Preliminary edition

Model for teaching portfolio
in engineering education

IngeniørUddannelsernes Samråd

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Background

In recent years the quality of teaching for students in engineering education has come increasingly into focus. This is evident from the fact that new requirements are being imposed for teaching quality in higher education, both externally and internally. As a consequence of this, there is intensive work on development of teaching, and increasingly on development of the teaching competencies of teachers.

There has also been an increase in requirements for the educational institutions to secure pedagogical competence development of teachers; for example, on appointment, new teachers must be able to document that they have sufficient teaching competencies. This is seen in connection with the quality control of higher education now occurring in a systematic way by virtue of ongoing evaluations and accreditation, where educational institutions must be able to document the pedagogical competencies of their teaching staff.

The teaching portfolio (TP) is a tool that has been introduced into higher education in order to be able to document and develop pedagogical competencies of teaching staff. Thus the teachers' TP is also useful for the continued quality development of teaching in higher education. In engineering education too it is important that teachers document their teaching experience and competencies, as well as profiling themselves and developing as teachers. Therefore, a working group under the IngeniørUddannelsernes Samråd has developed this model for TP.

There are many potential applications for a TP. The model has been prepared as an operational tool with associated guidance that provides the opportunity to:

1. Function as a tool for continuous pedagogical documentation, reflection and development for the individual teacher and his or her teaching practice.
2. Document the pedagogical development of the individual teacher.
3. Promote pedagogical profiling.
4. Promote pedagogical knowledge sharing, including between colleagues.
5. Form the basis for documenting the teacher's pedagogical competencies, e.g. in connection with appointments.
6. Be comparable across study programmes and educational institutions.
7. Document teachers' pedagogical competencies, e.g. in connection with accreditation and external evaluation.
8. Form the basis for dialogue on pedagogical development during employee reviews and salary negotiations.

Introduction to the TP model

This model for TP has been developed to be able to document teaching competencies for those involved in engineering education. It has been intended as a recommendation as to how TP in engineering education can be structured in the form of guidelines or criteria for what material should be included in the TP. The model also plans how a teacher's individual reflection on teaching and learning can be set in motion.

As well as a collection of the teacher's educational material, a TP is a tool and a method for supporting the individual teacher's development of teaching and his or her own competencies. The teacher's understanding of teaching and learning develops through the description, analysis and assessment of the teaching worked on in a TP. Through the overall work of reflecting on one's own teaching competencies and documenting them, the teacher increases his or her awareness of these competencies, and how they can be further developed.

A TP typically contains a pedagogical CV, including the teacher's approach to teaching (fundamental pedagogical view) and a description of his or her own teaching practice. A TP must also make clear how the fundamental pedagogical view comes into play in teaching practice and contributes to the students' learning results. Ideas concerning further development of teaching and the teacher's own teaching competencies should also be included in a TP.
The content of different teachers' TPs will never be the same, but will depend on the individual teacher's experience and the purpose of the TP. A TP is a practice-oriented method for documentation and reflection, and it forms the basis for assessing the teacher's teaching competencies.

Content of the TP model

The TP model, shown in figure 1 on page 8, has both a documentational purpose and a more personal developmental perspective. This means that the model is divided, as shown below, into a presentation part, which comprises the educational CV and the teaching practice description, and a personal part, which consists of the working portfolio.

The educational CV contains a description of the teacher's fundamental pedagogical view and a list of teaching experience and pedagogical training. This may be compared with standard CVs, which also list education and professional experience.

In addition, it may include pedagogical job functions, pedagogical development projects and conferences with pedagogical content (see section 3 in the guidance section). This part should be easy for all teachers to start, and will constitute a minimum for what can be regarded as a TP in this model.

The other part of the presentation portfolio, the teaching practice description, contains examples from teaching. It reflects how the teacher's fundamental pedagogical view and other pedagogical competencies are translated into teaching practice. This part of the TP describes objectives for the person's own teaching development and pedagogical competence development in the future.

The working portfolio is the personal part of the TP, where the teacher works on his or her own descriptions of, thoughts on and analyses of his or her teaching. The working portfolio is important for the TP, as it constitutes the background for the material selected for the presentation portfolio and forms the basis for the teaching practice description. In the working

portfolio the teacher gathers together examples from his or her teaching materials, notes on teaching and examination methods, course evaluations and other relevant material relating to teaching. The important thing about preparing a working portfolio is that the teacher is documenting his or her teaching in a structured manner, and that materials, thoughts and ideas are thereby saved. Thus this kind of material is documented systematically, providing a visible record of the teacher's pedagogical development and forming the basis for the analyses that are an essential part of the working portfolio.

