The Building Fair

This is a module which students and teachers at Vikingaskolan, Lund have been working with. The description is from the book *Homes, cycles and pellet burners,* by Johan Krantz and Pelle Persson, teachers at the Vikingaskolan.

Short description of the structure of the module

The motive (issue) which sets off this is the insight of the **need of sustainability**. Climate changes are underway and they pose threats. Energy resources and clean water are getting scarce. This is directly connected to the Swedish National Curriculum for Compulsory Education (Lpo 94, http://www.skolverket.se/publikationer?id=1070, accessed August 2007)[i], which states:

> It is important that education provides general perspectives. … An environmental perspective provides them with opportunities not only to take responsibility for the environment in areas where they themselves can have a direct influence, but also to form a personal position with respect to global environmental issues. Teaching should illuminate how the functions of society and how our ways of living and working can best be adapted to create conditions for sustainable development. (p. 7)

Further, among the "Goals to strive towards" (p. 10)

> *The school should strive to ensure that all pupils:*
> • Develop their ability to consciously form and express ethical standpoints based on knowledge and personal experiences, (…)
> • Show respect and care for the immediate environment as well as for the environment in a wider perspective.

And, among the Goals to attain in the compulsory school (p. 12)

> The school is responsible for ensuring that all pupils completing compulsory school: (…) know the requirements for a good environment and understand basic ecological contexts…

The concretisation of this is acting to find a way to design and build living space, which is good for the environment, good for human health and where energy can be used reasonably.

The keywords are thus

1. Environment
2. Energy
3. Health

The objective/ goal to be reached is the students understanding

- How to build a house and a city-block so it will be good for the environment and human health and energy conserving.
- How to perform measurements and calculations ensuring that the house and the city-block really function along the three principles.

This is done in a series of assignments done both individually and in groups. Each student is responsible for a house and a lot. The group is jointly responsible for the whole city-block.

<u>The assignments are</u>

A. To explain and prove what makes the best way to construct a house/ city-block

1. Environmentally correct
2. Energy conserving
3. Health promoting

B. To show how one does perform measurements and calculations ensuring that the house and the city-block really function.

Time schedule

The work takes three weeks. The teachers are available for consultation on demand. Next week we make a study visit in the Lund public cleansing plant. A representative of Lund Energy [the municipal company responsible for power supply and district heating] will visit the school.

Reporting

You report every week at “tune in” meetings. The work module results in a fair where you and your group describe and explain your work for external visitors.

Assessment

Assessment concerns your ability to

- Express a realistic solution to a real problem.
- Notice, describe and explain the consequences of a decision.
- To perform inquiries persistently and patiently.

There follows a description of levels of assessment.

Levels of assessment

Assessment concerns the degree of expressing the abilities of:

A. Describing and explaining the consequences of various decisions.
B. Problem solving adequate to the real situation.
C. Persevere in his/ her work of inquiry.

Level	Ability A	Ability B	Ability C
4	The student describes and explains why her/ his decisions make the residence good for environment and health and energy conserving. S/he explains the consequences of decisions in many steps: e.g. how a choice of heating affects health and environment and how this in turn affects other factors, local and global.	The student always uses relevant mathematical terms when reporting her/his measurements and calculations. S/he is using mathematical concepts and methods to describe the calculation of areas. S/he always justifies why the domicile is functioning. S/he can compare various designs and relate them to their use. S/he is participating actively, relates to the arguments of other students and leads the discussion forward.	The student is working patiently and makes an effort to do her/ his job well. S/he always chooses one among various different approaches which s/he develops by her/himself in various ways.
3	The student describes and explains why her/ his decisions make the residence good for environment and health and energy conserving. S/he relates her/his decisions to local and global perspectives and explains the consequences of decisions in a limited extent, e.g. how a choice of heating may affect nature locally and globally.	The student uses relevant mathematical terms when reporting her/his measurements and calculations. S/he is often using mathematical concepts and methods to calculate areas. S/he justifies why the domicile is functioning. S/he can compare various rooms and explain their size in relation to use. S/he is participating in discussions by following and trying out the solutions proposed by others.	The student is working patiently. S/he chooses an approach which s/he develops by her/himself.
2	The student describes her/ his decisions and explains sometimes why make the residence good for environment and health and energy conserving. S/he explains some consequences of her/ his decisions, e.g. how a certain way of heating may affect nature.	The student uses mostly everyday language when reporting her/his measurements and calculations. S/he is sometimes using mathematical concepts and methods to calculate areas. S/he sometimes justifies why the domicile is functioning. S/he can describe a room and explain its size in relation to use. S/he is sometimes participating in discussions.	The student is mostly working patiently. S/he is sometimes using his/her own solutions and approaches.
1	The student describes some decisions but explains seldom why it should make the residence good for environment and health and energy conserving.	The student makes measurements but explains seldom why the domicile should function in reality. S/he is seldom participating in discussions.	The student is seldom working patiently. S/he is doing what the teacher tells him/ her to do but pursues seldom his/her own ideas.

Kommentar [PS1]: Needs to be elaborated. E.g. what environmental factors are affected and how they in turn may affect health etc.

