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DEGREES OF REFLECTION IN ACADEMIC DEVELOPMENT: CONSTRUCTION AND APPLICATION OF A TOOL TO ASSESS CRITICAL REFLECTION IN PORTFOLIOS AND PROJECTS

Niveles de reflexión en la formación pedagógica universitaria: Construcción y aplicación de un instrumento de evaluación de la reflexión crítica en portafolios y proyectos

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Abstract:

Academic development based on 'reflective practice' consists of observing, analysing and reflecting on teacher practice in order to improve students' learning processes. Participants of the 10 ECTS programme of the Centre for Teaching and Learning in Higher Education, choose between the development of a reflective portfolio or a project on their teaching practice based on the premises of the Scholarship of Teaching and Learning (SoTL). We conducted a study to better understand the reflective processes of participants expressed in their portfolios or projects with the overall aim to improve the support to their professional development as teachers. The obtained results provided a

foundation for the re-design of the programme in terms of analysing the reflective practice with the use of a reflective analysis tool. Our main research questions were: How can we assess the quality of reflection in portfolios and projects? What dimensions of reflection can be found? At what level of reflectivity do our participants operate? To answer these questions, and based on an extensive literature review, we first developed a model and two rubrics to assess the quality of reflection in written texts. Second, portfolios and projects of participants were analysed with the rubrics and semi-structured in-depth interviews were conducted with the same participants. Results show differences in the reflective processes between projects and portfolios; that the difference in teaching experience influences the quality of reflection in both text types but that also the motivation and fulfilment of entry expectations conditions the reflection level in learning processes.

Key Words: ***college of education; evaluation; measuring instrument; research project; teacher education; university.***

Resumen:

La formación académica basada en la práctica reflexiva consiste en observar, analizar y reflexionar sobre la práctica docente para mejorar los procesos de aprendizaje de los estudiantes. Los docentes del postgrado de 10 ECTS del Centre for Teaching and Learning in Higher Education, eligen entre la elaboración de un portafolio o un proyecto de investigación sobre su práctica docente basado en las premisas de la Scholarship of Teaching and Learning (SoTL). Realizamos un estudio para comprender mejor los procesos reflexivos de los participantes expresados en sus portafolios o proyectos con el objetivo general de mejorar el apoyo a su desarrollo profesional como docentes. Las siguientes preguntas son centrales en nuestro estudio: ¿Cómo se puede evaluar la calidad de la reflexión en los portfolios y proyectos? ¿Qué dimensiones o niveles de reflexión son útiles para el análisis? ¿A qué nivel de reflexividad operan nuestros docentes? Para responder a estas preguntas, en primer lugar y basado en un amplio análisis de la bibliografía, se elaboró un modelo y unas rúbricas para analizar la calidad de la reflexión en los portfolios y proyectos. En segundo lugar, se analizaron los textos de los participantes con las rúbricas y se realizaron entrevistas semiestructuradas en profundidad con los mismos docentes. Los resultados muestran diferencias en los procesos de reflexión entre los proyectos y los portfolios; la diferencia de experiencia docente influye en la calidad de la reflexión en ambos textos, pero también la motivación y el cumplimiento de las expectativas de entrada en el curso condicionan el nivel de reflexión en los procesos de aprendizaje.

Palabras clave: ***escuela de formación de profesores, evaluación; formación de profesores; instrumento de medida; proyecto de investigación, universidad.***

1. Introduction and aim of the study

The Certificate of Advanced Studies (CAS) in Higher Education of the Center for Teaching and Learning in Higher Education at the Zurich University of Teacher Education has been in place for more than 10 years. The goal is the professionalization of academics as teachers to enhance student learning. We support teachers to make a conceptual and practical shift to more student-centred approaches to teaching. They also get support in adapting those principles and approaches in ways that suit and can be transferred into their own context.