Work on the TP is a continuous process, with development taking place in a constant interplay with teaching practice. Conclusions in the TP influence the person's teaching, and correspondingly, new experiences in teaching will mean further development of the TP and of the teacher's understanding of his or her teaching practice.

All parts of the TP, and how they interact, are described in detail in the guidance section.
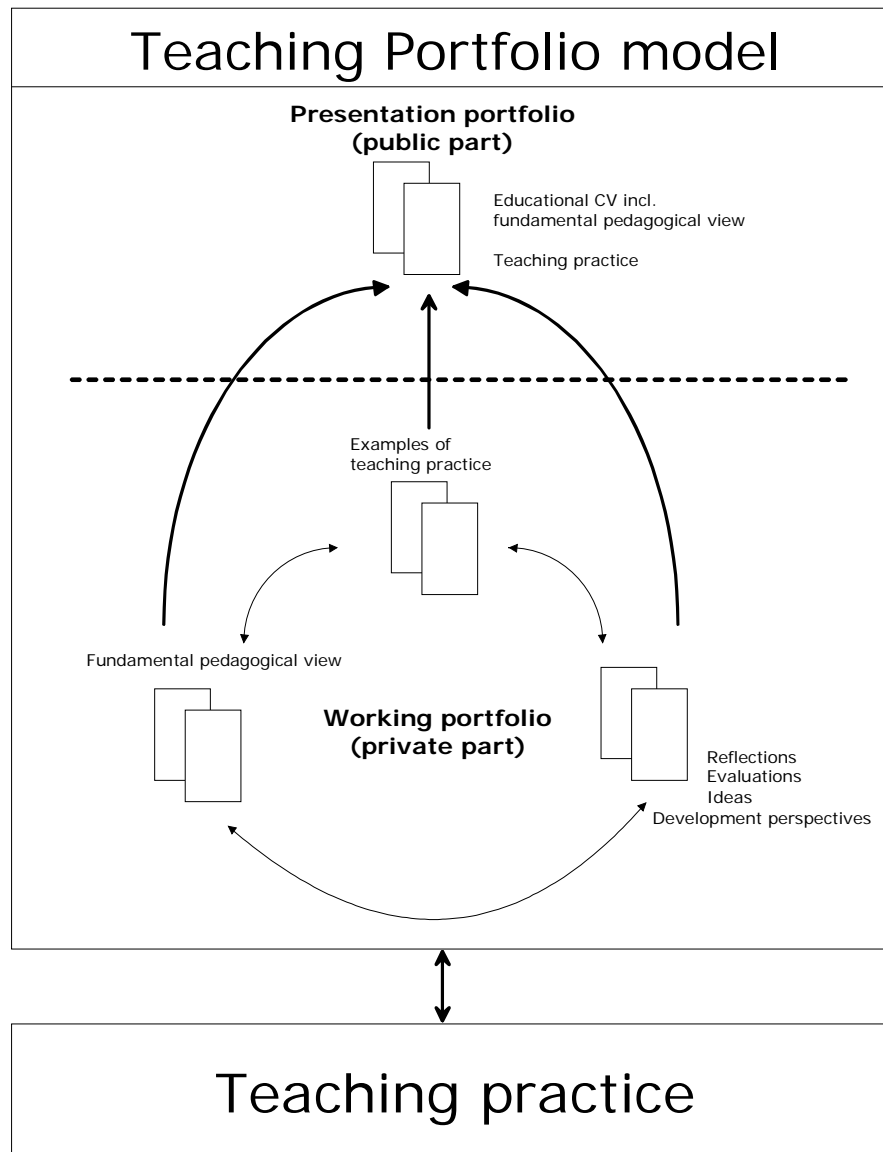
Teaching Portfolio model

**Presentation portfolio
(public part)**

Educational CV incl.
fundamental pedagogical view

Teaching practice

Examples of
teaching practice

Fundamental pedagogical view

**Working portfolio
(private part)**

Reflections
Evaluations
Ideas
Development perspectives

Teaching practice

Figure 1: TP model

Guidance on how to prepare a teaching portfolio

Contents

Guidance on how to prepare a teaching portfolio (TP)

> **What is a teaching portfolio?**
> The teaching portfolio is a tool that has been developed in higher education in order to document and develop pedagogical competencies of teaching staff. A teaching portfolio typically contains a description of the teacher's teaching experience, a pedagogical CV, the teacher's approach to teaching and fundamental pedagogical view, as well as how this comes into play in teaching practice and contributes to the students' learning results. Ideas concerning further development of teaching and teaching competencies are also typically included in a teaching portfolio.