Elaboration of the module

Goals/ objectives

The model for the construction of objectives was as follows:

Choose objectives →	Interpret them →	Formulate them
1. Ability to use science knowledge to underpin decisions concerning environmental and health issues.	You should use what you know about nature to say what you think about environment and health	You must understand how to build a house and a city-block so it will be good for the environment and for human health.
2. Develop knowledge of energy supply.	You must get better in knowing what is good or bad in using energy in different ways	You must understand how to build a house and a city-block so it will be energy conserving
3. Develop the ability to assess and evaluate various technological objectives.	You must get better in knowing what is good or bad in using technology in different ways	Cf. above, 1 and 2.
4. Develop the ability to use measurement methods and apparatus to compare, estimate and determine the magnitude of various quantities.	You must get better in making measurements in different ways and comparing them with reality.	You must understand how to make measurements and calculate to ensure that a house or a city-block really function.

The next step is to formulate the objectives *as an action*, taking as point of departure the direct assignment, which is:

Explain and show in different ways what you think is the best way to build a house and a city-block so it will be energy conserving, good for the environment and for human health. Show how you make measurements and calculate so the house and the city-block really function. You work in a group. You have a personal responsibility for the house. You and the group are responsible for the city-block.

The action is to build a city-block for young people to live in. The group builds a model of such a city-block, where every member has to think over her/ his part *and* the group has to reach a consensus about the whole block.

Performing the assignment

The teachers have devised a series of steps which they propose to the students.

1. Planning and making a drawing in the scale 1:50 of a flat/ villa. Make a drawing of the facade in the scale 1:50.
2. Build a model of the flat/ house and the whole building site in the scale 1:50.
3. Make a model of yourself and your parents in the scale 1:50.
4. Make a perspective drawing according to scale of a room in the flat/ house.
5. Choose building material and heating mode. Justify it.
6. Calculate and report the costs of maintenance (power, water, heating, garbage removal) for a year. You and your group do this for the whole block.
7. You and your group make a map of the block in the scale 1:100. Using the map you and the group build a model of the block 1:50. Place your houses in the block.
8. You and your group plan so the block will function in reality (roads, power, water, heating, garbage removal, telephones/ Internet).

After the assignment is performed the results are fed back to the goal-setting process, which amounts to an evaluation step. This feedback is performed by students and teachers, and is connected to student self-assessment.

Student participation

The work is connected to an individual development plan (IDP), where objectives are set together by the teachers and students (and parents)[ii]. The IDP must be negotiated by all teachers concerned, otherwise it cannot be operative. The IDP is, in this case, used to evaluate the module from an individual learner's perspective. Every week the student has to write a **reflection** in a *planning book*, which is her/ his preparation for the "tune in" meetings (TIM). At the end of the week s/he writes an evaluation in the planning book. S/he starts by reading her/his reflection and notes from the TIM.

The reflection is guided by the following:

1. Read the description of assessment levels (DAL) and underline what you think should be made more explicit and easy to understand.
2. Compare objectives and DAL and the work you have done so far.
    - Which level do you think you are on? Justify it.
    - What can you do to improve your work? Explain it.

The evaluation is guided by the following:

Compare objectives, DAL and IDP with the work you have done so far.

- Which level do you think you are on? Justify it.
- What has improved in your work this week? Explain it.
- What can you do to perform still better next week? Explain it and set an objective.

After the module is completed the students perform a self-estimation. It is based on the reflections and evaluations done during the three weeks the work has lasted. This is guided by the following:

1. Read your reflections and evaluations. Compare objectives and DAL with the work you have accomplished during the three weeks. Mark your level by filling in the bar chart. Justify in writing your choice of level.
2. Read your reflections and evaluations once again. Compare the level descriptions in the IDP with the work you have accomplished during the three weeks. Mark your level by filling in the bar chart. Justify in writing your choice of level.

Teachers make a corresponding estimation. If there is a discrepancy[iii] the teachers write a comment which is then used in *development interviews* with the student and parents, along with the content of the planning book.

The IDP comprises the following aspects of work:

1. The degree of taking responsibility for one's time at work.
2. Participation in planning of the content of school-work.
3. The ability to estimate one's performance.

This forms a progression of four levels, marking the possibility of developing the three aspects.

Level	Aspect A	Aspect B	AspectC
4	The student works extensively on consciously writing his/ her work-plan and to follow it. S/he always consults the plan in order to know what needs to be done and changes the plan if needed. S/he always sees to it that the group's plan works.	The student always has useful propositions or is developing the teacher's or other students' ideas.	The student always sees the merits and deficiencies in her/ his work and can report on products in a way that shows her/ his own development. S/he can justify her/ his judgements and explain why things turned out as they did.
3	The student can write her/his plan and work according to it. S/he often consults the plan and takes some responsibility for the group's work.	The student works hard at developing ideas and proposals. S/he often puts forth own proposals.	The student can most often point out the strengths and deficiencies of her/ his work. S/he can coherently tell about products and performance that show her/ his development.
2	The student can with some help write the plan and takes sometimes responsibility to work according to it. S/he consults it sometimes.	The student can sometimes take teacher's ideas and modify them. S/he sometimes and with some help proposes her/ his own ideas	The student can sometimes and with some help point out the strengths and deficiencies of her/ his work and distinguish between good and bad products.
1	The student seldom writes a plan, consults it seldom and works seldom according to it.	The student seldom formulates ideas and proposals.	The student can seldom point out the strengths and deficiencies of her/ his work. S/he can seldom distinguish between good and bad products.

[i] Teachers in other countries can refer to their National Curricula or to statements of political instances (ministers, parliament members etc.)
[ii] According to a government degree such plans must be set up for every student in every school included in the Lpo94 (belonging to the "compulsory school forms", i.e. primary and lower secondary school).
[iii] There was a concordance in two cases: the estimation of persistence (assessment of performance, ability A) and the estimation of how the student takes responsibility for her/ his time at work (aspect A, IDP levels).