As a central part of the one-year CAS (10 ECTS) our participants can choose between writing a teaching and learning portfolio or realising an elementary research

project based on the premises of the Scholarship of Teaching and Learning (SoTL) (Boyer, 1990). In a SoTL project a specific intervention or a new teaching method is tested by gathering evidences from students' learning in a systematic form. In a reflective portfolio they demonstrate a sound philosophy of teaching and learning as well as evidence competent teaching by compiling "artefacts" and reflections (Bachmann, 2015). In both cases reflection about the teaching and learning process or a learned skill involving complex critical thinking is viewed as an essential component of the development of their professional practice as teachers.

We conducted this study to assess the reflectivity of the participants as demonstrated in their portfolio or project reports as part of a systematic programme review. The following questions were at the core of the study:

- At what level of reflectivity do our participants operate?
- How is reflectivity made visible in the portfolios and projects? How can the quality of reflection in portfolios and projects be assessed?
- What model and instruments are useful to analyse the levels of reflectivity in our portfolios and projects to support the participants during the CAS?

Our study aims at assessing the quality of reflection and the diversity of pedagogical views in the portfolios and projects of the participants in a systematic way. The specific objectives of our research are: 1) to better understand the concept of reflectivity, reflective practice and what constitutes a good reflective process in teaching practice, 2) to develop a model for the analysis of reflective practice in written texts and 3) to examine the reflective practice of our CAS participants as exposed in their projects and portfolios with the overall aim to help them improve this process.

The study utilizes methods of qualitative research to get a rich and deep insight into the phenomenon under study from the perspectives of the involved participants (Creswell, 2014). The data base of our analysis consists of academics' research projects and portfolios as well as individual semi-structured interviews. The sample of participants includes a random selection of 8 teachers from different cohorts of three different CAS programmes who have volunteered to be interviewed and have provided their written texts for exhaustive analysis.

This paper shows how reflectivity can be assessed in portfolios and projects to improve the learning process of academics undergoing teacher training. We show the theoretical model and the rubric tools we developed -including its process of validation- to analyse the different levels of reflectivity, as well as the results of such analysis. We can see how a structured tool that provides specific information on the levels of reflectivity and that is tailored to the examination of portfolios and projects can be a vehicle for improving reflection processes in higher education.

2. Reflective practice in university teachers

Reflection is a generic term which implies thinking what you have done, are or will be doing and it involves close consideration of you as an individual, your moods, feelings and attitudes within the whole experience. According to Boud et al (1985), it is related to those 'intellectual and affective activities in which individuals engage to explore their experiences in order to lead to a new understanding and appreciation' (p. 19). Well-known work by Schön (1988) stated that, in order to solve complex problems, professionals needed to reflect, thus the term reflective practitioner to denominate that who uses reflection as a tool for revisiting experience both to learn from it and for the framing of complex problems of professional practice. Brookfield (1987) embodies the notion that this process involves the ability to shift perspectives on one's beliefs and practice. Feixas and Zellweger (2018) point to the reflection about teaching as intrinsic in transformative educational experiences.

Reflective practice has become a major model for continuing professional development in higher education (Clegg, 2000). It implies a systematic and persistent attitude of awareness, analysis and assessment of the teachers' teaching and learning assumptions, beliefs, values and practices in order to develop (new) strategies that can positively influence their professional career. It is focused on situations, actions and often complex problems, and therefore is closely linked to application and transfer, within and beyond the realms of the classroom space.

