

Sustaining the experiment: Hammarby Sjöstad and ecological adaptation

Jonas R Bylund,
Dept. of Human Geography
Stockholm University

A talk presented at the Urban Planning Lecture series at Columbia University's Graduate School of Architecture, Planning and Preservation, April 11th 2005,
Many thanks to Arish Dastur for the opportunity!

Introduction

Good afternoon/evening everyone. Thanks for coming. I'm Jonas Bylund and, as you might know, I am a PhD student at the Department of Human Geography, Stockholm University, and I'm interested in urban sustainability and planning.

The next half hour I will do the second leg of this presentation, the part on Hammarby Sjöstad in Stockholm.

So, I'll start off by giving you an overview of what this district is all about, why it's such a fuss around it in Stockholm.

And then I'll go on to discuss what I see as the main problem in this case, which concerns planners, developers, and sustainability measures. This second part, just as Hammarby Sjöstad itself, is drawn from work in progress.

What is a project?

Why is it that we never seem to end a project where we thought it would end? As you see in the schematic and very generalised figure, almost all projects have a starting point X, an intended objective Z, and the point Y where the projects ends up. Why do few things go according to plan in urban development? Is it a matter of barriers? But then it would be easy to merely count the barriers and either neutralise or avoid them. It's usually not that easy, right? So, what does it mean to do a project?

I'm sure that you, as planners, designers, and planning and design students, have read a lot or have had quite a few late hour colloquia in cafés on what a project is and how to go about it. This might sound familiar or even trivial, and if it does I hope you have some very good questions. But let me propose an answer, which I will return to and elaborate somewhat more in the second section: if we do anything

creative in the sense of not merely repeating a scheme done hundreds of times over and over again – i.e. to do something ‘original’ – then we really deal with experiments and the location of laboratories.

Hammarby Sjöstad

Hammarby Sjöstad is a district under construction. 9,000 apartments for an anticipated 20,000 inhabitants, 30,000 if including the ones to work there {hammarby sjöstad, hemsida}. It is given the role as a figure head in environmentally adapted building and the district has severe regulations on energy and resource use. In other words, it has been driven as a sustainable building demonstration object by the Stockholm City planning and management authorities.

Location

The location is a waterfront area at the border of the ‘classic’ inner-city demarcation called *the Customs Cut (tullsnittet)*. Officially, it is pronounced an extension of this boundary which separates the dense urban part and the sub-urban part of the Stockholm city. The district is administratively called the *South Hammarby Harbour*, since the area nowadays is a part of Södermalm’s district administration.

[rework language] Hammarby Sjöstad is, among the other new development-projects at the inner-city boundary commenced in the 1990s, conceived as a compact city (in that density is supposed to be sustainable when it comes to transport and the mix of business and living). Density and ‘urbanity’ became the guiding principles for the late 20th century urban planning and design in Stockholm (what Lilja talked about). The compact city is here the fusion of environmental concerns with the ‘post-modernist’ and public hangover of zoning and functional separation terms of modernism or functionalism. [ref?] Also something which rhymes well with the European Union green paper on urban development from the early 1990s {cec, green paper, 1990}

Now, why was this particular new development singled out to be a demonstration object of eco-cycle adaptation in Stockholm?

The company owning of the part called Sickla had had its eyes on this spot for some time and in the late 1980s they were successful in getting the city to draw new comprehensive plans for the area [?]. In urban sustainability jargon it would be called a brown-field development, being a redevelopment of an industrial site for

housing and small business uses. Post-world war II uses was characterised by a conglomerate (or muddle) of small industries and workshops. In the 1980s it had somewhat 'grey market' associations {hammarby sjöstad, web}.

The planning started properly with the intentions on getting the Olympic Games 2004 to Stockholm in the early 1990s. In 1997 the International Olympics Committee decided in favour of Athens, but Stockholm kept some of the strong environmental concerns for the development area. The Olympics-intention is also the reason for the awkward order of building this district: starting in the middle somewhere, and then in phases [five altogether?] 'patching' the area outwards.

There are, from my perspective, two important documents or statements to understand how these strong environmental concerns in Hammarby Sjöstad is supposed to be carried out.

