

SEMINARS

A Pedagogical Pattern Language about teaching seminars effectively

Astrid Fricke and Markus Völter
astrid.fricke@gmx.de, voelter@acm.org

Version 2.1, May 07, 2000

Copyright 2000 Astrid Fricke and Markus Völter. Permission is hereby granted to copy and distribute this paper for the purposes of the EuroPLOP '2000 conference.

Note for EuroPLOP 2000 conference readers

We know that this pattern language is far too long to be reviewed completely during the conference. We suggest you read the paper from the beginning until the checkpoint on page 16. We ask that the review cover the part from page 5 below the heading „The Pattern Language" to the checkpoint on page 16. We included our entire work so the portions reviewed can be seen within the context of our entire pattern language. Naturally, we welcome comments on the rest of the paper, outside of the workshop review.

Why and for who did we write this pattern language

This pattern language is intended for those instructors in the industry, who are not studied educators. We wrote it especially for those, who feel that something is going wrong with their seminars – perhaps they are even frustrated and do not know what to change or what the reasons could be. This pattern language gives some hints how the situation can be improved, i.e. how you can run better seminars.

After each seminar, whether successful or not, a teacher should do some kind of debrief, asking himself (or herself) the following question: „Did the seminar run as I expected it?" Try to find out about the reasons why it went this way. The following bullets might help if it was not as good as expected:

- External Factors that are out of my control, such as daily condition of the participants or the teacher, or an unplanned change of the room, a construction site in front of the window creating loud noise, et cetera. What could I have done to react flexibly to such a situation?
- I think they did not understand the topics. I had the impression that my talking did not reach them. Was it because the seminar was overly complicated for the participants, were the participants less qualified than I expected, or were they simply not interested?

- The participants were bored all the time, they did not ask questions, and they did not collaborate. Did not I manage to present the topics in an interesting and easily understandable way?

On the other hand, if the seminar was good, you also should try to find out why and use the successful techniques again in the upcoming seminars. Once again, some points that might help:

- Was it good because the participants were extraordinarily interested and motivated?
- Was it a the size of the group that facilitated effective teaching?
- Was it simply the good atmosphere in the group?

In general, teaching is about flexibility. Every teacher should have a set of techniques how he personally can run a good seminar. A teacher should collect these effective techniques over time, perhaps creating his or her own personal pattern language, or finding new patterns to add to this pattern language.

This pattern language gives some proven techniques for running a good seminar. For professional educators, these things might appear trivial, for the typical industry instructor, some of them might not.

However, there are no „magic techniques“. That’s why this pattern language does not give recipes that say „Do this, and everything is fine!“. It only hints at proven techniques and describes them as a pattern language. For experts in the field, this language might not provide much new information.

To apply the pattern language, every reader must decide for himself if a pattern is useful in his particular situation. It is important that you create a homogenous seminar. The participants should not think „Oh, look, now he’s trying to use pattern XY!“. Be sure that you, the teacher, are honest and that you do not try to do things you do not like or that do not suit to you.

In addition to describing the patterns themselves, the pattern language also tries to explain some of the biological, anthropologic and pedagogic background. It covers all aspects of a seminar from preparation till exams.

Introduction to Patterns and Pattern Languages

As mentioned above, this pattern language is intended for instructors in the industry. They will probably not be familiar with patterns and pattern languages. That’s why we include a small sections on this topic. If you are familiar with patterns and pattern languages you can skip this section.

The first pattern language was a called „A Pattern Language – Towns, Buidlings, Constructions“ and was published in 1977 by the architect Christopher Alexander et. al. [CA+77]. He defines a pattern as follows:

Each pattern describes a problem that occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice.

That means, patterns are not recipes that say „Do X, and everything is fine!“. They provide hints along which lines a proven solution can be found to the problem, ideally with advantages, disadvantages and consequences of using the solution.

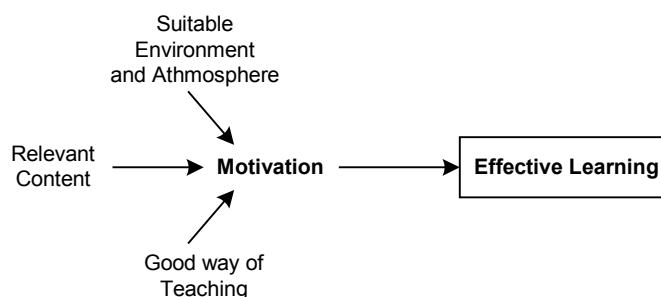
In his book, he introduces 253 patterns in the architecture domain. He presents patterns for everything from designing independent regions, to cities, to buildings and even to designing single rooms. By connecting these patterns with common forces and other relations he transforms this collection of patterns to a pattern language. It provides a consistent way to create a comfortable environment for people to live in.

At the beginning of the nineties the software community started using Alexander's technique to capture and communicate wisdom in software development. The movement started in universities and on the major programming conferences, such as OOPSLA. The first book that was publicly available was „Design Patterns“ by Gamma, Helm, Johnson, and Vlissides called the Gang of Four (GoF). It was published in 1994, and they presented a catalog of 23 patterns on how to design software systems. In the meantime, domain specific patterns and pattern languages have been created, and the pattern movement has its own set of conferences, namely the PLOP, EuroPLOP, ChiliPLOP and KoalaPLOP (PLOP stands for Pattern Languages of Programming). Many of the patterns presented at these conferences can be found in [PLOP1, PLOP2, PLOP3, PLOP4]

In the more recent past the scope of the pattern languages expanded once again, now including patterns of group working, designing software in groups, and pedagogic patterns, that deal with the problem of how to teach (especially IT topics). This pattern language is intended as another addition to the pedagogic pattern movement, which can be found on the internet at [PP].

Prerequisites

People are the central focus of teaching. Therefore, the patterns have to deal with biological and social basics that cannot be ignored. Taking these basics into account results in motivated participants, which in turn leads to successful learning. This section highlights some of them.

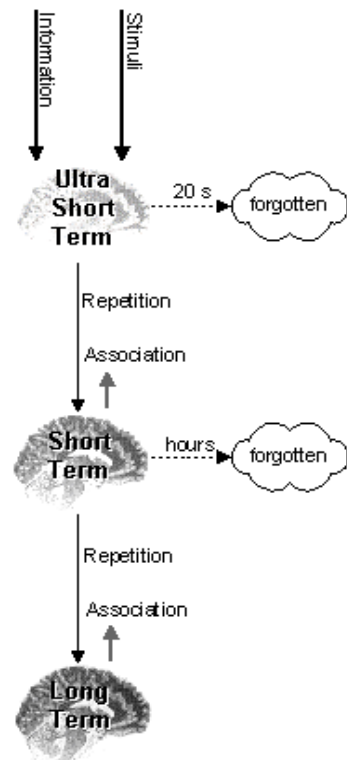


Biological fundamentals

The human being is a result of thousands of years of evolution. Although ignored by modern society, there are still some aspects in a human being, that result from the time when we were animals, primarily following our basic instincts instead of thinking and planning as we usually do today.

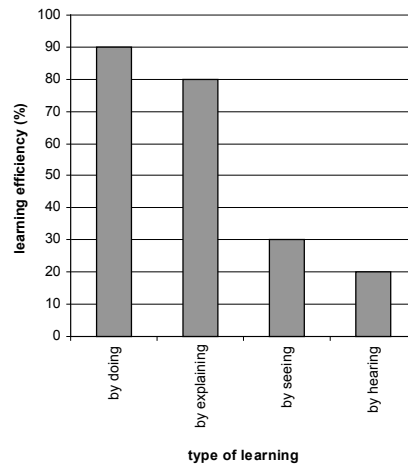
One of these instincts is „fight or flight“. That means, a creature runs away if it feels uncomfortable, stressed, or even threatened. Experiences during such a situation are not considered worth learning and are forgotten by the brain, thus not allowing the animal to override its instincts with possibly fatal thoughts. Mapping this behaviour to humans means, that people have to feel comfortable if they want to learn. This includes their physical environment as well as the social well-being during a seminar.

Another biological fact you cannot ignore is the way our brain works, in particular how it stores and remembers information. The brain is divided into three sections, receiving information in order. The first stage is the ultra-short term memory. It receives every information or stimulus from all the organs in the body. It can remember things for 10 to 20 seconds. In the literature [FV] it is often described as a kind of oscillation that abates after 10 to 20 seconds. During this time, the information has to be transported to the short term memory, where it can be stored for a couple of hours. The transfer from ultra-short term to short term memory takes place, if the particular piece of information is either repeated, or if it can be associated with other information available in the brain – otherwise the information is irretrievably lost. This way, the ultra-short term memory serves as a filter that reduces the huge amount of information reaching the brain. The third stage is the long term memory. As you know, it can store information forever, some of them unconsciously. Information is transferred to the long term memory, if the brain thinks, it is worth storing it for a long time. Information or techniques that are repeated again and again over a long period of time or can be associated with other information in the long term memory are transferred to this part of the brain. Consequence: repetition and association to other topics is absolutely essential in teaching.



There is another interesting information that relates to how people learn. As the following diagram shows, the learning efficiency depends on the way the people deal with the contents.

The diagram shows, that the participants should work on a topic on their own or explain the topic to somebody else. Just watching or listening to the teacher is significantly less efficient. „Learning by doing“ is the most effective way of teaching. However, this diagram shows the average. Specific people might have different efficiencies.



It is also important that you plan your schedule in accordance with the daily rhythm of humans. Late afternoon and directly after lunch are times, when people are generally less capable. Including breaks and arranging the topics in a suitable way is important.