Self-reflection on general and disciplinary teaching is shown to be effective in deepening and advancing teachers learning (Bloxham & Boyd, 2007). It goes beyond the skill of 'learning how to learn', it is also fundamental to engaging fully with the subject and becoming an agent within a discipline. Brockbank and McGill go so far as to say: "by consciously engaging in reflective practice, the learner has created and in turn creates the conditions for the type of learning that is the essence of higher education." (2007: 91)

3. Models of reflection in academic practice

Reflection is a complex construct where different features and dimensions intertwine with aspects of quality and intensity. The literature offers differentiated possibilities for describing reflection levels and processes. The following list looks at various models of reflection suggested by Ghaye and Lillyman (2000): iterative, synthetic, holistic, structured, and hierarchical:

- Iterative models can be described as a cyclical process of reflection where deepening of awareness and an increase in knowledge and skills arise from a repeated cyclical movement through the reflective process.
- Synthetic models decompose reflection into interests and forms. Interests refer to the goal of reflection which could result in the strengthening of a prior theory

or practice, clearer understanding, solution of a problem or a critique of the professional practice. Forms are the characteristics of the act of reflection.

- Structured models describe reflection as a process of accessing, understanding and ultimately learning through experiences which is guided and supported by an expert guide. It is based on the acknowledgement that reflection is a difficult task to do without any help or expert guidance.

- Holistic models link personal and professional values with practice, intention with action, development of the individual and the team within the context of practice.

- Hierarchical models describe the process in terms of levels or categories with increasing complexity where the lower level is considered to be less complex and a prerequisite for the subsequent levels. In these developmental models thinking is viewed as qualitatively different at different levels and reflecting increasing levels of maturity.

Following Larsson, Anderberg and Olsson (2015), Kember et al. (2002), Fund, Court and Kramarski (2002), Van Manen (1992), and Mezirow (1991), we conceived a model that combined an iterative and a hierarchical approach along four features of reflection as detailed in Engfer et al. (2019):

1. Components of reflection (Mezirow, 1991; Kreber & Cranton, 2000), where content reflection as well as process and premise reflection help us to understand the subject matter, the "what we do" and "why we teach the way we do" by reconceptualising the issues, justifying the approaches taken or suggesting alternatives.

2. According Van Manen (1991), reflection can be technical (judgement on efficiency of the means to achieve certain ends), practical (examines the objectives and their actual results) and critical (with judgments about professional or personal action, and placing it in socio-historical and political-cultural contexts).

3. Reflection through writing (Fund, Court & Kramarski, 2002) distinguishes among descriptive texts, personal texts, linking texts and critical texts.

4. Reflection through portfolio writing (Larsson et al. 2013), examines reflection in the following aspects: What? (subject matter); Why? (teaching philosophy), How? (teaching and learning methods), the effects on students' learning, and the linkage between theory and practice.

These types of reflection provide a useful structure to describe the work of academics and highlights the multiplicity of reflections that are relevant in any situation at the individual level. These four features of reflection should neither be considered as exhaustive nor discrete. However, with these perspectives we were able

to validate on one hand assumptions and premises in the teaching of our participants and on the other hand to differ processes of reflection how they appear in written texts of our participants. In the end, they provide us with the necessary guidance into how to analyse portfolios and projects and will be able to be used to help academics undertake systematic reflection about their teaching.

4. Our model to assess reflection in portfolios and projects

The consultation of these concepts helped to design a model for the analysis of portfolios and projects. Before its application, the model was validated in three rounds. In the first round it was expected that a single tool could be helpful to assess both types of texts. The validation process was carried out by 6 colleagues working in pairs to analyse 6 contributions: 2 each pair (one project and one portfolio). The contributions were from participants of different disciplines, years of experience and showing different level of work quality. We found out that the tool needed improvement as to differentiate properly among the dimensions of the portfolios and projects, and because still different forms of reflectivity were difficult to discriminate. Selected statements of reflectivity tended to be large and different interpretations of the level and quality of reflection were constantly made. In the second round, the validation showed an improved rubric which was newly applied to the same 6 texts. Still the aim was to use the same tool for both types of writing texts. Finally, our findings suggested that some criteria could be common to both but other criteria had to be specific of projects and of portfolios. In the third and final round, two different rubrics were created and used to analyse the same 6 texts. These were exchanged among the same 6 colleagues and the findings were finally satisfactory for all as they allowed greater consistency among dimensions and levels (Engfer et al., 2019).