Programme

The first one, the *Hammarby Sjöstad Environmental Programme*, outlines general guidelines on energy and resource use for the district {gfk, miljöprogram hammarby sjöstad, 1998}. The aims are summed up as three items in the programme:

- The environmental performance of the district is to be 'twice as good' or factor two in relation to the best applied technology in contemporary new development – and there is a comment that if these goals are to be reached, changes in both lifestyle and developments in technical solutions as well as conscious planning is needed.
- The systems developed must both fulfil the operational objectives and be educational, an environmental centre shall be founded.
- An integrated project administration for the environment [rework, why 'for the environment?'].

The programme also states the idea of Hammarby Sjöstad as a 'spearhead for ecological and environmentally directed building and living', together with the remark that the district shall lie in the international front-line of sustainable development of dense urban environments. In other words, the compact-city principles are stated as general objective.

[rework paragraph lanugage-flow-wise] This spearheading thing is very important. According to the programme, Hammarby Sjöstad is to become Stockholm's or even Sweden's international pride! The district offers solutions to the "dense city's environmental problems". This is very important since (1) we have to adapt to the

premises of Nature and (2) 80 per cent of the world's population will live in cities in the 21st century. The novelty/newness of the district is its advantage from a sustainability perspective, since here, in a *new* district, people's "expectations and demands on being able to develop new lifestyles and business with a far reaching environmental thinking" can be met. The whole world's population is thus considered in this translation [ref.]. Set in the spearhead-metaphor, the district is to function:

...as a national and international role model and source of inspiration for ecological planning, building, and living. A powerful development of eco-technological and socially sound solutions, applicable in the Western society as well as in developmental countries, is needed to achieve this {gfk, hammarby sjöstad miljöprogram, 1998\ : 5, my translation}.

This is a translation of the conditions that operationalise what is usually called ecological modernisation, but also the experimental character of the whole project: "The district shall be utilised to push forward new technology and to try out different technological solutions. Depending on economy, technological ripeness, or other factors *the solutions can be set to trial in varying extents.*" {gfk, hammarby sjöstad miljöprogram, 1998\ : 7, my translation, emphasis added\}

It is also stated that there is political unity in Stockholm regarding these targets and, because of that, the programme will be used as a planning tool and as foundation for agreements regulating the carrying through, i.e. the ground-use agreements with the developers. For every phase Stockholm City will make development agreements with land-owners as well developers to secure the flexibility of the environmental programme.

Beside the agreements and the instruments to help this district to become as environmentally adapted as possible, there is also the so-called Hammarby Model. This is an infrastructure model based and consequent in the principle on the locally as-closed-as-possible eco-cycling of water, energy, and other resources. The model is based upon the collaboration between the three utilities *Stockholm Vatten*, Fortum, and [*Renhållningsförvaltningen*].

Strategy

The second document is the *Strategy to develop Hammarby Sjöstad into a spearhead for ecological city-building* {slk strategi hammarby sjöstad, 1997}. This document states the use of five instruments to realise the city's intentions, in trying to find ways to make

the actors connected to Hammarby Sjöstad do the best they possibly can to help realise the goals in the environmental programme.

Instruments:

- The *Environmental Load Profile* (ELP) a software application proposed to be the interface in the co-ordination of the actors. This instrument is in reality that actor who determines what *twice as good* means: to halve the environmental load against an average in new development from the end of the 1980s until 1997. The ELP is given the function equivalent to a protocol in a laboratory. As complementary to the ELP's touchstone function, and simultaneously as a consequence of this instrument, the other instruments are then suggested.

- Knowledge on the technological front-line, i.e. building, gathering, and diffusion of this knowledge – also named *The Knowledge Pass*.

- *Technology Procurement*, where the ELP defines what parts in the building process that may need more support and technology procurement will make the technology needed commercially available. This instrument is in the first place intended for products or systems who are not yet sufficiently on the market [whatever that means].

- *Development and Demonstration Projects*, where the ELP defines in what areas the greatest need is for such projects. The ambition is that that which is Development and Demonstration Project in the first phase shall be commercially available in the second phase. The Strategy proposes a reimbursement system "based on the environmental enhancement value for the city and not for the cost of the measure". This is to avoid Stockholm City falling in a disadvantageous position during negotiations (because of the local actors' informational advantage) and to avoid bad solutions where an actor argues the project's demonstration value. This model will, according to the Strategy, give "clear rules of the game" for the actors [ref.].