Social fundamentals

The social basis for our pattern language is mutual respect among the teacher and the participants and among the participants. Every single person is accepted as a human with equal rights and equals duties. This means that everybody sticks to the basic rules of politeness. For example, everybody lets another persons finish what he/she wants to say before he or she starts talking. The opinion of the other participants and the teacher are respected. If the teacher tries to explain something, the participants are quiet. They do not just leave the room whenever they would like to.

On the other hand, the teacher does not try to be an authority, regarding the participants as subordinates. He respects their opinion and qualification. He tries to teach the contents as effectively as possible and cares about „his“ participants by including breaks, et cetera.

During a seminar, especially during longer ones, the group of participants and teacher(s) has to merely live together. They form a group. This group should work well, i.e. people should trust each other and be honest. However, everybody should accept the minimum social distance that other persons might need. Do not be obtrusive.

In general, the athmosphere is at least as important as the methodical and technical content. The seminar should be held in a good athmosphere, humour is important and the teacher should be relaxed, honest and competent.

You should also keep in mind, that for some participants, the seminar is a way to escape from everyday business live. You should respect this, and not try to overstrain the participants.

The Pattern Language

Pattern Form

The patterns in this pattern language use a form similar to the one used by Alexander in his book *A Pattern Language* [CA+77]. All patterns are written in the you-form, thus directly talking to you, the teacher. In addition to the pattern name, each pattern is divided into three sections. The first section describes the problem and the forces (bold font). The second section (below the ***) outlines the solution to the described problem as well as the consequences, limitations and disadvantages. The third section provides examples and additional information (italic font) on how to implement the pattern. References to other patterns in this language are highlighted by using CAPITAL LETTERS.

1. PATTERN NAME*

Problem Description

Solution outline,
consequences, drawbacks

*Exaples and additional
implementation information*

In addition, each pattern is marked with zero, one or two asterisks (*). Like in Alexander's patterns, they show how „alive“ we believe the pattern is.

Two asterisks denote patterns that state invariants. We believe that these patterns are essential and that the described problem cannot be solved in a significantly different way. One asterisk means that we think that we are on the right way, but there might probably be room for improvement of the patterns. For patterns with no asterisk we are sure that there are other, perhaps better ways of solving the problem - but we have not yet found them.

Pattern Language Overview

The above section describes the form of each single pattern. This section describes the actual pattern language, which is built from the single patterns. The pattern language is divided into different phases, each beginning and ending with a checkpoint. The following is an overview over the language, assuming that you are assigned to run a seminar on a given topic with a defined audience.

Checkpoint: Seminar Preparation

The first task is to prepare the seminar by structuring the contents and by creating a comfortable environment in which to teach. This phase defines the basis which is needed to execute a successful seminar.

Checkpoint: The Seminar begins

You are now ready to start the seminar. The participants arrive. You should welcome the participants, create a comfortable athmosphere and make room for personal communication. This phase is important from a social point of view.

Checkpoint: Start teaching

The sessions begin. You have to arrange your teaching in a suitable manner by giving overviews, summaries, et cetera. You should teach the content in a way that is accessible for the participants. You should include exercises. And there are some rules to follow for you as a teacher.

Checkpoint: Teaching is over

Now that the teaching is over and the participants have successfully learned the required topics, it is time for the exam.

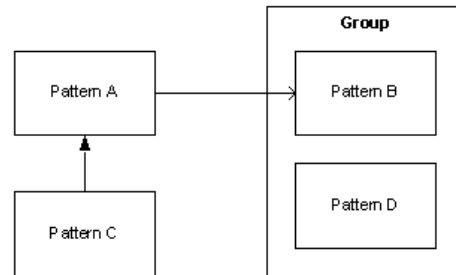
Checkpoint: Seminar is over

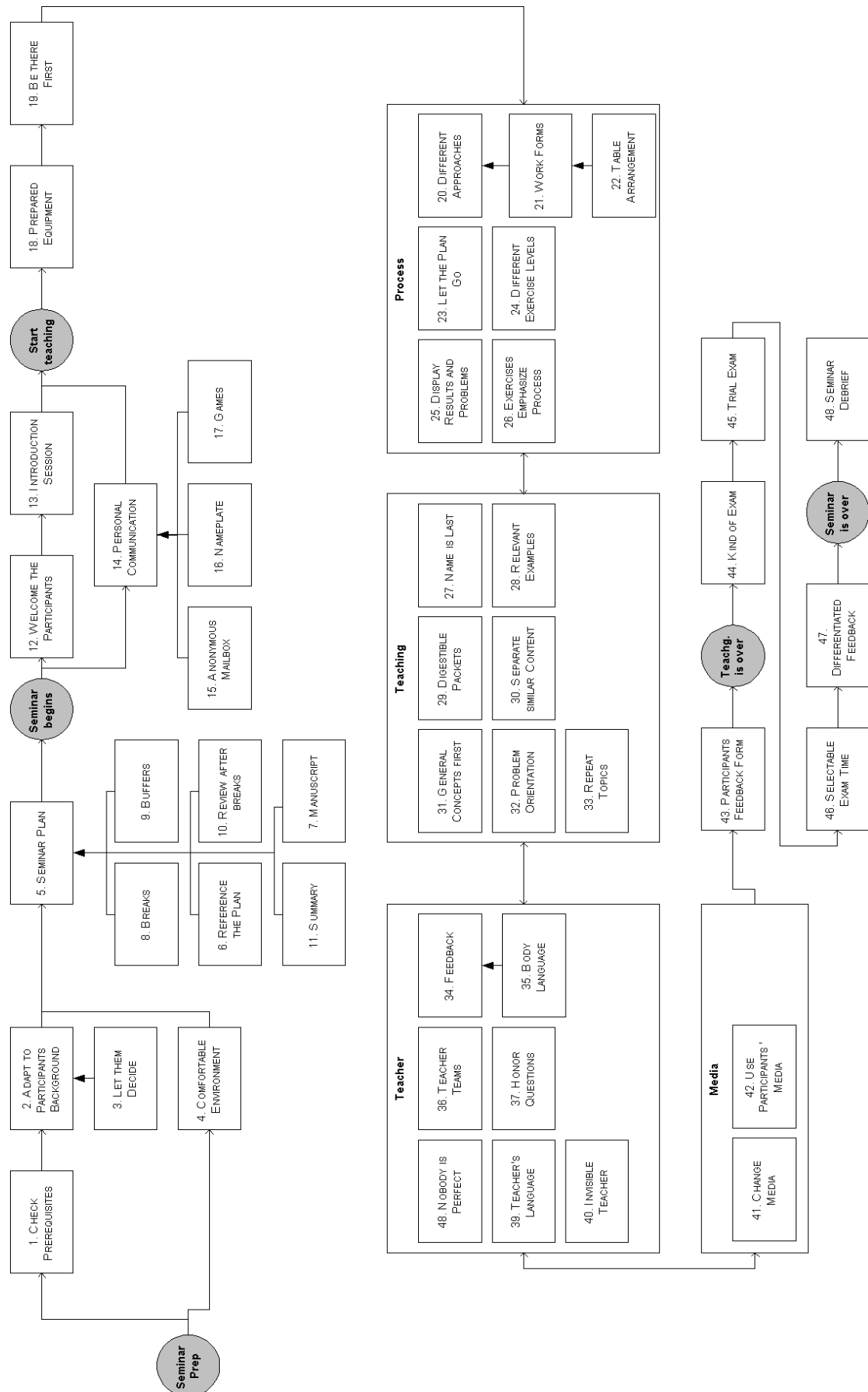
The seminar is over and it is time to look back.

Language Map

In the map that follows below, the following symbology is used (see sketch below):

Pattern A must be implemented successfully before Pattern B can be implemented. It provides a kind of temporal ordering. Pattern C is a way to implement Pattern A. It could also be seen as a kind of specialization. Patterns B and D share a common context and are therefore grouped.





Quick Access Table

The following table lists some typical problems and names the patterns in this language that can be used to address these problems.

After the seminar, people say they did not understand the topics.	DIGESTIBLE PACKETS, GENERAL CONCEPTS FIRST, SEPARATE SIMILAR CONTENT, DIFFERENT APPROACHES, REVIEW AFTER BREAKS
Participants say, they do not know how to apply the newly learned topics to their own domains.	ADAPT TO PARTICIPANTS' BACKGROUND, RELEVANT EXAMPLES, BUFFERS, PARTICIPANT SELECTION
People are bored during the seminar.	ADAPT TO PARTICIPANTS' BACKGROUND, RELEVANT EXAMPLES, WORK FORMS, CHANGE MEDIA, FEEDBACK, INVISIBLE TEACHER
The participants say, the seminar was too stressful.	BREAKS , PARTICIPANT'S MEDIA, COMFORTABLE ENVIRONMENT
The participants leave the room often during the seminar.	BREAKS
Participants ask questions about topics that will be taught later.	SEMINAR PLAN, REFERENCE THE PLAN, DISPLAY RESULTS AND PROBLEMS
The atmosphere is very sterile.	DISPLAY RESULTS AND PROBLEMS, COMFORTABLE ENVIRONMENT, TABLE ARRANGEMENT, PERSONAL COMMUNICATION, GAMES, NAMEPLATE, BODY LANGUAGE, TEACHER'S LANGUAGE, NOBODY IS PERFECT, BE THERE FIRST
My sessions are boring, I do not feel I can fascinate the participants.	CHANGE MEDIA, BODY LANGUAGE, PROBLEM ORIENTATION, RELEVANT EXAMPLES, ADAPT TO PARTICIPANTS' BACKGROUND, REFERENCE THE PLAN
The participants are afraid of the exams.	KIND OF EXAM, SELECTABLE EXAM TIME, HONOR QUESTIONS, NOBODY IS PERFECT
The participants do not want to do exercises.	EXERCISES EMPHASIZE PROCESS, DIFFERENT EXERCISE LEVELS
I do not know whether the problems are on my side or on the participants side.	TEACHER TEAMS, ANONYMOUS MAILBOX, PERSONAL COMMUNICATION
The participants do not ask questions during the sessions.	HONOR QUESTIONS, ADAPT TO PARTICIPANTS' BACKGROUND, NOBODY IS PERFECT
I talk and show	WORK FORMS, CHANGE MEDIA, MANUSCRIPT, LET THE

transparencies all day long, and I think the participants are not able to follow me. Other possibilities?	PLAN GO
I feel I do not get in touch with the participants.	PERSONAL COMMUNICATION, BREAKS, INTRODUCTION SESSION, WELCOME THE PARTICIPANTS, NAMEPLATE, GAMES, NOBODY IS PERFECT
I feel the participants cannot get the big picture, they do not see context.	REFERENCE THE PLAN, SUMMARY, PROBLEM ORIENTATION, GENERAL CONCEPTS FIRST
They do not know how to prepare the exam.	EXAMPLES, TRIAL EXAM

The Language

Checkpoint: Seminar Preparation

The first task is to prepare the seminar by structuring the contents and by creating a comfortable environment in which to teach. This phase defines the basis which is needed to execute a successful seminar.