In the final version of the tools there are five content dimensions for the portfolio and four for the projects. Based on Larsson's et al. (2011) classification for portfolios, the "what, why and how" are considered. Projects focus on the formulation of research questions and the methodological approach. For both text formats, portfolio and projects, special interest is given to the effects of teaching on learning and the connection between theory and practice (Table 1).

Table 1
Description of content dimensions.

Portfolio	**Subject matter** What is taught?	**Teaching philosophy** Why is taught?	**Method** How is taught?	**Effects of teaching on learning**	**Linkage between theory and practice**
Project	**Research question** What is explored?	**Research method** How is it developed?			

Source: Own elaboration.

Alongside with the development of the dimensions, the debate was centred among the levels of reflectivity. First it was considered that two levels of analysis of reflectivity (descriptive and reflective) could well discriminate among statements. However, many statements classified as reflective still showed big differences with regard to the quality of reflection. For example, some were exploring their own experiences in order to lead to new understandings while others, in addition to that, were critically reviewing their presuppositions and showing a deeper understanding of the nature of their own learning process. Following Fund, Court and Kramarski (2002), Van Manen (1992), and Mezirow (1991)'s models, a third level had to be included (the meta-reflective). Therefore, the final levels of reflectivity, considered in more detail in our model (Engfer et al. 2019), are descriptive, reflective and meta-reflective.

- Texts on the descriptive level remain based on preconceived opinions, even if an understanding of concepts and models is visible. They show a comprehension of topics but without reflecting upon its significance or relating it to personal or practical situations.

- On the reflective level, texts demonstrate the examination of experiences in order to find new options. There is a critique on assumptions about content or processes; it raises questions and does not take for granted a situation. Such exploration of one's own experiences might lead to new understandings and appreciations.

- On the meta-reflective level, a critical perspective is visible in texts: there is a critical review of presuppositions, a deeper understanding of the nature of learning. It shows a capacity to take distance from one's own teaching in order to get a deeper formulation of learning processes and an awareness of one's own mindset with the aim of transforming it.

Taking the description of three levels of reflectivity and the dimensions of portfolios and projects, a list of indicators was developed. The model is being represented in form of two rubrics containing the aforementioned components and scope of reflectivity (see annexes 1 and 2).

5. Methodology

The study utilizes methods of qualitative research to get a rich and deep insight into the assessment of degrees of reflection in academic development from the perspectives of the involved participants (Creswell, 2014). Data from participants' written portfolios or project reports were collected as well as complementary interviews were conducted. Methods of content analysis were applied to further refine the characteristics of the quality levels in the model as well as to gain further insights into the dimensions for the analysis of the written reflection.

The analysis of the qualitative content of the texts and the interviews has used a combination of deductive and inductive techniques at different moments of the study and according to the different research instruments (Ruiz Olabuénaga, 1996). The analysis of the qualitative content was inductive during the construction of the tools whereas in the application of the tools it was deductive.

The construction of the model was supported by the literature. In the testing of this phase, the analysis of the qualitative content has followed an inductive procedure. Initially we have dived into the documents and the situation of reflectivity in academic development to identify the topics or dimensions that seemed relevant. In order to develop categories as close as possible to the material to be interpreted, we have formulated definition criteria based on theory, then step by step we have constructed the categories and codes that have been applied in the different segments of the texts analysed. Within a feedback process these categories have been continuously revised until the main category has been obtained.

In the phase of application of the tools, i.e. once the model and rubrics have been defined, the text segments have been analysed deductively. Portfolios and projects' statements are 4000 words long or over and represent academics' own meaning making about their disciplinary teaching and practice. Still, the context of assessment and the guidelines provided influence the style of writing and the type of analysis teachers chose to present. The analysis of the accounts involved looking across the statements for themes (for example, planning of the active learning method the teaching philosophy, or transfer of learnt skills). Careful attention was given to the form of writing. The analysis of accounts provided in these circumstances is a powerful tool for understanding some processes in contemporary higher education (Clegg, 2000).