1. What is the purpose of your TP?

When you begin working on a TP, it is important that you are clear about the purpose of your TP and how you are going to use it. This can help you decide which areas and examples from your teaching practice will be relevant for inclusion. The purpose may change over time and according to the context in which you use it. Different versions of a presentation portfolio may be prepared for different purposes and target groups. If you develop a working portfolio, the material in that will be more consistent. When you work on your TP, it is important that you are aware of the fact that a TP has two purposes: to profile yourself as a teacher through your presentation portfolio, and, through the working portfolio, to be a tool for you to develop your own understanding of teaching.

The purpose of preparing a TP may be to:

- develop your own understanding of teaching
- work on developing your teaching
- document your competencies, e.g. in connection with employment
- profile yourself

A TP is a personal document characterised by your experiences, interests and opinions, as well as by how you prefer to describe your experiences and competencies within teaching and learning. The following TP model (see fig. 1 on page 8) has been created to help you structure your own TP.

2. Introduction to the three sections of the TP model

- The **educational CV** is part of the presentation portfolio, i.e. it is the part of the TP for displaying information (see figure 1 in Model for teaching portfolio in engineering education). In the educational CV you should document your pedagogical competencies and activities. It also includes your description of your fundamental pedagogical view.

- The **teaching practice description** is also a part of the presentation portfolio. The teaching practice description is an optional part of the TP model, which can be prepared as a supplement to your educational CV. The teaching practice description should exemplify your teaching practice, and how your fundamental pedagogical view comes into play in your teaching.

  The education CV and teaching practice description together constitute the presentation portfolio. In this model you may feel it is enough to prepare an educational CV as a start on your TP. Your educational organisation may have decided what is required in a TP, and this may influence your choice.

- The **working portfolio** is the personal part of the TP. This is where you can work on ideas, experiments, etc. It is your tool for reflection and for the continued development of your understanding of your teaching practice and the experiences you have had. A working portfolio is also ideal for documenting everything relating to your teaching.

2.1. Ordering the work

When you set out to prepare a TP, you can start by working on your educational CV, which gives you an overview of your experiences of teaching. After that you can begin on the working portfolio, where you produce material for the examples in the teaching practice description. You choose suitable examples, which you then set out in the teaching practice description.

How a teacher prefers to work on his or her TP is a highly individual matter. Some people will probably prefer to work on all three sections at once. It is up to you which method you choose.

2.2. Work on TP – a cyclical process

The TP should be worked on in a cyclical process, as illustrated in figure 2. This process occurs first and foremost in the working portfolio. The teacher's practice and the significance teaching practice has for students' learning is the focus. What happens in the teaching situation is observed and recorded. These observations are noted and saved. Other things to be saved might be video recordings, activities on interactive whiteboards or similar. On the basis of this, a number of documents are created.

The next phase is considerations on the basis of what was observed. What went well or less well, and how does the teacher carry over the good choices for the next time? This phase is also translated into a number of documents. These documents are included in the TP together with all the material from teaching sessions.

The next phase after this may be perceived as a phase in which you plan ahead, and where, on the basis of your observations, you create new ideas and find new teaching activities. Here might be a place to gather ideas from literature or colleagues. You might also revise your fundamental pedagogical view.