1. CHECK PREREQUISITES **

Preparing a seminar involves understanding a wide variety of issues and concerns. Each seminar has a unique audience with unique skills and objectives, or at least with a different number of participants. Often, it is usually executed in a new place with a different infrastructure. Two seminars are never identical, even if they cover the same topic. You don't want to be surprised when you arrive on site or meet the participants.

Therefore, check the prerequisites before creating a detailed SEMINAR PLAN. Make sure that everything you rely on is really as you expect it. It is a good idea to use a checklist that contains all the necessary items that have to be checked before you start to plan the seminar in detail.

Examples for the contents of such a checklist might be the following:

- *What is the background / domain of the participants?*
- *What is the overall content the seminar should teach?*
- *Is there a concrete goal you want to reach with the seminar?*
- *Which additional materials and media are available for this topic?*
- *How many participants will be in the seminar? Are the planned teaching method suitable?*
- *Which is the best way to teach the contents? This depends very much on the participants!*

- *You should inspect the room, and check about the table arrangement, the available media types, etc*

2. ADAPT TO PARTICIPANTS BACKGROUND *

The participants attend a seminar because they want to learn something they can use in their day-to-day work. During the whole seminar they should be able to see how the topics relate to their problems. It is important that they never lose this feeling during the seminar, because it is directly related to motivation.

Therefore, ensure that the contents of the seminar are as near to the participants' background or domain as possible. Avoid the use of examples from domains with which the participants are unfamiliar. If the all participants are from the same company or from companies in the same domain, use examples and wordings from this domain. If the participants work in different domains, try to use well-known domains in your examples (such as banking, vehicles, persons...).

Of course, this imposes more work on you, the teacher, because you have to learn the intricacies of a perhaps foreign domain. But this is much better than forcing the participants to learn your domain in addition to the seminar's core contents. If you think it is too much work to get into the participants' domain, you should consider not to teach the seminar.

Using this pattern results in a much more effective seminar, because the participants can ask relevant, realistic questions, and they can see directly how the newly learned topics help them in their everyday work.

Use RELEVANT EXAMPLES or exercises from the participants' domain. Try to use the participants' wording. For example, teach a tool with the help of a realistic project from their domain or even company. We know of a guy who teaches project management to employees of a company that manufactures hydroturbines. He told us that since he uses real turbine projects in his seminars (he knows them because he has done quite a lot of these seminars), the participants are much more satisfied with the seminars.

3. LET THEM DECIDE *

You want to ADAPT TO THE PARTICIPANTS BACKGROUND, but you are not completely sure about how to do this regarding the contents, the schedule or the methodology. Sometimes it is impossible to make these decisions in advance because the exact skills or interests of the participants are not known.

Therefore, involve the participants in the planning of the seminar, or give them some alternatives to choose from at the beginning of the seminar. The participants will feel better and the seminar will be more relevant to them, because they were involved in the decision of what will be taught, and how.

For example, you could ask them how often they want to include breaks, which examples they want to do (selection from a set of possible examples), or you could ask them whether they would prefer a more active involvement (exercises, group work) or whether they would like you to do a more presentation-style seminar.

It is also a good idea to build your seminars from „components“. There can be some basic components (e.g. Java introduction of Java for C++ programmers) that create the foundation on which advanced components can build (such as RMI, JNI, EJB or Swing). The participants have to choose one of the basic components and can add any number of the advanced components.

4. COMFORTABLE ENVIRONMENT **

The environment in which the sessions take place should support the learning process because learning is only possible in an environment where a person feels good. In a situation or setting where a person feels stressed or otherwise uncomfortable, the brain blocks learning (see introduction).

Therefore, the seminar should be held in a comfortable environment that facilitates learning. Do not try to create a living room atmosphere! But the room should be large enough, it should be painted in friendly colors, it should be quiet and have large windows, et cetera. Of course, often it is not possible to modify the room to suit your needs, but it is still possible to make it somewhat better.

Some ways to improve the atmosphere in a classroom without renovating it could be the following: it is important that the room is tidied up, there should be only those things in the room that are relevant to the seminar. A wardrobe for the participants to put their jacket and bags is also a good idea. A very important aspect of the comfortable environment is TABLE ARRANGEMENT (see below).

During the seminar, work results and other related information could be attached to the wall, thereby making the room a part of the seminar (DISPLAY RESULTS AND PROBLEMS) . Cork strips can be attached to the walls of the seminar room to facilitate this.

It is also a good idea to add shelves for related books and material. Do not use cupboards to lock the books away. Make them available to the participants.

You can also use flowers that give off a fragrance. In addition, for some kinds of seminars, it might be useful to install a CD player for the breaks. For example, it is proven that Mozart's music stimulates learning.

If you are building a new classroom try to find a room with many and big windows, because daylight is better for work than artificial lighting. If you need lighting regularly, be sure not to use neon lamps because they create a very artificial kind of light, use pleasant lighting. Consider placing some plants in the room. Do not make the room look like a hospital by using white walls, white tables, et cetera. Use wooden or other friendly interior, and add curtains to the windows. Also take care of the infrastructure. Make sure that there are enough power outlets, also for the students. The same is true for LAN plug sockets, if computers should be used. A good projection surface for the overhead projector or beamer is also important, it should be large enough that the contents can be read from the back of the room.

Some of Christopher Alexander's patterns in [CA+77] might also be worth a look, especially those from 159 onwards. They deal with the problem of how to make the inside of a building comfortable.

5. SEMINAR PLAN **

Usually, you are very familiar with the contents of a seminar you teach. You might not realize the problems the participants might have because you deal with the contents all the time and know them by heart. Often, this results in an unstructured approach to the contents which is hard to follow for the participants. You should not believe that talking a lot compensates for an unstructured approach, because you might not distinguish between important and not so important topics. In addition, you will not like to admit things like „Oh, what I forgot last session when we were talking about XY....“.

Therefore, create a plan, or an agenda. This helps you to determine a general strategy for your seminar. The plan will help to not drift away into non-issues. Try to create plans on different abstraction levels, a high-level plan for the complete seminar and detailed plans for each topic. The plans should highlight important topics and define goals you want the participants to reach.

You should CHECK PREREQUISITES before creating the plans. Intergrate them with a schedule including BREAKS, BUFFERS, et cetera.

During the seminar, try to explicitly REFERENCE THE PLAN. If the atmosphere gets bad or if people try to disturb the session, be flexible enough to LET THE PLAN GO.

A good plan also contains a lot of experience and requires experience to create. So be sure to adapt the plan from seminar to seminar, to incorporate your new experience. During a seminar you should continuously check whether the plan is still current and whether you are still in the schedule. If not, the plan has to be adapted. Doing this regularly means, that you can adapt it in a sensible way, and not just leave away the last chapter, because time gets short at the end.

6. REFERENCE THE PLAN *

Usually you have a SEMINAR PLAN, but this plan is not obvious to the participants. The participants ask themselves

- What does the teacher want to tell us?
- What is the goal?
- How does this topic relate to the overall goal?

If the participants do not know where you will lead them, they cannot easily follow you through the content. The seminar might seem unstructured although you have a plan. Real motivation cannot build up.

Therefore, tell the participants about the plan. Show it to them before you start a session. Tell the participants briefly what will be covered in the current session and show them where in the overall context the current session is located. Also reference the plan during the sessions and whenever you have reached a goal or milestone. The participants will never be surprised as they will be able to embed the current topic into a greater context.

As always, there are different possibilities. You could show the table of contents, and show where the course is currently, or you could just tell what's going to come. Another alternative is to put up the table of contents on the wall, and always have a pointer pointing at the current topic. If there is not too much content in a seminar, you could add a simplified version of the

TOC on each transparency, highlighting the current section. Be sure to use short names for each section, so that they can easily be referenced. REVIEW AFTER BREAKS is also a good way to REFERENCE THE PLAN.

7. MANUSCRIPT *

The participants should be motivated to think about the things they are taught during a seminar. If they are already stressed by copying contents from the blackboard or a transparency, this is not possible.

On the other hand, writing things yourself can be a good way of learning.