Our study consists of 8 participants from three different CAS programs who allow us access to their reflective statements and to be interviewed. The main participants' characteristics of the sample are summarized in Engfer et al. (2019). Even the small sample, a representation of the heterogeneity among participants in terms of age, gender, discipline, institution and experience in teaching was sought. They was an equal number of male and female participants, equal number of options for portfolios and projects, diverse age and years of experience (from younger and less experienced to more experts) and from disciplines of social work, special education, marketing, economy and physiotherapy.

Individual semi-structured interviews were conducted with the same participants at the end of the course to understand their gain in reflective practice as a result of our CAS. The interviews also followed a deductive process of analysis of the answers, according to questions derived from the theory on reflective practice and on impact of academic development. The codification was executed three different times by three researchers in order to adjust the codes following the research questions. MAXQDA (v2018.1) supported the process of assigning codes to the selected segments

of the interviews to conduct a systematic qualitative content analysis. The codes and categories can be found in annex 3.

6. Results

What follows is an analysis of the texts from the different degrees of reflectivity and not an exclusive meta-analysis of the themes. In this regard, the study was not meant to classify participants into categories. Additionally, the difficulties to classify a whole portfolio or project into one of the three levels were evident: there were statements in the texts that were descriptive, while others were more reflective or meta-reflective. Further, the statements given in the interviews provided additionally specific explanations concerning the reflection level, thoughts and learning processes of the participants during the CAS. Still the overall approach of the text was in many cases classifiable and we could characterise the texts of the eight participants as:

P00. Reflective with some descriptive elements

P01. Mainly descriptive

P02. Descriptive with some reflective elements (especially in the interview)

P03. Reflective with some meta-reflective elements

P04. Descriptive with few reflective elements

P05. Reflective with some meta-reflective elements

P06. Reflective with meta-reflective, with few descriptive elements

P07. Mainly descriptive with few reflective elements

With regard to interviews, they mainly consist of statements on the reflective level (61 codifications) and descriptive level (44 codifications). One interview is outstanding with meta-reflective statements (6 codifications). These different levels are illustrated by examples below:

Descriptive text passages are characterised by a high degree of descriptive characterisation, as the following excerpt on teaching methodology (how) shows:

> «One cannot follow a speaker for long. I was not aware of this at all until now. This has a very big influence on my teaching, which is now much more fragmented and contains many more exercises and activities» (P01).

Although this quotation shows that important viewpoints were gained from the course, the next step, the systematic and critical questioning based on the gained

knowledge, is missing. In most cases, however, descriptive text passages flow smoothly into the reflective stage, as revealed in the following extract on teaching philosophy:

> «My teaching-learning philosophy has developed in the course of my many years of activity [...]. It is a dynamic construct based on a mixture of experience, acquired theory and ongoing reflection. [...]» (P04).

Here it becomes clear how during the writing process, the descriptive text type is changed into a reflective one.

Also interesting are examples of texts that point to an essential personal insight and establish a connection between the why and the how of teaching:

> «Before the CAS, my teaching strategy was mainly frontal teaching. I was convinced that I had to demonstrate the material to the students and afterwards they should practice practically. [...]
>
> The material I learned at the CAS about brain research and learning psychology opened my eyes to the fact that frontal teaching is no longer up to date. I have come to the conviction that by activating prior knowledge, the individual learning paths are used and deepened. The focus of activity should be with the students. In the CAS I have learned about a wide range of possibilities to activate prior knowledge. I have already started to apply this knowledge regularly at the beginning of my lessons. Since learning takes time, I support the consolidation phase» (P03).

And in the interview, the same person demonstrates a development in reflecting on the own teaching style in saying:

> «So here I'm sure that I let them [the students] do it too, and I don't really have the feeling that I have to have a solution. They just make mistakes so that they can learn from them later» (P03).