- *Builders in Competition*, with the subheadings *Incentive for the Best Proposition* and *Incentive for the Best Building*. Competition between actors is to be created and the example described is that the projects with the best ELP gets a ground allotment.

- *Joint Procurement*, this instrument too is to create competition among the actors, but also to broaden the base of actors and, at the same time, push the prices on products and systems, make demonstrations possible, and to define completely new types of services.

And it is with the Strategy that my concern with the Stockholm Local Investment Programme (SLIP) becomes obvious, as the instruments to be used are more or less, in principle, the same kind as is understood in the Government's Local Investment Programme (LIP), which was enacted in February 1998. Also, the Strategy refers to the Stockholm City's LIP-application, even if it was not settled with the government at that time. [make clearer connection to LIP and SLIP]

LIP

In 1998 the Swedish government granted the City of Stockholm SEK 650 million in subsidy to promote and carry through measures to increase the ecological sustainability. The subsidy came by way of the new policy on Ecological Sustainability and the Local Investment Programme (LIP).

What is LIP? Aimed at adapting the Swedish society through local investment support a programme that ran between 1998 and 2004. SEK 6.2 billion disbursed in subsidies so far, with a total national investment volume of SEK 27.3 billion – out of which SEK 21 billion is related to direct environmental measures. More than half of the Swedish municipalities had local investment programmes during this time. One third of the subsidies has been allocated to projects pertaining to the shift to renewable energy, energy efficiency, and energy savings {ieh, 2003}. LIP was (since it's over now, final report are overdue [check IEH]) directed at the municipalities to take on role of 'changer', this because of: (1) the relatively strong role/position municipalities have in the Swedish state administrative system; (2) following the LA 21, the idea of local awareness and action should be supported. Here as well, there is the intention of using ecological modernisation.

The Social Democrat translation of sustainability into greening the People's Home. The response to 'second generation environmental problems', which meant translating sustainable development into ecological sustainability, i.e. an extension in measuring the nation's performance. Sustainability usually ecological sustainability, which gives a focus on ecological adaptation.

What is the People's Home? And how well ecological modernisation fits into this win-win model, the 'natural' adoption of ecological modernisation in Swedish state policy-making.

We could compare the statements on LIP and the theory of ecological modernisation with the People's Home-concept. For instance, Hall argues that one of the

most important postulates for the People's Home in the 1930s was that there "...was no contradiction between socio-economic equality and economic efficiency; on the contrary, they could be made to reinforce each other." {Hall, 1998\; 847\} This became a key in the construction of the post-war Swedish welfare state, as it was in consensus with the liberal opponents. Further, Gösta Rehn, economist and one of the theorists behind the model, opined that "...the goal is not to weaken market forces but to create an appropriate environment for microeconomic behaviour in competitive industries. It is no less than to induce the market to live up to the claims made for it and unleash its productive forces to maximise human welfare." {\quoted in \Hall, 1998\; 848\}

LIP as innovative for two reasons. Firstly, because of the focus on 'new technology'. Secondly, LIP itself was not the 'usual way of doing things'.

LIP has/had an emphasis on results rather than on techniques and methods *per se*, which effected municipalities in general to opt for or design programmes that would hypothetically most reliably deliver results – as far as possible taking a safe path, instead of risking a bit more {lundquist, 2000; %2001}. Although, LIP is a badly written and implemented policy. Bad syntax, because of the focus on innovative environmentally sound technologies or systems (resource and energy efficiency or production) was stated in the bill with the undefined 'new technology'. For instance, one municipality chose to interpret new technology as 'any/every technology that promotes ecological sustainability' {rrv, 1999\; XY\}. Bad implementation, instead of handing over the responsibility of the realisation to the usual sectorial authority, the Ministry of the Environment (ME) took it on themselves. This meant, according to my informants and other studies [which?], insecurity in the municipalities on what was doable and, since there was a lack of competence at the ME, conflicts over proposed measures. A further hitch was that the Swedish Environmental Protection Agency (SEPA) was not even consulted when the policy was in the 'pipeline'. In 2002 the LIP was eventually moved to the SEPA.