Therefore, use a manuscript that is built along the following lines:

- It should capture the SEMINAR PLAN by stating important goals, facts or milestones explicitly. You can then use it as guideline for the seminar and the participants can use it to REFERENCE THE PLAN.
- It should be detailed enough. The participants should not have to write down too much to capture important aspects. Especially, complex drawings or diagrams should be included in the manuscript.
- Be sure to provide enough room for the participants to annotate the manuscript with their own comments, sketches or explanations.
- For you as the teacher, the manuscript should leave enough room for you „add value“. If it is too detailed, the participants could also read the manuscript at home and you would be superfluous.

The manuscript is not the same as the transparencies. The transparencies should contain only the important facts and leave you enough freedom to explain things verbally. In contrast, the manuscript should be self-explaining and complete.

8. BREAKS *

The brain can only concentrate on a topic for a limited period of time. This is also true for the brain of a seminar's participants. After this period, the participants are not able to learn effectively anymore. Often, this is the reason why a seminar is considered „hard“. As a consequence, the participants often leave the room during sessions. This creates an atmosphere of noise and hectic.

Therefore, include enough, regular breaks. Even five minutes of fresh air during a session can help significantly. The breaks should be planned at regular intervals during each session. You should try to stick to the planned break times. If it is unsuitable to make a break at the planned time, tell the participants about it and ask them to continue for another five or ten minutes. This shows that you did not forget the break. Breaks also help to improve the quality of the group by providing room for PERSONAL COMMUNICATION.

Include many, perhaps small breaks. People can go to smoke, have a little talk, go to the toilet or just go to the window and breathe fresh air. Try to keep the breaks short, and try to keep them in the schedule. Be sure that they are long enough that people have realistic chance to go to the toilet or smoke a cigarette without returning late! During these breaks, coffee and other drinks (tea, juices) could be served. You should consider planning more breaks in the afternoon,

because in the afternoon people are usually more tired than in the morning. Longer breaks for (second) breakfast and lunch should be included, of course.

During my time at the university, the sessions were usually 90 minutes. One professor included a 5 minute break after 45 minutes. This enabled the participants to walk around and breathe fresh air, allowing them to stay awake for the second half of the chemistry lessons.

In his book Accelerated Learning [CR89], Colin Rose suggests to take a ten minute break after 50 minutes of instruction.

9. BUFFERS *

During a course, unforeseen problems and topics will arise, the participants might have important questions, pet problems, or related side topics. You should be able to incorporate these additional topics (at least to some extent) without ruining your plan. You should not ask the participants to „add an extra hour/day“ to include the additional topics or to answer a participant’s question, because they might have planned their time differently.

Therefore, when creating the plan, keep these unforeseen temporal requirements in mind by including time buffers. Because unforeseen topics will come up in any seminar, it is safe to incorporate these time buffers from the beginning (and if not, you can finish early!) However, make sure not to drift too far away from your SEMINAR PLAN. If a question is completely out of the scope of the seminar, answer it off-line.

The schedule can explicitly contain periods marked as buffers, or, alternatively, some parts of the content could be marked as „optional“, these parts can then be replaced by one of the unplanned problems. Sometimes the unplanned topic is similar to a planned example; consider replacing the example with the unplanned topic.

During a seminar on Design Patterns, we had enough time to discuss patterns in the context in the participants’ company’s product (which is written in their own OO language, making the discussion even more interesting). This had a very positive effect on the overall success of the seminar.

10. REVIEW AFTER BREAKS **

BREAKS serve as a way to relax and to have PERSONAL COMMUNICATION. However, the participants tend to forget things that have been taught before the break, because the topics have not yet been stored in the long-term memory. In addition, you need to give the participants a chance to connect to the topics from before the break to help them understand the new topics.

Therefore, after each break, review the topics that were covered before the break. Focus on the important aspects, try not to get lost in the details. Take these required time into account when you create the schedule and the SEMINAR PLAN.

There are different methods how this repetition can be achieved. Either you simply repeat the important topics, or you quickly revisit the important transparencies, et cetera. In a well-working group it is even better if one of the participants repeats the important topics perhaps by using your transparencies.

As always, it is best if the participants are active instead of passive. In this context that means, that the repetition can be achieved by letting every participant write down the important topics on a paper on his own, or by discussing the important topics with his neighbour. To simplify such a discussion, you can prepare cards with important topics. Another possibility is to ask questions and let the participants answer them, perhaps in groups.

11. SUMMARY **

The participants should leave after a session (or after a seminar day) with a feeling of accomplishment. They should know exactly what they have learned and what they can do with that knowledge. Sometimes, the important parts get lost in the details that have been discussed during the session or day. Always make sure that the participants can identify the important topics as such. These topics should be embedded in a greater context. This facilitates the transfer of the knowledge into the long term memory.

Therefore, at the end of each session or day, provide a summary which repeats the important topics that have been covered. Relate these topics to things learned during previous sessions and and illustrate how the rest of the seminar will build on these topics. Be sure to emphasize the essential topics and show the context. If your seminar is broken up into DIGESTIBLE PACKETS, summaries are simplified.

It is not important that you once again tell the participants what you have already said three times during the day! The important aspect is, that they are confronted with the important topics once again. That means, that this summary session can also be „implemented“ by letting them do an additional exercise, discussing with their neighbors, writing a small summary, showing a final example that makes use of the contents of the session/day, et cetera.

Checkpoint: The seminar begins

You are now ready to start the seminar. The participants arrive. You should welcome the participants, create a comfortable atmosphere and make room for personal communication. This phase is important from a social point of view.

12. WELCOME THE PARTICIPANTS **

The beginning of a seminar is one of the most important phases. It is at that time when social contacts are created or blocked, it is a perfect time for the first PERSONAL COMMUNICATIONS. When the participants arrive they are usually unsure about where to go, who to talk to, et cetera. You as the teacher should guide them here.

Therefore, welcome the participants. You should be already there when the participants arrive. You should talk to them informally. Talk to them, show them the room, introduce them to the other participants. If a suitable atmosphere is created, the participants will get in touch with each other and a group starts to form. This makes room for PERSONAL COMMUNICATION among the participants and you. However, it is important that you are not obtrusive, you have to keep each person's minimum distance.

You could show them the room, perhaps introduce them to the other participants, et cetera. You could place tables in front of the classroom, offer coffee (and other drinks, because not everybody likes coffee!). Ask the participants about their professional background and their expectations towards the seminar. The participants feel that their opinion is important. However, be sure not to drift away into private contents. You can also ask them explicitly, what made them come to this seminar.

13. INTRODUCTION SESSION *

To make PERSONAL COMMUNICATION possible during the rest of the seminar, the participants need to learn something about each other at the beginning. Usually, the participants are a little bit shy and you should start this process. In addition, you might want to learn something about the participants, to ADAPT TO THE PARTICIPANTS BACKGROUND or to LET THEM DECIDE.

Therefore, take the time at the beginning of the seminar to let everybody introduce him-/herself to the others. The participants should be given a chance to state their expectations towards the seminar and tell the others about their professional background, their company, et cetera. This session should be held in an informal context, which can be achieved by using a suitable TABLE ARRANGEMENT. It is also possible to use GAMES at the beginning of such a session. To make a start, you should begin the session by introducing yourself. Be sure to introduce yourself, not the seminar.

There are different ways how this introduction session can be held. The most common form is that everybody introduces himself to the others, including his name, employer, his field of activity, et cetera. In general, the contents depend heavily on the clientele (imaging the difference between programmers and pedagogists). It is a good idea to let the participants decide what they want to include in their introduction. An alternative form is to let one person interview another person and introduce this other person to the group. The introduction session usually ends with everybody attaching a NAMEPLATE to himself.

14. PERSONAL COMMUNICATION **

In addition to creating a physically COMFORTABLE ENVIRONMENT, it is also important that people feel well from a social point of view. They need to talk to each other informally. This is especially true if they work in the same domain and come from different companies, because they will want to talk shop with each other. If you do not give them the time explicitly, they will do it during the sessions. It is also very important that there are times where the distinction between you and the participants becomes less important. Informal talking is also necessary to build up a harmonious group.

Therefore, make sure that the participants have time to talk! Create spare times where all participants are together in an informal setting. These spare times should not be filled with seminar content. It is important that you are also present during these spare times, but not playing the teacher's role, you should be „on the same level“ as the participants. Avoid doing other things during this time, such as organizing the next sessions or making additional copies. Also try to avoid talking about the seminar or about topics from the seminar.

Personal Communication can help to solve problems among the participants or between you and participants. To facilitate personal communication be sure to use NAMEPLATES. Playing GAMES can provide a good environment for talking.

The group could go to lunch together or visit a pub in the evening. The COMFORTABLE ENVIRONMENT can offer small tables, where people can stand, drink coffee and talk to each other.

This pattern is especially important if you have worked (or work) in the same domain or even company as the participants before you started teaching seminars.



15. ANONYMOUS MAILBOX

There are people who are not able to solve problems by PERSONAL COMMUNICATION with other participants or you, the teacher. You should still give these people a chance to communicate their concerns. And sometimes, real problems have risen in the group that cannot be solved just by talking while having a cup of coffee.

Therefore, create an official way for participants to communicate to you anonymously. Important information might be communicated to you via this path that would otherwise not reach you at all. If the group works well, PERSONAL COMMUNICATION will suffice to solve problems. If this pattern gets used heavily, this indicates that there are serious problems within the group or in the relationship participants/teacher.

An example for this pattern pattern might be a real mailbox somewhere in the class room where participants can put notes. Email and web technology offers other possibilities, of course. At the end of the seminar, offer feedback forms that can be filled by the participants anonymously. Of course, if the groups works well, PERSONAL COMMUNICATION can help to avoid problems that make this pattern necessary.