In reflective texts, teachers explain properly why they have chosen the topic and describe difficulties as well as how she would like to address them.

> «The evaluations of the last years showed that I could improve the liveliness of my teaching. It is not enough to explain topics and illustrate them with examples. It would be more useful to exchange and develop them actively more in depth». (P05)

She is able to explain that she has chosen this method with the aim to activate the students and describes her role as teacher to give them a guidance through their learning processes.

> «[...] to pursue consequently the didactic orientation towards learning outcomes and let enough time for work on cases and for individual reflection I chose a structured method. [...] Now I implement the same method 3 times and evaluate each round to improve the next one». (P05)
>
> «I choose this method because it enables a constructivist learning process as describes e.g. Piaget. [...]

> In my project finally I didn't pursue the question whether this method enhances the learning processes of the students, but how the different phases (of the method) can be designed in detail. [...]
>
> Not every new content will be integrated similarly or will lead to the construction of a new or adapted mental model» (P05).

The following examples from the interviews show that meta-reflection goes one step further in the depth of reflection:

> «Actually, a topic that comes up again and again in my work: How do you get the message, or what you want to convey, across? Well, we are working in the field of [laughs] communication here, but I still find it difficult sometimes. Because our school system is so shaped, I'll say in the direction of "right and wrong", what is right and wrong, but in the communication, we encourage students to promote independent thinking. That they ask questions independently and that these categories of "right and wrong" are somehow broken down... [...]
>
> Because I have noticed with myself that what I really have all my life is what I have worked for myself ... nobody can know everything. And you can also learn from the students. [...]
>
> And exactly this aspect of mediation, translating from teaching back into research, what I take from teaching into research and what I take from research into teaching. Or, if I do research so that I think along with them, how can one possibly think along with them or write in a language that can be used later for mediation?» (P06).

Here, a critical distance is taken from one's own actions and the findings are placed in a wider context. Teachers are able to undergo a deeper journey of thought in order to obtain comprehensive and in-depth understanding about certain issues.

> «[...] the attributes "lively" and "clearly" not necessarily appear together. Teaching can be very lively but hasn't to be clear at the same time. So, it's problematic to evaluate both together. It would be useful to perform focus groups to get a better understanding. Maybe students associate with these two attributes concrete work with the clients. [...]» (P05).

According to degrees of teaching expertise, we find that both projects and portfolios can differ in terms of reflectivity. In two cases of mainly descriptive portfolio reports, the primary aim of these two participants was to acquire the certificate. The two other portfolios demonstrated a high quality of reflection. As an example of the two other portfolios with high quality of reflection the latest:

> «I wrote in my portfolio, I was actually more influenced by teaching in front of the students, but during the programme I noticed, that there are other possibilities and variations […] and so, I let them do things on their own and I don't have the feeling anymore that I need to have a solution. I let them make mistakes, so they can learn from them…» (P07).

The analyses revealed that the reports vary from descriptive to meta-reflective. The heterogeneity of our participants has to be considered, too. So, the participant's background ranges from few to many years of teaching experiences and coming from all disciplines. In 3 reports some meta-reflective elements attracted attention. Especially one project report was particularly standing out because of its mainly reflective and meta-reflective level. An important aspect of the teaching philosophy of this participant was to support students in critical and independent thinking. During the interview this was underlined several times including arguments towards different approaches in teaching, like agile higher education, learning environments on equal footing with students, etc:

> «Because I think if there's good planning, it's much easier to improvise afterwards and really see what the group needs, what's in the room now, which can then possibly be different for each group. I notice that, exactly, that this has brought me more in the direction of recognizing that there is something like agile university didactics and that is perhaps something that I do intuitively, automatically more. And that also has a name [agile higher education]» (P06).

In the sample examined, the majority of reflections are at a reflective level, although some texts can also be classified as descriptive. Rather rarely meta-reflexive passages can be identified.