You can test new initiatives in practice and your analysis work continues in the same circle.
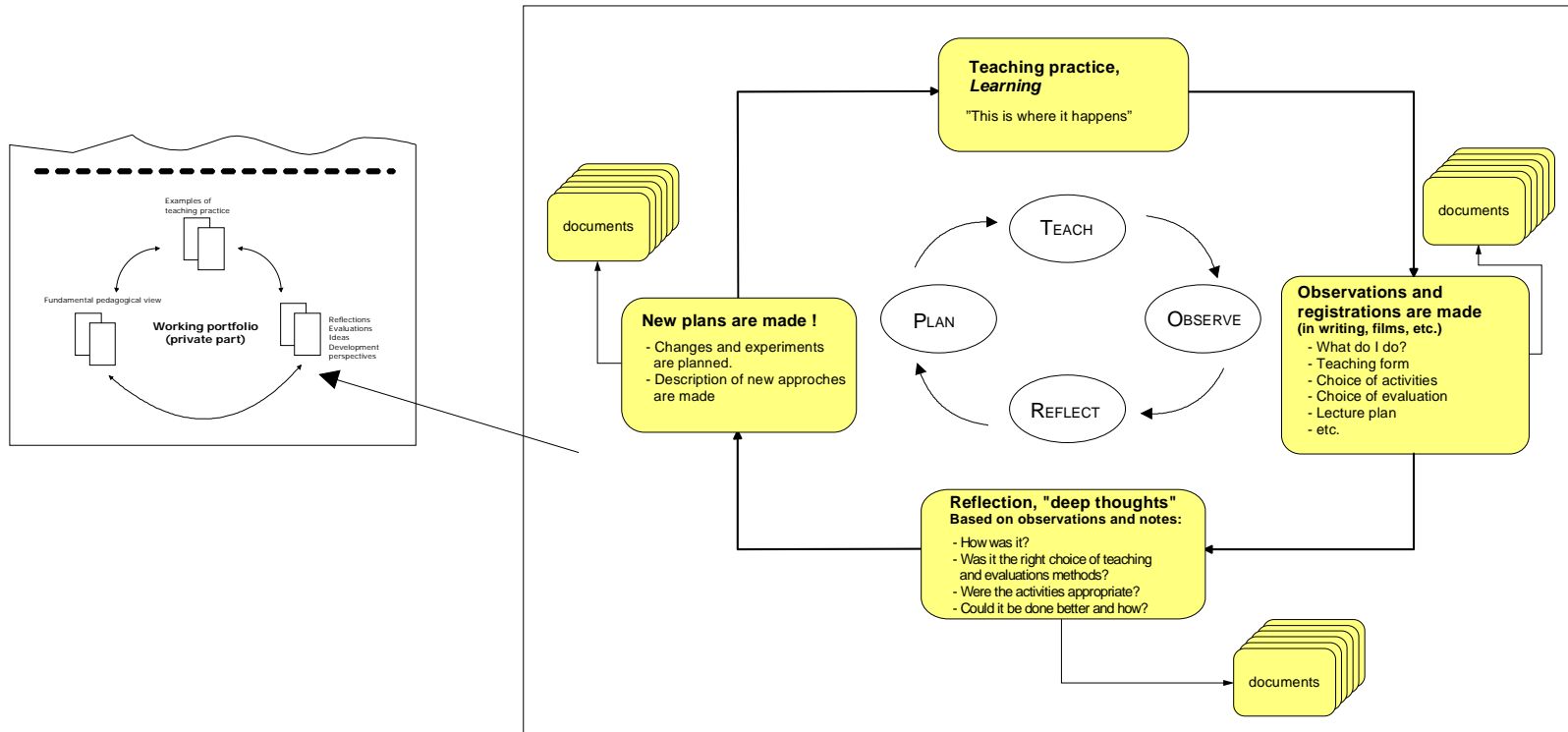
Figure 2: Cyclical work process

3. Guidance for educational CV and fundamental pedagogical view

Teaching Portfolio model

Presentation portfolio (public part)

Educational CV incl. fundamental pedagogical view

Teaching practice

Examples of teaching practice

Fundamental pedagogical view

Working portfolio (private part)

Reflections
Evaluations
Ideas
Development perspectives

Teaching practice
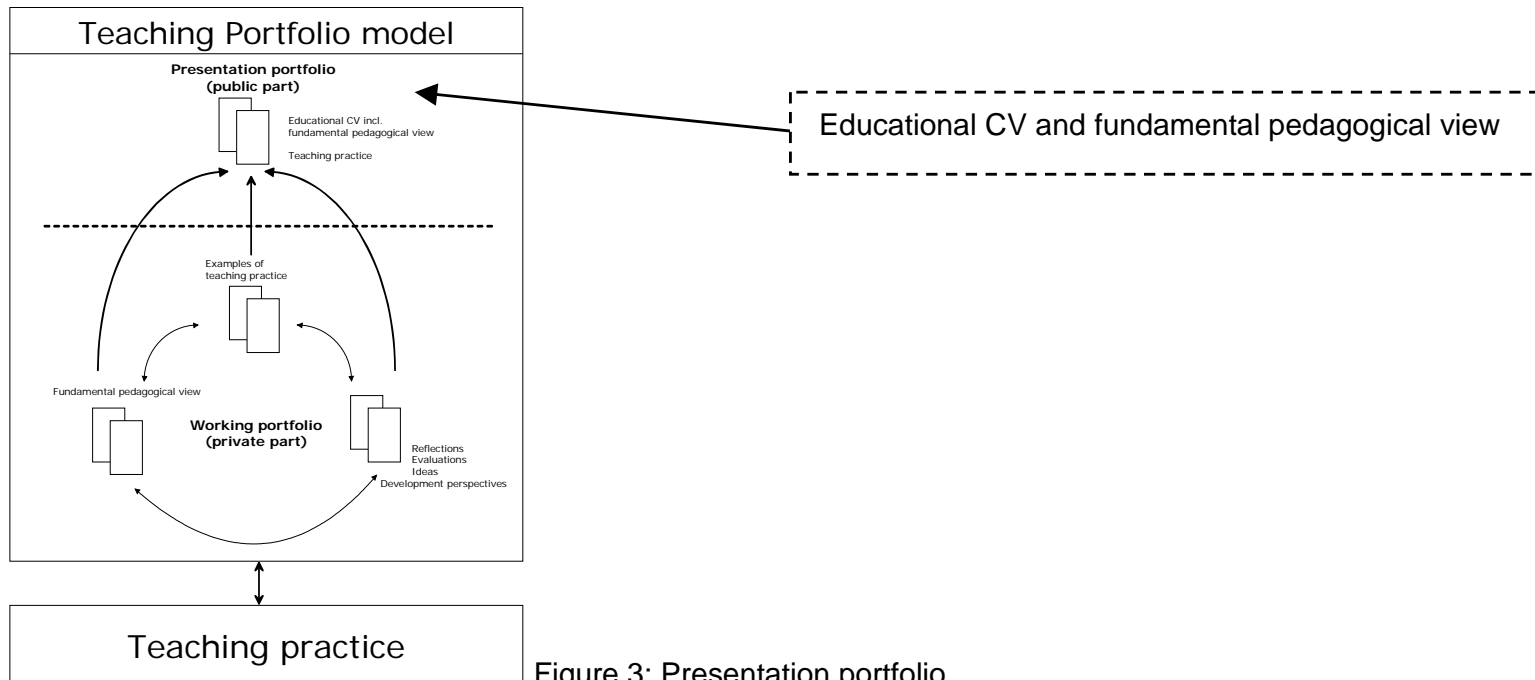
Educational CV and fundamental pedagogical view