The basic idea: Hammarby Sjöstad as a field-test

One of the big posts in the Stockholm Local Investment Programme (SLIP) is the Eco-cycling Districts, with a share of SEK 400 million of the subsidy they make up the case-study in my doctoral dissertation {\see \Bylund, 2003; %2004}. Half this sum is reserved for Hammarby Sjöstad. But apart from Hammarby Sjöstad

there is also two existing districts to share the other SEK 200 million, *Skärholmen* and *Östberga*, both built under the so-called Million Programme [note: what-is?]. From this perspective, the other two ED:s, the existing ones, was initially thought to benefit heavily from Hammarby Sjöstad spin-offs. From the point of view of the SLIP, in their application at least, the idea was to take the cue from the ‘Spearheading’ and set-up Hammarby Sjöstad as a place to develop solutions to use in existing districts as well.

The Stockholm application sees a unique possibility to develop *new environmental technology* in the holistic or comprehensive operation on three districts and the following order volumes:

This is particularly urgent for redevelopment projects. Environmentally adapted redevelopment of existing building stocks presupposes that the technology and the products already are developed and tried in practice, and that the volumes of production are big enough so that the prices have been forced down. {SLK, Stockholms stads lokala investeringsprogram, 1998\}: 15\}

Here the Eco-cycling Districts as a project is translated into a field-test – a laboratory. This idea on the laboratory is very important as it is neither a metaphor nor a parable but a literal intention. Firstly, because new environmental technology products and systems are to be developed, and this is an experiment as the geographical boundary of what is considered to be the laboratory is enlarged [rewrite this sentence, it’s not one lab that is made bigger but a designated development space turned into a lab]. Secondly, the method to develop products and systems is far from conventional.

SLIP also built their application to the Swedish government and the ME on the Strategy, it was translated, so we have two programmes fused into one here – SLIP is intimately tied to what happens in Hammarby Sjöstad.

The simple idea of how this should/would work out was that the actors (here builders and developers) would make propositions for measures, write them down in an application, get some subsidy for it, and then return with a report on the implementation. The SLIP-council should ideally only take on the role as a filter, saying yes and no to propositions. It built upon the local actors being very hungry, having a big appetite for doing these measures, implementing new technology in their building process.

Framing the lab

Taking the cue from (at least) Sandercock, experiments in modern planning did not turn out that well [the quote or simply ref.]. So, it is no news that it is all about experiments, but I would like to describe why it is unavoidably so when we deal with sustainable development, or change in urban space – not on the grand scale of theory and planning schools, but in the situation, the practice of ‘projecting’, the run of a programme.

In a nutshell, why ontological variability? A big lesson drawing on science and technology studies: (1) An innovative project and therefore impossible to set in advance how many actors needed to tie in to the project in advance {latour, aramis, 1996}; (2) which means that it’s impossible to predict all counter programmes; (3) but, if the project ‘wants to live’, gives counter-counter programmes and a deviation (more or less); (5) which in turn gives the imperative of hypothesis, testing, trials – the experiment and a reconfiguration of competence in a network. This describes the ontological variability in an innovative project, in other words the reconciliation of reality where the programme is modified or aborted or transformed into something else {\cf. \latour, mauguin, teil, a note on, 1992}.

‘The [miljösatsningarna] was stronger in the beginning than now [around 2002], it’s no secret’ according to a planner at the SCPA, ‘ that we won’t reach the targets set for Hammarby Sjöstad’ [check TAMS] according to civil servant or local actors [developers? builders?].

What other people have said about Hammarby Sjöstad and SLIP. Ethnography on ‘negotiation lines’, from which maps of ontological variability can be made – or a social topography.

The outcome of a project is thought to be dependant on the framework for it (its context). I don’t totally agree and I hope to show why. Because a project also sets up its own frames of reference, its own context! And it is here that the thought comes: it would be so easy to merely count and then, with that increased knowledge, simply avoid these ‘contextual’ barrier and obstacles in the future. But let’s count the ‘big’ ones in this project.

Counter and counter-counter programmes

One way of explaining this outcome is to count and describe the counter programmes working against the Environmental Programme and the Strategy. And

then what counter-counter programmes might have appeared/was set up. Counter-programmes detected in Hammarby Sjöstad, from a SLIP-perspective.

- Competence and skills on the part of the local actors (builders, developers) in writing and handling the rules surrounding the subsidy. On Development and Demonstration Projects. Carrots and sticks without sticks... or that the sticks in Hammarby Sjöstad was in the development agreements with SRETA, which didn't necessarily promote the participation in SLIP-measures. The agreements, different views on them – delivering to the ELP. SLIP had to go out and sell in this subsidy, or be very active in helping out writing the applications, in imagining measures and solutions that could be done.