In summary, it can be concluded from the analyses that although final works such as portfolios or projects provide an insight into the reflective processes of the participants, the individual contexts and backgrounds can have a considerable influence on the depth of reflection. The motivation for a course is an influencing factor that should not be underestimated. In addition, the background of experience plays a major role in how reflection is reflected in texts, for example whether someone is mainly active in teaching or in research. The willingness to engage in a process of reflection also depends on the individual possibilities of how many resources can be used for such a certificate work.

7. Conclusions

After the study we can conclude the following in relation to the research objectives:

1. The concept of reflectivity, reflective practice and what constitutes a good reflective process in teaching practice.

A good reflective process in teaching practice is an active, systematic and persistent attitude of critical thinking (Dewey, 1933). The process of critical thinking involves the careful acquisition and interpretation of information and use of it to reach well justified conclusions. Though critical thinking principles are universal, their application is an important element of all professional fields and academic disciplines therefore it requires a process of reflective contextualization.

Through the use of reflective practice, teachers can question, evaluate, and reconstruct the teaching process by challenging the established theory and practice. Critical thinking skills can help teacher's problem solve, reflect, and make a conclusive decision about the situations they face. This reflective practice creates new possibilities for the development of strategies that positively impact students' learning processes and teachers' professional career and for the development of the teaching knowledge.

2. A model for the analysis of reflective practice in written texts

Not all types of learning and cognitive functioning require reflective practice, but reflectivity is a central part of many practitioners and has not been interrogated with the kind of rigour that teachers would normally apply to their own disciplines' theoretical framework (Bleakey, 1999: 315). We need ways of examining how academics attempt to look critically at the self and their teaching.

The model and tools designed, according to this initial study, suggest that at least three levels of reflective practice can be found in written texts: descriptive, reflective or meta-reflective. Supporting critical reflection in portfolios and projects is desirable as it shows a more profound level of meta-reflection.

3. The reflective practice of our CAS participants as exposed in their projects and portfolios

Our analysis of texts showed that critical reflection in teaching practice at higher education is not an easy endeavour for many. The texts were mainly reflective, some descriptive and only a few had meta-reflective elements. Provided the heterogeneity of participants, it seems that this is dependent of experience and motivation and less on discipline, according to interviews. Additionally, projects seem to be more suitable for more experienced teachers and portfolios for junior lecturers.

So, what does it mean for the re-design? Suggestions include to put a focus on reflective practice during training based on our model, to support the individual learning processes of our participants with coaching and to provide more specific feedback in order to answer more accurately to their needs. This also requires more targeted and individualised learning environments and to offer different assignments depending on the background of participants. These options confirm the findings of Oppl (2018) to enable an active handling of heterogeneity and to even consider it as a central concept and resource.

The study shows us that the instrument is suitable for assessing the quality of reflective texts. Still, the study has some limitations. The sample is small in order to get remarkable results on whether to declare where our participants stand in terms of reflective practice. Further, the analyses of the interviews show that the written texts provide only a part of the reflection the participants went through. Reflection is an

ongoing process which takes place on different levels that can be seen only partially in the texts.

Secondly, the tool needs to be applied to a wider audience and a different context of academic development to be further refined. This step is currently in place and our next priority is the digitalisation and "didactisation" of the rubric to be suited for self-assessment.

Thirdly, the study reveals the complexity of reflective processes and confirms the importance of interactive learning environments in programmes of higher education. In combining it with peer-feedback, coaching and added by structured self-assessment processes it may be possible to get deeper insights in the reflection processes of teachers.

These data from reflective statements validate treating the teachers as key informants into the processes of academic development revision. The knowledge we provide can only be strengthened and deepened by more in-depth analysis of the sort undertaken here.