16. NAMEPLATE *

If you want to create a good atmosphere and facilitate PERSONAL COMMUNICATION, you should give the participants and you a way to call everybody else by name.

Therefore, be sure that everybody wears a nameplate on his shirt, so that everybody's name is present all the time. Nameplates on the table are not suitable, because during breaks and other informal times when the names are most important, they are not available. Be sure to find a consensus whether to use first or last names.

An ideal and simple way to create nameplates is to use Tesa Krepp (a german brand of adhesive tape usually used for nameplates) and write the name on it with a thick pen.

17. GAMES *

You realize that it is important to have PERSONAL COMMUNICATION. To make this possible, a harmonious group, a „team“, must be built up, especially if the group works together for a longer period of time and they did not know each other before the seminar. Such group-building processes should be explicitly assisted at the beginning of a seminar. An atmosphere of trust must be created among the participants to allow effective learning. This is part of a COMFORTABLE ENVIRONMENT.

Therefore, consider playing games in the group. The games should emphasize achieving things together. Games that aim at distinguishing winners and losers are not suitable. The games should leave enough room for PERSONAL COMMUNICATION. Games improve group quality, and they are usually not very demanding, from an intellectual point of view, serving as a good way to relax. However, games can be dangerous if the participants do not like them or consider them childish or otherwise useless. Never use games if the participants do not want it.



The positive effects of playing games in a group can be observed at the EuroPLOP conferences. A special person (George) is there to organize and coordinate games. Real, mature people play them, and this is one of the reasons why the EuroPLOP is so special. It is reported that games are also successfully used in some management seminars.

Checkpoint: Start teaching

The sessions begin. You have to arrange your teaching in a suitable manner by giving overviews, summaries, et cetera. You should teach the content in a way that is accessible for the participants. You should include exercises. And there are some rules to follow for you as a teacher.

18. PREPARE EQUIPMENT **

You should run the sessions smoothly, executing your SEMINAR PLAN without significant distractions. You should not be surprised by faulty or missing equipment, unsorted transparencies, et cetera. This creates anxiety you will probably have to abandon your PLAN. It creates a feeling of chaos and non-professionalism among the participants.

Therefore, you should prepare all the necessary equipment for a session, to let the session proceed without you leaving the room, looking for transparencies, et cetera. You need to have a PLAN for a session, otherwise you cannot prepare! A good MANUSCRIPT can simplify the preparation significantly.

Some of the aspects that should be prepared are media (it is very embarrassing if you mumble something like „Last time the transparency was there,“. The scripts should be available in adequate numbers. The overhead projector should work, flip chart pens should be available, you should know how to darken the room, et cetera. It is a good idea to create a checklist for this purpose, perhaps as part of the PLAN!

19. BE THERE FIRST *

It does not make a very good impression if you drop into the classroom two minutes after the session should have begun, and quickly prepare your "show" while saying hello to the participants. There is no time for PERSONAL COMMUNICATION between you and the participants.

Therefore, be there well before the participants arrive. This gives you time to PREPARE THE EQUIPMENT and WELCOME THE PARTICIPANTS as they arrive. The participants have the impression that you consider the seminar important. When the participants arrive, they have time for PERSONAL COMMUNICATION among each other and with you.

You should prepare all necessary materials, prepare all the necessary transparencies in the correct order, clean the blackboard, et cetera. Be sure to use this pattern in conjunction with PREPARE EQUIPMENT.

20. DIFFERENT APPROACHES **

Every person has different channels through which he or she can obtain knowledge most effectively. Some learn by reading, others by listening or working with their hands or even by explaining a topic to somebody else. Some people need a graphical representation of the topic to learn effectively, or they even have to create a sketch on their own. Do not be fooled by yourself: Not every participant learns most effectively in the same way as you do!

Therefore, provide different approaches to the same topic. You should try to give every participant a chance to learn using the most effective channel. If it is not possible to provide different approaches for a single topic, then at least use different approaches for different topics, so that each participant has the chance to learn something. Using different WORK FORMS can help here.

An average human being takes up over 83% of the overall knowledge with the eyes. So be sure to visualize important topics.

It is also a good idea to use a combination of several channels, e.g. when explaining something verbally, you could show transparencies in addition. For the visualization of important topics, you can use transparencies, posters, models... You could let the participants draw a diagram that sums up your explanations.

21. WORK FORMS *

Usually, the presentation style is used for the majority of the topics although this style is often not suitable. Usually, it is used because it is not too much work to prepare, and because it can be planned easily. It is a mistake to believe that the participants learn a lot just because you cover a lot of knowledge in a short time.

Therefore, try to use other work forms. There are many alternatives to the traditional presentations style. Learning works much better, if the participants are actively involved! Be sure to adapt the work form to topic taught. Of course, there are other forces when you decide which work form is best, such as time and space requirements, and the motivation of the participants.

If presentation is necessary, be sure to alternate the presentation phases (where the participants are passive) and the work phases (where the participants are active).

There are several ways how to involve the participants into the seminar. The most commonly used forms are:

- group work
- partner work
- working alone, and
- discussions involving all participants.



Especially for exercises, group and partner work is interesting and often more effective than working alone. It has the additional advantage of improving the cooperation among members of the group. You should ideally try to alternate the different work forms. If you do that, then there is also space for presentation style phases.

This pattern is strongly related to INVISIBLE TEACHER and DIFFERENT APPROACHES.

You can let the participants work out solutions to problems on their own. Be sure that the majority of the participants will find the intended solution, otherwise they will get frustrated. You should be available to help, answer questions and provide material for the participants to use.

Letting the participants explain a topics to a fellow participant can also be a very effective way of learning.

The presentation style should only be used if you intend to transport a lot of information in a short time. The emphasis is on information: Only use it for fact-style information. Do not use it for topics that have to be understood by the participants or for building up skill. Be sure not to get blinded by colorful, animated presentations that can be created with today's tools. They are a lot better than plain talking, but the participants are still passive!

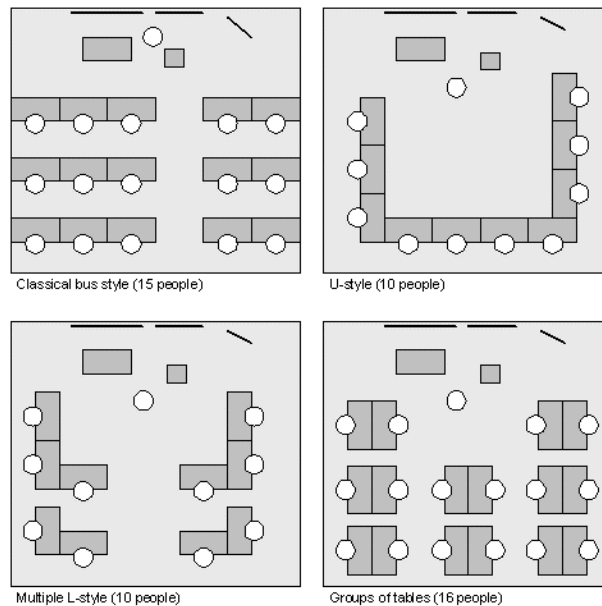
22. TABLE ARRANGEMENT **

DIFFERENT APPROACHES or WORK FORMS require different levels and ways of cooperation among the participants. The environment in which the sessions take place should explicitly support this requirement to cooperate. This is crucial for the success of a certain WORK FORM.

Therefore, arrange tables in a way that supports the selected WORK FORMS. You should either choose an arrangement that can be easily rearranged to adapt to changing WORK FORMS, or, if rearrangement is not possible, you should select one that can be used for as many WORK FORMS as possible.

Also keep in mind that the participants should feel well from a social point of view. Ideally, everybody should be able to look everybody else in the eye. Be sure to respect the minimum spacial and social distance that everybody needs. Otherwise the situation might be considered obtrusive and as a consequence, people will not feel comfortable.

Of course, rearranging the tables might not be possible in a classroom where a significant infrastructure is installed, such as computers and networks. Some of the possible arrangements are quite wasteful regarding space, and might therefore be impractical.



There are different possible table arrangements. The most generally usable one is the U-Form, where people sit on the outside, looking inward. It can be used if you use a presentational style, because everybody can look to the front. It is also well suited for discussions and collaborative work, because everybody can look everybody in the eye (including you, the teacher). This arrangement has the additional advantage that you can easily walk to every participant. A last point is, that it is not possible for some participants to sit in the last row, or: those who arrive last do not have to sit in the unpopular first row. The U-Form has the disadvantage that it wastes a lot of space.

Rearranging the tables during a seminar or even a session can be a good relief. People have to move and it can be good fun (see GAMES). During such rearrangement people have to talk to each other, making a good possibility for PERSONAL COMMUNICATION.

For pure presentations, the traditional bus style can be used: people sit in rows, everybody looking forward. This arrangement uses the available space very effectively. The most significant drawback is that people cannot look other people in the eyes, discussions and other forms of collaborative work are difficult. In addition, it is hard for you to walk to the participants, because usually the rows are quite narrow (and filled with bags, coats, etc).

For pure discussions it might make sense to sit in a circle using only chairs and no tables at all. This creates a more informal setting and can break psychological barriers. The U-Form is a quite good approximation of a circle and can often be used alternatively.

For group work, arranging the tables in groups is most suitable. A good compromise for presentation style and group work is the Multiple-L-Form. People are naturally grouped and can still look to the front.

23. LET THE PLAN GO *

You have a SEMINAR PLAN and you try to stick to it. This can create a kind of unflexibility. At sometime during the sessions, the need will arise, to do something

unplanned because a participant asks a question that is not really part of your plan. You have enough BUFFERS, so there is no temporary constraints.