- The subsidy amount for 'private' or profit-making actors and the rules on 'path dependency'. But repayment of the subsidy if not successful! This in connection with the [stränga] rules in LIP on accounting and specification or details on what exactly you are supposed to do. Which in turn led to a situation when improvements in projects was seen by the ME as a deviation from the 'path' set out in the local actor's original application and hence susceptible or threatened with repayment.

- Builders and developers conservatism. doing things that work. Stable/unstable artefacts, 'doing things that work'. Incremental and radical innovations (in Europe, 80-90% for incremental, 10% for radical). peer pressure. The reconciliation of reality.

According to the final report from the SLIP-council

Boundaries of the lab

A second way of explaining or describing the outcome so far is to describe, drawing on the presented counter programmes, what kind of process this is. Is it planning or is it research? Is it implementation or creation of markets?

The argument is that a policy or a programme conceived in terms of ecological modernisation will not, without large financial support from the public, lead to any 'automatic' modernisation, i.e. implementation or testing of 'radical innovations'. The middle-range might be fine, but is the policy or programme then cost-efficient?

The reason for this is the unpredictability of projects dealing with ‘radical innovation’, because of a project’s ontological variability and the unavoidable displacement of the laboratory.

How to illustrate ontological variability with the case-examples? By invoking ‘displacing the lab’, which is an opening to the question of frameworks (externalities/internalities and overflowing) and the intentions ‘behind’ the project, i.e. what makes a project developing according to the intended shape or not.

Let’s start with yet another list, but this time on topics that I’d like to comment on and squeeze in under two headings and the short space here. Because the district seemed ill fit to take on the role that SLIP and Stockholm City wanted to give it, at least when we look at the counter programmes and lines of conflict/controversy. And to say something general about ecological modernisation, that is what kinds of actants it is perhaps most optimised to work with (a give-away: better standard, and not the promising and innovative stuff – or you’d need a lot more investment subsidies for that in Sweden at least).

Displacing laboratories: I don’t know where the proper place for laboratories or experiments are. I can only take what is usually meant by these two notions, what kind of activity they entail, and see if it fits and what kind of conflict or controversy it means in this particular case. For example, in architecture, in what we could call the travelling nomadic ones, the last ten years or so (I have no systematic investigation to back this up) there has been a trend of calling or naming your office or group as a ‘lab’ for this or that. It sounds like they are progressive, likes to take risks and chances, wants to develop something new, be innovative quite simply. I’m not saying that they are not, at least not trying to. But what is a lab? And when do we do experiments?

The reconfiguration of competence in networks, taking the cue from Callon and Haraway. Two quotes.

"The laboratory is a special place, not for any epistemological reasons that might still comfort positivist philosophers, dyspeptic mathematicians, and their molecular biological sidekicks but because the laboratory is an arrangement and concentration of human and nonhuman actors, action, and results that change entities, meanings, and lives on a global scale. And the laboratory is not the only site for shaping technoscience."

{haraway, 1997\ : 66\}

"The reconfiguration of networks – that is, the production of new statements, or the elaboration of new skills and techniques – operates within groups with restricted membership. These groups' frontiers are fairly well-defined, they are either smaller or larger than a laboratory and are only rarely coextensive with one." {callon, is science a public good, 1994\ : 412\ }

Hypothesis and theory seems like important tools or elements used in this activity, in that special place yet rarely coextensive with a laboratory. Is it possible to connect them to predictability and the ability to calculate? I think so, at least from a policy- and programme making point of view this seems to be important – why else the weight of indicators and assessments everywhere?

From this point of view we could now take on Marcus' distinction between vernacular and architectural building. In his view, the 20th century was remarkable because it was the first time in history that "building can be said to have been a failure" {marcus, the need for, 2000\ : 2\ }. If the definition of vernacular building is that it is a "direct spatial answer to local needs and values" in a given cultural context then:

"Purely technically, there have certainly been flaws that were experienced as problematic, but it is difficult to talk about functional or aesthetic failures in a more fundamental sense. The architectural building of this century [the 20th], by contrast, has been continuously criticised on both the functional and aesthetic planes, and has even been accused of being a strong contributory cause of many of the social problems shared by the western welfare states." {marcus, the need for, 2000\ : 2\ }

Marcus' distinction draws attention to the kind of project that architecture can be: One the one hand using routines, proven solutions, and fairly stable relationships to create a material fact, on the other hand an experiment to produce something original, answering to needs interpreted anew or not formerly known (remember the generic city), and without the relative security of black boxed routines. It follows that the "strength of architectural knowledge thus lies in its generative capacity, while it demonstrates a noticeable weakness in foreseeability or predictive capacity. In vernacular building, the opposite condition tend to apply." {marcus, the need for, 2000\ : 4\ }

The question whether a project is successful or not can be reformulated and perhaps answered through: What is a project and a project's shifts between discourse and materiality?

