Medical Teacher, the Journal of Primary Care Education and Medical Education.

The next steps in the further development of the project are to open a new dialogue with the users of the spaces. In 2009 we had groups of faculty members trying to implement the new active classroom pedagogy but without suitable spaces. Today we have a huge amount of spaces facilitating dialogue, visualization, and peer-to-peer learning. A built space is important but not sufficient to drive educational change. We now have to engage with the large majority of faculty in order for them to find their ways of using the new spaces in an active way. We also need to find new approaches and measures to assess the impact of how space impacts on learning.

work ahead!

Jonas Nordquist

A lot of interesting, and indeed, challenging



Publications

Special issue

Nordquist J, Kitto S and Reeves S (eds). Future Learning Spaces. Journal of Interprofessional Care 2013;27 Suppl 2.

Original articles

Nordquist J. Alignment Achieved? The Learning Landscape and Curricula in Health Professions Education. Medical Education 2016;50:61-68.

Nordquist J, Laing A. Designing Spaces for the Networked Learning Landscape: Design of Learning Spaces. Medical Teacher 2015;37:337-343.

Kitto S, Nordquist J, Peller J, Grant R, Reeves S. The Disconnections Between Space, Place and Learning in Interprofessional Education: An Overview of Key Issues. Journal of Interprofessional Care. 2013;27. Suppl 2:5-8.

Nordenström J, Kiessling A, Nordquist J. Building for Change: University Hospital Design for Future Clinical Learning. Journal of Interprofessional Care 2013;27. Suppl 2:72-76

Nordquist J, Sundberg K. An Educational Leadership Responsibility in Primary Care: Ensuring the Physical Space for Learning Aligns with the Educational Mission. Education for Primary Care. 2013;24(1):45-49.

Editorials

Nordquist J, Laing A. Spaces for learning – A Neglected Area in Curriculum Change and Strategic Educational Leadership. Medical Teacher 2014;36(7):555-556.

Nordquist J et al. Focusing on Future Learning Environments: Exploring the Role of Space and Place for Interprofessional Education. Journal of Interprofessional Care. 2011;25(6):391-393.

Nordquist J, Kitto S, Reeves S. "Living museums": Is it Time to Reconsider the Learning Landscape for Professional and Interprofessional Education? Journal of Interprofessional Care. 2013;27. Suppl 2:2-4.

Commentaries

Nordquist J, Laing A. Spaces for Learning - A Neglected Area in Curriculum Change and Strategic Educational Leadership. Medical Teacher 2014;36(4):555-556.

Nordquist J. et al. Future Learning Environments: the Advent of a "Spatial Turn"? Journal of Interprofessional Care. 2013;27 Suppl 2:77-81.

Other academic papers

Nordquist J, Sundberg K & Laing A. Aligning physical learning spaces with curriculum: Medical Teacher 2016;38 [AMEE Guide 107] (In press).

Nordquist J. Learning Spaces and Community Spaces. In Taylor I. (ed). 2016. Future Campus - Design Quality in the Higher Education Estate. Royal Institute of British Architects, London. (In press).

Architectural papers

Rosenberg Architects (now Varg Architects). 2011. Future Learning Environments: Formal Spaces. Rosenberg Architects, Stockholm.

White Architects. 2011. Future Learning Environments: Conceptual Manual for Informal Learning Spaces. White Architects, Stockholm.

Walldin V. 2012. Future Learning Environments: An Ethnographic study on behavior, needs and design. White Architects, Stockholm.



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We would like to express our gratitude to students and faculty at Karolinska Instiututet who devoted their time and knowledge in this project and for being of great inspiration for us.