Figure 3: Presentation portfolio

The educational CV comprises the first part of the presentation portfolio. It consists of the following elements, where items 1, 2 and 3 <u>must</u> be described, while the rest may be described as required or preferred:

1. Fundamental pedagogical view/idea
2. Teaching experience
3. Pedagogical training

4. Other things that may be included:
   - Pedagogical job functions
   - Short courses in educational theory
   - Conferences (with or without a paper)
   - Pedagogical development project
   - Contributions to pedagogical development
   - Informal course on teaching and educational theory
   - Other courses and work with pedagogical relevance
   - Other

Examples of prepared educational CVs can be seen here: http://uvp.sdu.dk

You may find it helpful to work on writing your educational CV (points 2 and 3 and your choice from the other points), before you get involved with describing your fundamental pedagogical view. This may give you an overview of your experiences of teaching, and these considerations may be able to help you find a common theme that runs through your teaching. This work may form the basis for making your fundamental pedagogical view clear to you.

3.1. Fundamental pedagogical view (obligatory)

This section of the TP is obligatory. You have to prepare a description of the pedagogical ideas that form the basis for your selection of teaching methods in your practice. The description of your fundamental pedagogical view is important, as it forms the guiding principle for the rest of your TP. However, your own understanding of teaching is important for the description of your fundamental pedagogical view. In a TP it will be clearer for the reader if what you are describing is based on your experiences and described in your own words, rather than if you just copy out descriptions of current teaching trends in higher education. It is important that you base it on your own experiences and ideas. The most important thing in a TP is that it be obvious that you think about your own teaching and are interested in describing your thoughts and developing them further.

You should describe the background to your choice of methods and your thoughts on how they result in learning by your students. In your description you should include your opinion of what constitutes good teaching.
A good, structured setting out of elements in your fundamental view – preferably in point form – provides a quick overview for the reader and makes it easier to get your message across.
References to relevant literature are welcome but not essential.

3.2. Teaching experience (obligatory)

Here you list your teaching experience, preferably in table form. It is up to you to determine how much to include. The examples shown on http://uvp.sdu.dk are for inspiration only.

3.3. Pedagogical training (obligatory)

Here you describe the relevant formal pedagogical training you have undergone, both before and after your appointment. Examples of relevant pedagogical training may be:

- Basic pedagogical course
- University teacher training at the engineering education institutions that offer this, or from another university
- Teacher training courses for upper secondary school level
- Primary and lower secondary school teacher training

3.4. Miscellaneous

Pedagogical job functions

Here you describe current and previous formal pedagogical job functions in addition to teaching. Examples of pedagogical job functions groups include:

- Head of Studies
- Student adviser
- Programme coordinator
- Member of Academic Study Board
- Member of pedagogical networks
- Assistant professor adviser

Short courses in educational theory

Here you describe the pedagogical courses you have attended that are not covered by point 3 in the educational CV – preferably in table or point form. It is up to you to determine which courses are relevant in this context, but as a starting point, courses leading to a qualification should be included.

Conferences

This point includes relevant pedagogical national or international conferences, perhaps with a brief description of the conference theme. If you wrote a paper for the conference, you should refer to it.