Therefore, let the plan go. Diverge from the plan and improvise the parts that are necessary to cover the unplanned topic. This is a good way to ADAPT TO PARTICIPANTS BACKGROUND. It is important to have a SEMINAR PLAN, to be able to return to that plan after you have finished the unplanned topic. Thus, the insertion of an unplanned topic will not result in chaos.

You could either insert the topic „in-line“ and answer it immediately. Then it is good to choose another presentation medium, e.g. the flipchart if you use transparencies for the planned topics.

You could also postpone the unplanned topic until you have finished with a reasonable section of the plan. To make sure that the topic is not forgotten, it might make sense to add the unplanned topic to the OVERVIEW or to the RESULTS AND PROBLEMS.

24. DIFFERENT EXERCISE LEVELS *

The most important aspect of exercises is to allow the participants to improve their newly acquired skills by working on a topic on their own. To improve their skills, the exercise must be located at the upper edge of the participant's current skill level. Because this is usually not the case, there are some participants who consider the exercises overly simple (and do not learn anything) and some, that consider the exercises too difficult (and are frustrated, because they do not get them done; they do not learn anything, either).

Therefore, provide exercises of different difficulty levels, different approaches, different topics et cetera. Allow every participant to choose from these exercises, and solve those that he thinks are important for him to improve his skills. Doing this, everybody is successful and the motivation is kept on a high level.

Although we generally expect participants to be willing to learn, it has to be mentioned that this pattern only works if the participants really want to improve their skill, and not just try to survive the seminar with a few efforts as possible.

A problem with this pattern arises, if people overrate themselves and try too difficult exercises. Especially in a group, a participant might be tempted to try a too difficult exercise because the neighbor/friend also tries the more complicated one. A participant will sometimes have to admit that he has to step back.

The pattern can be implemented by giving participants a collection of exercises to choose from marked with a „skill level“, or you could put a collection of exercise sheets on a table, and everybody can choose whatever exercise he wants to work on.

25. DISPLAY RESULTS AND PROBLEMS *

The participants should be able to identify themselves with the seminar. This requires that everybody is aware of results, achieved goals, milestones and perhaps problems. In addition to just REFERENCING THE PLAN (which states goals and objectives), everybody should see that the seminar produces usable and visible results (and thus reaches the goals and objectives).

Therefore, make results, reached goals, objectives as well as open points and problems visible and obvious to all participants. Use lists, posters, et cetera to do so. Every participant should be allowed to add open points or work products (in a structured way). Everybody can write down important topics and problems. As a consequence, participants will be able to recognize what the group has achieved, and which points are still open. Questions do not have to be asked again and again, and the participants can see that the questions are not forgotten. It can also serve as a SUMMARY or as a way to REPEAT TOPICS. Using this pattern can also help to build a COMFORTABLE ENVIRONMENT.

Put the problems and achieved results on a poster on the wall for everybody to see. A bulletin board can be used to collect questions and open points. If it is not possible to „decorate the room“ this way, use sheets of paper that can be edited by everybody and keep them in a publicly accessible place. Copy these papers for everybody on a daily basis. Modern technologies like the WWW, news and email offer additional possibilities. For example you could use a seminar web page that everybody can edit over the web, using tools like WikiWiki.



26. EXERCISES EMPHASIZE PROCESS *

Often, people are frustrated if they do not get the right solution for an exercise, whereas „right“ is defined as the solution the teacher wants to see. This might happen because DIFFERENT EXERCISE LEVELS are not available. However, the real use of exercises is to have the participants work on them, thereby working on a problem, creatively applying the newly learned topics.

Therefore, honour the work on the exercise, and not whether the solution is right or wrong. Especially in IT technology, there is often no „right“ or „wrong“ solution, there are several more or less elegant alternatives. You should keep in mind that often, the solution is conceptually right, and only some minor details keep it from actually working.

An example could be the following: Do not ask the participants to write a program for a specific problem, but ask them to document how such a program could look like, which tools could be used, et cetera. Then, groups of participants could discuss the solution and perhaps create the final program.

27. NAME IS LAST *

Often, a new topic is introduced by bombarding the participants with technical terms. But the participants cannot yet connect these terms to available knowledge, which leads to confusion. The participants are not able to understand the new topics. There is a danger that the participants create false associations, which have to be removed later when they really understand the topic.

Therefore, make sure that the participants understand a topic or concept before you give it a name! If you mention a name before you explain it, participants might know some (possibly) wrong things about the name, creating wrong associations.

A good example from the programming languages domain is teaching the use of the static keyword in C++. If the participants already know C, they might immediately associate the word static with their present knowledge. It is hard to work out the subtle differences. If you first explain what you want to achieve, and then give it a name, the chances are better that they understand the differences.

28. RELEVANT EXAMPLES **

Examples facilitate learning by providing illustrations for abstract concepts. The examples should help the participants to understand the topics. Examples should not be a „new problem“ for the participants. The participants should realize the example problem immediately. If the example is not easily understandable, it further complicates the learning process.

Therefore, always use relevant examples, ideally from the participants' domain, thereby ADAPTING TO THE PARTICIPANTS BACKGROUND. They will be able to understand the examples and the underlying topics more easily because they are familiar with the domain. In addition, they can see that the newly learned concepts are relevant to them.

Try to distinguish between

- examples at the beginning of a new topic when using PROBLEM ORIENTATION: it is intended and useful if an example introduces a new, not readily solvable problem; and
- examples that are used to illustrate an already covered topic. These should not introduce „new“ problems.

Ideally, you should use examples that have really been (or currently are) a problem in the participants domain. Perhaps, the participants have already tried to solve the problem with other, unsuitable tools or techniques. Then, the participants can directly see, how their problems can be solved with the new knowledge.

In general, it is also important, that you use up-to-date examples. It is your job to gather such examples. It is also very bad to use examples that have already been solved with another, even more suitable technique.

29. DIGESTIBLE PACKETS *

People can only concentrate for a limited period of time. This is the primary reason to include regular BREAKS. If a topic takes longer than the time people can concentrate, the participants will have difficulties understanding the topic in its entirety. Because comprehension decreases, the motivation will decrease, too, and the seminar will be considered difficult.

Therefore, organize the topics in such a way, that the topics remain small and understandable. Ideally, each topic should be understandable on its own and should be finished during a reasonable amount of time, ideally the time the participants are able to concentrate. If the topic takes longer, make a break! Be sure to REVIEW AFTER BREAKS

to bring them back in line. Create logically consistent packets and show the interrelations among the packets.

Be sure that at the end of each session (or at least of each day) the topic is finished, usable, and complete. The participants will leave with a feeling of accomplishment and satisfaction. You can use a SUMMARY to augment this feeling. As a consequence, you should also avoid to organize a seminar that only covers „dry, unimportant“ theory for the first three days, until at the fourth day, practically usable topics are taught. After at most two days, the participants will be disappointed and frustrated.

30. SEPARATE SIMILAR CONTENT *

Often, a seminar's content covers several similar, but not identical topics. When such similar topics are taught without enough temporal separation, the brain is not able to distinguish the topics correctly. This creates confusion for the participants and they might create wrong associations. The same is true for similar terms with different meanings.

Therefore, do not present similar, but slightly different topics in sequence. Separate similar contents in time and explain clearly, when one is used, and when the other one. Be sure that the participants really understand a topic before you introduce another, similar concept.

Comparisons of two similar topics should only be done if the two topics are understood thoroughly. Never try to show the differences to not yet covered topics when explaining a specific topic („As you will see later, this is different from ...“).

31. GENERAL CONCEPTS FIRST **

The brain learns best if it can associate new topics with already learned topics. The more associations the brain can create for a new topic, the better it remembers it. The brain can store new knowledge more easily if it has „categories“ in which to store new knowledge.

Therefore, teach general concepts first. When teaching details, or other topics that are based on the general topics taught before, this has two positive consequences: The new topic can be remembered more easily, because it can be associated with the general concepts. And the general concepts are stored more thoroughly, because they become REPEATED TOPICS as new topics are introduced.

For example, teach the concepts of defining logical interfaces first. Explain the advantages of pure interface definitions. Then introduce pure abstract classes (C++, Java) and interfaces (Java, IDL) and show how they implement the general concept of an interface.

32. PROBLEM ORIENTATION *

It is very difficult for the participants to get a start on new topics. The introduction to a new topic must be as easy as possible for the participants. The participants should be motivated to learn the new topic. To be motivated, they need to know what they can do with the new knowledge.

Therefore, start a new topic by introducing the context, ideally using previously learned topics (this helps to REPEAT TOPICS). Show the problem the new topic solves. It is important for the participants to know where you will lead them, they must know the goal. Just REFERENCING THE PLAN is not enough, you should create real tension. Teach details of a topic only in a second step, after the fundamentals are well understood. Always start with the overview, use a top-down approach and teach GENERAL CONCEPTS FIRST.

You should discuss problems from the participants background, problems which they have already understood well. The seminar should give them the tools needed to solve this problem. Reference this problem repeatedly in the course of the seminar.

33. REPEAT TOPICS *

There are some biological preconditions for effective learning. The brain can remember things easier, if it can connect new topics to old ones, and it considers those topics important, that it comes across repeatedly. The transfer of knowledge from the short-term memory into the long-term memory happens easier after a couple of repetitions.

Therefore, repeat important topics. Create cross links among topics to allow the participants to connect new topics to older ones. Be sure to repeat only important topics, and not more or less unimportant details. Otherwise, the participants' brains will interpret a repetition as „this is important“. Using older facts as a basis for new things is also a means of repeating topics, this is facilitated by teaching GENERAL CONCEPTS FIRST. Additional repetitions are of course provided by a REVIEW AFTER BREAKS, or by recalling them in a SUMMARY session.