Images is imagination, and imagination is essential for creation. Thus, having an idea and a vision (creating an image) is an important part in urbanist practice. But there is also the project. If one launches a project, there is always a tricky thing called ontological variability to reckon with – there is no certainty of the outcome unless you do something which already has established relations and procedures, i.e. not an innovation. It means that one has to consider the experimental side of urbanism, one has to take into account the goals and intentions not only stated by politicians and investors (the usual suspects in contemporary urbanism), but also every imaginable actor and object. Their counter-acting activities (intentional or not), their views on things and desires has to be translated and negotiated. And so compromise and manouverability is part and parcel of any project. This is why Marcus states that the generative phase in architecture has a lot of theoretical support but that theory helping architects in the predictive phase is lacking {marcus, the need for, 2000\}: 5-6\}.

This distinction could mean (1) either or (which Marcus probably didn't mean); and (2) that 'architectural' building by imperative is innovative – it's impossible to escape the experiment. I suspect this distinction to be a (typical) self-delusion from architects, on the other hand, they should know what they are talking about. Maybe it was merely a way of keeping it within architecture as a discipline.

This is another way of saying that it is impossible to study the process of a project without doing some questioning on things taken for granted in the account of what has taken place. Indicators of all possible sorts (economic, ecologic, social) is only half-way, as they depend on an already reduced framework to be able to state anything useful. And of course I can use them, but they won't help us understand – or, better, learn from – the particular roller-coaster this project has been riding!

As a geographer for my part I'm more interested in the production of space and urban situations/settings, than with only the particular activity of being an architect (they are very interesting sub-species of urban specialists, no doubt). To break out of this [and why did I bring it in in the first place?] I have two quotes for two seemingly contradictory localisations of where the laboratory is.

Basic point made, by me elsewhere and in the SLIP-final report [ref.], is that the developers and builders did not want to experiment with ‘radical innovations’ – at least not without greater securities (i.e. money or ‘insurance’ againts future backlash) than the SLIP could give them. Still many measures have been carried out and those are for the most part in the ‘middle range’. The ‘technological frontier’ and to bring forward technological adaptation: the hoistering of ‘monsters’ or unstable ideas/artefacts.

ELP, a software especially designed in this process, to calculate more externalities than the usual developer’s own frameworks.

Quasi-objects in my usage is something that could never be called a ‘commodity’, and it has severe trouble with the activity of ‘transaction’ (of making quits).

Translations are usually like the whispering game, as long as the transport is not black boxed (on why the diffusion model does not work as an explanation).

Round-up remarks

[is this necessary as introduction to the second section?] That this is not an investigation into ‘proper’ planning issues, but the underlying thinking and questions surrounding the project is, or has many connections with modern planning topics. Or, I take the cue from Fainstein’s note on what was meant with a ‘city planner’ in a recent paper, i.e. ‘anyone who is explicitly concerned, in an official capacity, with shaping the city’ {fainstein, can we make, 1999\}: note 1} – I have elsewhere somewhat rough-hewed termed this ‘group’ as Urban Specialists.

Repeat on experiments and laboratories, what a project is, the boundaries of the laboratory, policy as hypothesis/theory, and how to think about sustainability and society-nature and the city, and indicators as half-way explanations. What does each of them imply, what’s the implications?

And if we want to learn from projects we have to examine it in its ontological variability.

Final remarks

Thanks to Arish for this opportunity to talk to you and spend some travel money in the project.

And sorry if my use of rhetorical tricks was a bit obvious, my excuse is that 1) it’s an experiment for my part, how to communicate my research in an understand-

able way; 2) I'm not used to talk in front of people, I tend to be very nervous; 3)
English is not my mother-tongue;

Questions?