Pedagogical development projects

Here you describe your participation in internal and external development projects, stating the name and purpose of the project, and your function in connection with the project.

Contributions to pedagogical development

Here you describe relevant contributions to pedagogical development not covered under the points above. An example could be participation in the planning and holding of conferences, inspiring or initiating pedagogical development projects and participation in pedagogical networks, etc.

Informal courses on teaching and educational theory
Here you describe the relevant informal pedagogical courses in which you have participated. Examples include:

- Pedagogical "coffee table discussion clubs"
- Colleague mentoring
- Teaching development (where the initiative arose and was set in motion on the basis of the individual teacher's interest)

Other courses and work with pedagogical relevance
This section describes courses that do not naturally belong under the items covering actual pedagogical training and course activities. These may be courses in subjects that do not in themselves have a pedagogical purpose, but may be useful as pedagogical tools in connection with teaching. One example is the Belbin Authorization course, which teaches use of the Belbin tool. This can support the students' formation of groups, as it makes individuals aware of their own personal competencies.

Other
Here may be described other relevant pedagogical conditions that are not naturally covered under the items above.

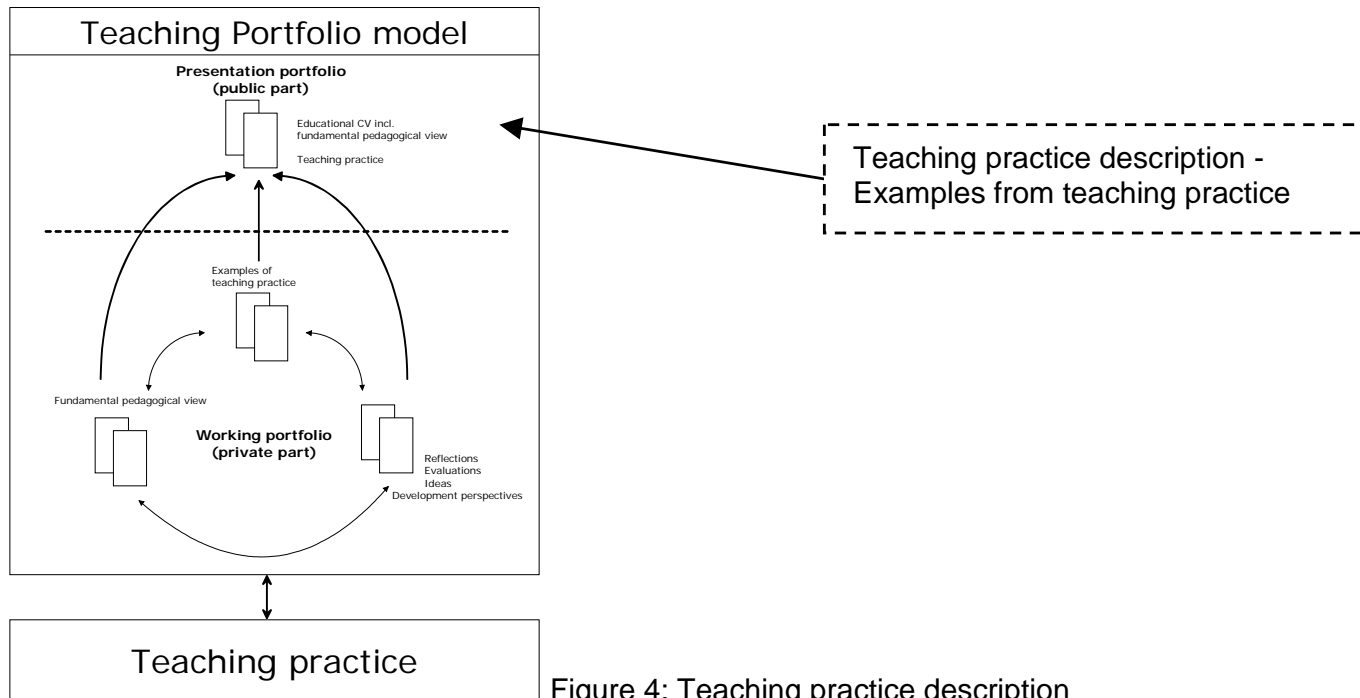# 4. Guidance for teaching practice description

Figure 4: Teaching practice description

The presentation portfolio's teaching practice description describes and documents the practice that characterises your teaching. It is a selection of the material you reach by working on your working portfolio. Where it is relevant, the educational CV may be referred to, so both parts of the display section appear as a single unit.

The teaching practice description consists of:

1. Purpose
   a. Describe your purpose in preparing a teaching practice description
   b. Why have you chosen this purpose?
   c. To whom is it directed? (Colleagues, management, appointments committee, others?)