There are different ways how things can be repeated. For example, exercises can be used. Or you could let the participants discuss and relate the three most important topics.

34. FEEDBACK *

The participants want to learn the content of the seminar. But often, they are not sure whether they understood something until the exam or when they are back in their company. If they think that they captured a topic although they did not, they will not ask questions.

Therefore, give the participants feedback. The feedback should be differentiated and objective. Always begin with the positive feedback. Criticism should always help the participants to improve the criticized aspect. Be sure to give the feedback in time, later feedback is not effective. Positive feedback can significantly increase motivation.

One form to give feedback is to let the participants work on exercises, thereby they can see their learning progress. Explicit feedback by you is also possible, for example by asking questions.

35. BODY LANGUAGE **

Research says that 70% of the overall information is taken up via your body language. The body language can either support or contradict the spoken word. During the communication process, the body language always overrides the spoken word, i.e. the use (or not use) of this non-verbal form of communication can significantly affect the whole teaching process.

Therefore, you should support the spoken word with the help of your body language. Gestures and facial expressions should be used intentionally.

You should try to look the participants in the eyes, so they feel spoken to and integrated. In addition, you as the teacher get feedback about the participants condition. You should look at everybody in turn. If you use a too detailed MANUSCRIPT, there is a big risk of not looking at the participants, because you have to read the manuscript.

You should try to balance your movement in the room between the two extremes „Pillar in the room“ and „Tiger in the Cage“. Hectically walking around is as negative as standing around without a move or hiding behind your desk.

You should always try to show your full front and try to display open gestures with your hands and your arms. Never sit down or otherwise hide behind the desk.



A good way for novice teachers to improve their body language is to take acting classes or improvisation classes. You can also videotape yourself and see „how you act“.

36. TEACHER TEAMS *

Teaching is not easy and it can be a lot of work to prepare a good seminar. It is especially hard for a teacher to find out about his personal weak points. It is hard to find problems (and their reasons) in your own sessions. If you are very unproductive with a class, you might not realize what the problems are.

Therefore, join up in teams with fellow teachers. Working in teams is generally more effective than working alone. The people motivate each other and the team produces much more and better output than each member alone. However, working in teams in the context of teaching requires a common attitude towards methodologies, people, et cetera.

During the execution of a seminar, the team member can help each other to improve the seminar by giving constructive feedback.

This teaming can be applied to different extents:

- *You can prepare the MANUSCRIPT together or teach according the the same PLAN.*
- *You can prepare seminars together, they can share materials, examples et cetera.*

- *You can run seminars with more than one teacher, especially during group work phases. Financial or temporal constraints might be a problem here.*
- *You can occasionally sit into each others sessions and criticize him and talk about his problems after the session, which helps you with SEMINAR DEBRIEF. This requires a lot of trust into each other.*

37. HONOR QUESTIONS *

Often, participants do not ask questions because they fear that the question is „silly“ in the eyes of the fellow participants or the teacher. They fear to show weakness. This is unfortunate because questions show that the participants think about a topic. A question can also give a good hint on the problems the participants might still have with a new topic. Or questions can lead the seminar into a direction that is not part of the SEMINAR PLAN but important for the participants (which is a way to ADAPT TO THE PARTICIPANTS BACKGROUND).

Therefore, motivate the participants to ask questions, also if they seem silly or if they show that a participant does not fully understand the topic. If NOBODY IS PERFECT, the participants need not be perfect, either. Always honour questions, not bright answers. If you have a working group of participants and if they accept you as a partner, the courage to ask „risky“ questions raises.

A good way to motivate the participants to ask seemingly silly questions is to to answer questions even if they seem silly at the first glimpse. This might force you to LET THE PLAN GO.

This pattern was inspired by Prof. Joseph Bergin at EuroPLOP `99. He gives „tokens of approval“ to „participants who reveal that they are struggling with new concepts“ [PP].

38. NOBODY IS PERFECT **

At some time in the seminar, the participants will ask a question you cannot really answer. This might be unpleasant for you as the teacher. You might feel tempted to block such questions or give evasive answers. You can be sure that the participants will notice that!

Therefore, do not try to be perfect. In particular, if you cannot answer a question, admit it! This is even true if the question is about the seminar content you as the teacher should know. But nobody is perfect. If you try to seem perfect, nobody will believe it. Tell the participants freely that you do not know the answer. Tell them that you'll look it up for them, or explicitly ask the fellow participants whether one of them can answer the question. You can also try to work out the solution together with the participants. Be sure not to create the impression that the question is overly difficult, and that everybody who tries to answer it cannot possibly know it because you, the teacher do not know it. Otherwise, nobody will answer such questions!

A teacher who tries to be perfect is not very credible. Try to be honest and learn how to say „I don't know!“ with grace.

You should avoid searching your transparencies / books, mumbling things like „I'll find it in a moment..." unless you really know it is there. Often such „searches“ are used to think about a more or less acceptable answer, although you definitively do not know it.

39. TEACHER'S LANGUAGE *

In addition to the technical contents, one of the most important aspects of good teaching is the medium with which the contents are primarily transported – namely your language. Your speech should be easily understandable for all participants.

Therefore, you should use a language that suits the participants, being expressive and fascinating at the same time. Your voice should resemble the suspense that should prevail in the participants. You should speak loud enough that it can be heard in the whole room. If you run a lot of seminars and you experience problems with your voice you should consider training your voice, control your breathing and ensure proper posture.

Use short, simple sentences. Technical terms should only be used if they are well known. Use a verbal style. Speak slowly and insert breaks to give the listeners a chance to process complicated facts. Accentuate important topics by changing your voice, by varying your talking rate or by repeating them. Speak loud enough and do not use too much dialect.

If non-native speakers are among the participants, you should slow down your speech to ensure that everybody can follow.

40. INVISIBLE TEACHER *

Usually, the teacher is the central point of a seminar. You lecture your manuscript. The participants are passive, copy the contents, do not ask questions; they do not try to follow you in your thinking. Learning is most effective if the learners work on their own. Otherwise, the participants start to feel bored, motivation is low and the participants start to do other things. In the worst case, they leave the sessions and get coffee.

Therefore, put the participants into the center of the seminar. Your job as a teacher is to help the participants learn for themselves. The best teaching method is not to teach at all, but to let the participants work on the content on their own. You should offer the participants help whenever they have problems. Sometimes teacher presentations are necessary, but you should keep the „show“ part of your sessions to a minimum. Use different WORK FORMS to achieve this.

It is also important that you do not show off with your skill. The participants do not attend a seminar to learn how skilled their teacher is, but to learn as much of the content as possible (with as few words and as much fun as possible). This „show off“ problem is especially critical with very skilled teachers, or gurus. A guru in a certain domain is not necessarily the best teacher, there is more to good teaching than good domain knowledge.

This pattern has consequences on how sessions are organized (see WORK FORMS). The active part of a teacher should be minimized by utilizing group work, exercises, discussions, et cetera.

41. CHANGE MEDIA *

It is boring for the participants to stare at the blackboard all the time and copy the things they read there. Different presentation forms (graphics, text, explanation) can be most suitable for certain participants (DIFFERENT APPROACHES).

Therefore, you should change media during the sessions from time to time, ideally the medium used always suits the content. Several different types of media are available: blackboard, overhead projector, slides or films, flipchart, beamer, and script. However, be sure not to create a „media battle“ using every possible medium in every session. By changing the media in the course of a seminar, the sessions are more diversified.

Make sure that the selected media fit to the selected WORK FORM.

The blackboard is well suited to explain processes or build up something because the creation process can be observed by the participants. The overhead projector can be used to show complicated diagrams or drawings, that have more informing character. Slides or films can be used to show real world applications of a topic, and they serve as a kind relaxation phase during a session. The flipchart is well suited to explain questions or to make notes. A beamer can be used together with the suitable animation software to illustrate a process. Of course it can be used as a replacement for transparencies by using a presentation software such as MS Powerpoint.

If you create and use transparencies, be sure to keep the following aspects in mind:

- *Give the participants time to look at the transparencies*
- *Use a font size that can also be read from the back rows (try it!)*
- *Use colours and different fonts to facilitate reading*
- *Do not overload them with too much detail (especially a problem when copying things from books)*
- *If more than one topics is displayed on a transparency, hide the topics that are not currently explained.*

If you want to explain a process, be sure to use a medium that reflects this process. Suitable media are animations, the blackboard or stacked transparencies. Do not present the full solution (e.g. on a transparency or in the script) and then verbally explain the process how to come to this illustration.

42. USE PARTICIPANTS' MEDIA *

The participants usually have to do two things in parallel: Understand new topics and copy text from a blackboard/transparency/slide. This is a very challenging task. You as the teacher should make this as easy as possible for the participants.

Therefore, create „equal chances“ for everybody. You should use the same kind of media as the participants do, so the participants can easily copy things as fast as you write them. Keep in mind, that the participants should be given the chance to understand the topics they copy. Otherwise, they do not know whether they did understand it or not, and they cannot ask important questions.

If you show complex drawings, give the participants hardcopies, do not ask them to copy the drawings manually while you explain them. If the participants have to copy things manually

(which is good from a learning efficiency perspective), write them on the blackboard or on transparencies during the session. It is very frustrating for participants to enter the room and see a completely filled blackboard and hear the teacher saying „You can already start copying that...”

43. PARTICIPANT'S FEEDBACK FORM

You try to make your seminar as good as possible, but it is hard for you to determine whether it is good or not. The most realistic judgement ultimately comes from the participants.