2. Examples from your teaching that you wish to present, which agree with your purpose regarding your TP. You may deal with the following when preparing your descriptions of your teaching:
   a. Content and learning objectives of the teaching
   b. Teaching and evaluation methods
   c. External factors you need to deal with as a teacher (other programme elements, co-teaching, semester planning, availability of premises, etc.).
   d. How your fundamental pedagogical view comes into play in your teaching and in the example in question.
   e. Other

3. Objectives for your future teaching development and your own competence development based on your experiences. Section 5.1 provides guidance on how to start this. See also examples for inspiration at http://uvp.sdu.dk

5. Guidance for the working portfolio

Teaching Portfolio model

Presentation portfolio
(public part)

Educational CV incl.
fundamental pedagogical view

Teaching practice

Examples of
teaching practice

Working portfolio, personal part

Fundamental pedagogical view

Working portfolio
(private part)

Reflections
Evaluations
Ideas
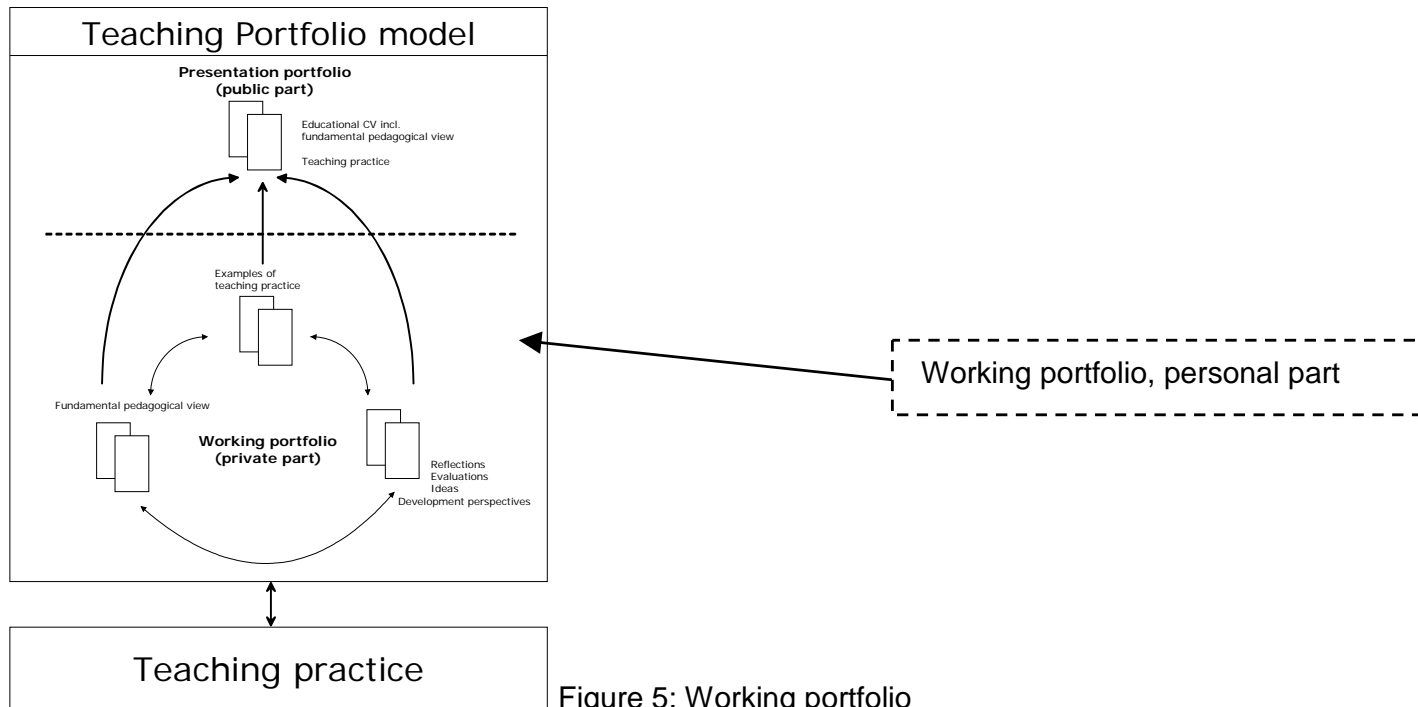Development perspectives

Teaching practice

Figure 5: Working portfolio

In the working portfolio you work on evaluating your teaching practice and developing your thoughts and ideas about teaching. This section is personal and depends on your experience of teaching and the students' learning. You have the opportunity to maintain and document how you have worked on your teaching and developed as a teacher.

The documentation consists of a number of examples of teaching materials, notes about what the teacher experiences through his or her teaching, as well as considerations of evaluations from students. It may also contain all other material that you consider to be relevant to document and save concerning your teaching.

The following can be mentioned for inspiration:

- Teaching methods
- Examination and other evaluations of students' learning
- Course evaluations
- Log book of teaching
- Learning results (students' papers, essays, process descriptions, etc.)
- Examples of work with feedback to the students on their results
- Considerations in connection with planning of courses and evaluations
- Considerations in connection with experiments in teaching
- Educational material
- Notes on benefits arising from participation in courses
- Notes from own teaching practice
- Other notes
- Literature that has inspired development of teaching
- Objectives for future development.

The most important purpose of your working portfolio is for it to be a tool that you can use to remember, document and regularly follow up on your teaching experience. Having a working portfolio helps you to become more aware of yourself as a teacher and to be able to describe your competencies and experiences to others in different contexts.

It may be helpful to consider the following when evaluating or analysing your own teaching:

- What methods did you choose to use during this teaching assignment or on this course?
- What made you choose these?
- How did it go?
- What improvements might be appropriate for next time?
- How did you use the student evaluations, and how are the results of these connected with your experiences of teaching and the students' learning?
- Have these new experiences meant that you have revised anything in your fundamental pedagogical view?

The idea of a working portfolio is not that you should write long analyses or histories, but instead make brief notes as your teaching goes along. When you revise your TP or you need to use your presentation portfolio for display purposes, you will have the material available and can put together what you need in a more structured way. When you revise your TP, all "old" documents that are relevant should be saved, so that it is possible to follow your pedagogical development in the course of the time in which you have worked on your TP.

In addition, you may like to create an "idea bank" in your working portfolio, where you can describe new ideas that might inspire your future teaching.

It is thus from this section of the TP that you can choose to display some parts in the teaching practice description in the presentation portfolio.

5.1. Structuring material for the teaching practice description

In the teaching practice description you can choose to show examples from your teaching practice that you first dealt with in your working portfolio. The following section recommends a method for describing your teaching practice.

You can describe and analyse your teaching in a systematic way with the help of the questions below. This should help you become aware of the link between learning objectives for your teaching, your types of instruction and examination, and how the students achieve these learning objectives.

a. Content
First and foremost, the content and framework of the teaching should be described, with its content, learning objectives and who the students will typically be. There may also be other documents that you have produced to make the objective for the student or yourself visible or concrete, for example, descriptions of project assignments.

Here it may be useful to consider the following:
- Are these the right learning objectives – and why these ones?
- Does the content of the teaching support its learning objectives?

- Does the teaching aim for the right level of learning?

b. Teaching and examination methods

The next is to deal with the teaching and examination method. First and foremost, the method(s) should be described, possibly with lesson plans and considerations of the students' learning attached. It will benefit the work to include concrete documents such as assignments, papers, exercise guidance, examples from teaching, notes, etc.

Next it may be helpful to describe:

- What is your reason for choosing this/these teaching method(s)?
- What is your reason for choosing this/these examination method(s)?
- Are there other methods for achieving the learning objectives that you did not choose, and what was the reason for these not being chosen?

c. Interplay with external factors

Development and implementation of courses is often influenced by factors other than the teacher and his/her students. The external environment or overall goals may influence the choice of learning objectives and teaching methods. The next thing to deal with is what external factors may have an influence.

Describe the following factors, if they have or have had any influence on your teaching planning:
- Formal requirements for education
- Physical environment
- The positioning of teaching in education
- Co-teaching
- The fundamental pedagogical views and policies of the institution
- Other

5.2. Future development

On the basis of your work on your TP, you can here deal with the perspectives for your teaching. This may include:

- What have you learnt about teaching and the students' learning from the examples you have chosen?
- What ideas do you have as to what you can develop in your teaching – and how (e.g. through cooperation with groups of colleagues, participation in courses, etc.)
- How has the work on your TP affected your fundamental pedagogical view?
- How can I further develop my competencies as a teacher?

You will find examples of educational CVs, with the wording of a fundamental pedagogical view, teaching practice description and documents from the working portfolio, on the teaching portfolio model website: http://uvp.sdu.dk

References (see also http://uvp.sdu.dk):

- Karolinska Institute (2008) Qualifications portfolio for researchers and teachers: http://ki.se/ki/jsp/polopoly.jsp?a=37688&d=15676&l=en (search term = "Qualifications portfolio")
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- Seldin P. (2004 3rd Ed.) The Teaching Portfolio – A Practical Guide to Improve Performance and Promotion/Tenure Decisions. Bolton: Anker Publishing Company, Inc.
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