Therefore, give the participants a chance to „rate“ the seminar. Ensure that the participants can stay anonymous, if they want to. To get a comparable result, be sure to guide the participants by asking certain questions or write down some criteria they can rate (e.g. on a scale from 1 to 10).

A very common technique is the feedback form that each participant can fill in. It keeps the participants anonymous if they want. A good way to motivate the participants to fill in the form is the following: Do not let them do it at the end of the seminar, but let them fill in the form when you are only half way through. This has the consequence that the participants have a chance to benefit from their criticism.

Checkpoint: Teaching is over

Now that the teaching is over and the participants have successfully learned the required topics, it is time for the exam.

44. KIND OF EXAM *

Often, the exam is seen as a problem by the participants, some are even afraid of it. You should try to take away this fear. In addition, in many seminars, the kind of exam is completely unsuitable.

Therefore, think about what kind of exam to use:

- Exams can be written or they can be verbal.
- You can differentiate among the participants by testing the skill or by testing how fast they accomplish the exam.
- You can also use a project that has to be done by each participant to find out about a participant's qualification.

If your seminar aims at improving the skill of the participants, then a project serves well as an exam. A oral exam is also good, because you can get a feeling for how the participant solves problems. The disadvantage is that it is more work for you to find an appropriate mark. And the results are not as easy to prove and compare.

You should also ask yourself if it is necessary to give marks. Marks always create a way for the participants to compare to each other, which can be frustrating for those who are among the best.

If your seminar aims at acquiring a title such as „Certified Pattern Engineer“ then a written exam, perhaps using multiple choice questions from a previously published catalog is preferable. For such seminars, it is often unnecessary to give a mark, because it is only interesting if the participant has passed or failed.

45. TRIAL EXAM *

The participants are afraid of the exam and they repeatedly ask you what the scope of the exam will be. They do not know how to prepare the exam. This creates fear.

Therefore, give the participants a chance to prepare the exam by writing a trial exam during the seminar. Be sure to ask the same kind of questions with the same difficulty level in the real exam, otherwise you will get incredible. The trial exam should be significantly shorter than the real exam, but it should contain all types of questions that will be asked in the real exam.

This trial exam does not necessarily mean more work for you, because you can compile it from exercises and the participants can correct the trial exam on their own with the help of a previously prepared solution. As an additional help, you can give hints on the topics that should be repeated if a specific trial exam question could not be answered successfully.

46. SELECTABLE EXAM TIME *

Participants learn with a different speeds. You should give each participant the chance to learn with the speed that is most appropriate for him.

And there are different daily forms of a person. You do not want to have a participant get a bad mark just because he had a bad day when he wrote the exam.

Therefore, give participants a change to write the exam whenever they feel ready. Be sure not to judge participants on their learning speed, if the goal of the seminar is to teach skills.

You can give them a couple of days to choose from, e.g. each monday in the following 4 weeks after the seminar.

47. DIFFERENTIATED FEEDBACK *

The seminar is not necessarily over after the exam. The Participants can also learn from the mistakes they made in the exam. A well designed exam can show the participants where they have weak points and what they understood well.

Therefore, try to give every participant a differentiated feedback after the exam. Give hints on how he can learn his weak points. To motivate the participants to be interested in the mistakes they made in the exam, be sure to promote the exam as a way to learn even more, not just as a way to get a mark.

There are different ways to give exam feedback:

- *Do not just tell them their mark, but also return them the complete exam together with a correct solution, so that they can compare them.*

- *If it is not possible to return the complete exam, write down a list of their weak points and pass it to them.*
- *You can also offer the participants a chance to talk with you about the exam. This is especially important for weaker candidates.*

Checkpoint: Seminar is over

The seminar is over and it is time to look back.

48. SEMINAR DEBRIEF **

When a seminar is over, you will have made some good and bad experiences, you will have discovered problems and mistakes on your side. Probably you will have made some positive experiences, too. You do not want to make the same mistakes again, and you will want to repeat the good parts in the upcoming seminars.

Therefore, be sure to do some kind of debrief after a seminar. All positive experiences and the obvious mistakes should be captured for reuse or avoidance in future seminars.

You could either just think about the seminar and capture the content on a piece of paper. It is also a good idea to have a kind of predefined checklist that asks certain key questions. If you use TEACHER TEAMS, it is also a good idea to discuss a seminar with a colleague. Of course, PARTICIPANT'S FEEDBACK FORM can provide valuable input.

Related Patterns and Pattern Languages

There is another pattern language covering the same topic by Dana L.G. Anthony, it is called *Patterns For Classroom Education* and it is published in [PLOP2]. Its focus is on teaching „difficult technical topics“ and covers patterns like *Simulation Games* and *Debrief after Activities*.

The following paragraphs relate this pattern language to some of the patterns that can be found at the homepage of the Pedagogical Pattern Project [PP].

To implement the SUMMARY pattern, the *Class Concept Map Pattern* by Jeanine Meyer can be used. This pattern proposes that the whole class jointly tries to create a concept map that relates all the different terms and concepts taught during a session.

The *CoG-PADD* pattern by Donald J. Bagert also proposes to start with a motivating problem when introducing a new topic. This is also proposed in the *PROBLEM ORIENTATION* pattern in this pattern language. Ian Chai's *Concrete to Abstraction* pattern [PPP] proposes to start a new topic with an example, thereby describing a real world problem that the new topic can solve. Alan O'Callaghan explains that a programming should be taught as „a means to solving problems“ in his *Model and Implement Pattern*.

The *Design-Implement-Redesign-Reimplement Pattern* by Steve Houk describes its intent as the following: „Explain new concepts and methods based on old concepts“. Although he restricts its pattern to teaching OO concepts, he uses the same approach as we do in in our REPEAT TOPICS pattern.

Joseph Bergin's *Early Bird* introduces the notion of teaching important concepts first, because „Students often remember best what they learn first.“ This is basically the same as we propose in our GENERAL CONCEPTS FIRST pattern.

Expose the Process by Byron Weber Becker describes that the „Students can benefit by watching idea develop“. This is related to our EXERCISE EMPHASIZE PROCESS pattern.

In his *Gagné-Ausubel Pattern of Lecture* Tim DeClue describes a way how the teacher can use WORK FORMS to let the participants take part in the sessions actively. His pattern is based on the writings of Robert Gagné and David Ausubel. This pattern aims at the same problem as our WORK FORMS. Mary Lynn Manns also proposes a more hands-on approach to teaching in her *Lab-Discussion-Lecture-Lab Pattern*.

Joseph Bergin and Jeanine Meyer introduced a pattern called *Gold Stars for Confusion*. It claims that „tokens of approval“ should be given to students who „reveal that they are struggling with new concepts“. Just as our HONOUR QUESTIONS pattern, it tries to motivate the participants to think about a new topic and ask if they have problems.

An special WORK FORM is the *Icky Poo* pattern by Joseph Bergin and Owen Astrachan. They propose to use „very vivid physical analogies“ to „make the presentation of a complex topic unforgettable“. Jutta Eckstein's *Incremental Role Play* pattern proposes the same for teaching OO concepts by „asking the students to behave as objects“.

A central intention of our patterns is to make participants really take part in the sessions. They should be motivated to think and contribute. In their *Round Robin Pattern* Kent Beck and David Bellin propose using a round robin strategy to make everybody contribute to a session. According to them, the problem is that in every seminar, after a short period of time there is a core of listeners and speakers, while the rest does not really contribute to the sessions.

Jeanine Meyer has a *Team Teaching Pattern*, which is basically the same as our TEACHER TEAMS, although she provides a more detailed description.

As mentioned above, these patterns can be found at the homepage of the Pedagogical Pattern Project [PP].

Acknowledgements

Many people gave useful comments and criticism to this paper. First and foremost, we would like to thank our EuroPLOP 2000 shepherd Norm Kerth. He provided us with many really insightful comments and constructive criticism. His experience in teaching and pattern writing has helped to improve the paper tremendously.

We'd also like to thank Birgit Wiedenmann, Martin Siebert, Bernd Unglaub and Hartmut Ott. Birgit gave us many useful comments and contributed the MANUSCRIPT, TEACHER'S LANGUAGE, FEEDBACK, and BODY LANGUAGE patterns. Martin inspired many of the illustrations, told us about the Multiple-L table arrangement and laid the foundations for the CHECK PREREQUISITES pattern. Bernd gave many useful hints that have been incorporated in several patterns. Hartmut inspired the Quick Access Table.

Literature and Online Resources

- CA+77 Christopher Alexander et. al., *A Pattern Language: Towns – Buildings – Construction*. Oxford University Press 1977
- CR89 Colin Rose, *Accelerated Learning*, Dell Books, 1989
- FV Frederic Vester, *Denken, Lernen, Vergessen*, 23rd edition, dtv, 1996
- MH Hilbert Meyer, *Unterrichtsmethoden (Bd.1 Theorie, Bd.2 Praxis)*, Cornelsen, 1987
- PLOP1 Coplien, Schmidt (editors), *Pattern Languages of Program Design*, Addison-Wesley 1995
- PLOP2 Vlissides, Coplien, Kerth (editors), *Pattern Languages of Program Design 2*, Addison-Wesley 1996
- PLOP3 Martin, Riehle, Buschmann (editors), *Pattern Languages of Program Design 3*, Addison-Wesley 1998
- PLOP4 Harrisson, Foote, Rohnert (editors), *Pattern Languages of Program Design 4*, Addison-Wesley 2000
- PP *Pedagogic Patterns Project* home page at <http://www-lifia.info.unlp.edu.ar/ppp>
- WP Wilhelm H. Peterßen, *Handbuch Unterrichtsplanung*, 6th Edition, Ehrenwith, 1982