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Annex 1. Rubric Assessment of Reflective Thinking in PORTFOLIOS:

Levels of reflective thinking in PORTFOLIOS			
Dimensions:	**Descriptive Portfolio**	**Reflective Portfolio**	**Critical Reflective Portfolio**
Subject matter	- It shows **what** is taught (subject matter). - Describes subject matter without explaining why the topic was chosen. - Does not address concepts or aspects that are difficult and how these difficulties could be addressed.	- It shows a comprehensive exploration of the topic under examination. Describes **subject matter** and explains why the topic was chosen in favour of others. Addresses concepts or aspects that are difficult and how these difficulties could be solved. - It shows a comprehensive understanding of learning as a starting point for an intervention. - Can show awareness of how a specific course fits in the overall curriculum.	- It shows a comprehensive exploration of the topic under examination. - It shows a comprehensive understanding of learning as a starting point for an intervention. - Describes **subject matter** and explains why the topic was chosen in favour of others. Addresses concepts or aspects that are difficult and how these difficulties could be solved. - Can show teacher's awareness of how a specific course fits in the overall curriculum or can contextualize a course within the study programme. - Can become aware of why the curriculum is built as it is or why it should be changed.
Teaching philosophy	- **Teaching philosophy** describes the teaching values and beliefs without acknowledging that there is a connection between these and their implementation in the practice. - It deals with meaningful concepts but does not relate to personal or practical situations.	- There is an explanation of why the teachers' values and beliefs about teaching and learning fit into the context of his/her discipline. - Can include a discussion about the concepts of teaching, learning and assessment, the goals for the students, and the teacher's professional growth in the context of the discipline.	- There is an explanation of why the teachers' values and beliefs about teaching and learning fit into the context of his/her discipline. - Can include a discussion about how the teacher has changed the way s/he looks at him/herself as a result of the course. - The course has made visible or even challenged some of his/her firmly held ideas with regard to his/her teaching approach, has discovered faults in what s/he had believed to be right.
Methodological design	- It shows **how** teaching is done and learning is assessed (method), highlighting the features, qualities in order to furnish a clear and complete concept. - Describes the **learning activities** without acknowledging that there is a choice of teaching and learning activities, and why certain activities are chosen in favour of others.	- It shows a comprehensive explanation of why certain teaching and learning **methods and activities** are chosen in favour of others and what is achieved by making this choice. - Can include a discussion about the role of the teacher in the students' learning process. Can show an awareness of the student group's diversity and its needs.	- It shows an explanation of why certain teaching and learning methods and activities are chosen in favour of others and what is achieved by making this choice. - Can include a discussion about how the teacher has changed the way s/he looks at the role of the teacher in the students' learning process, the methods, activities, diversity of students.

			- Can include a discussion about the challenges of gathering data in the context of a classroom, and its relevance for the advancement of the didactics of the discipline.
Effects on teaching and learning	- Describes the **effects** as good/bad and better/worse, without acknowledging that there is a connection between the teaching and learning activities and the effects on student learning. - Does not show evidence (qualitative or quantitative) or evidences are expressed from the perspective of how s/he has been planned, implemented and assessed. - The **final** analysis shows understanding of what happened but there is little or no connection with personal assumptions, theoretical background or others' views. - There is little or no reflection on the effects on student **learning.** - **Conclusions** are superficial or not related to the achievement of the portfolios' objectives.	- A connection between pedagogical action and student learning **(effects**) is acknowledged together with thoughts about what could be the reasons for a certain effect. - Can show evidence of the teacher making investigations –non-systematic or systematic –with some hypothesis in mind. - There is a reflection on the **effects on student learning** and a valid judgement is made from which to take future decisions. - Acknowledges a connection between the teaching and learning activities and the effects on student learning. - Can comprise a discussion regarding the effects in relation to learning outcomes. - Conclusions are offered in relation to the extent to which the objectives of the portfolio are achieved.	- A connection between pedagogical action and student learning (effects) is acknowledged together with thoughts about what could be the reasons for a certain effect. - Can show evidence of the teacher making investigations –non-systematic or systematic –with some hypothesis in mind. - There is a critical reflection on the effects on student learning and a valid judgement is made from which to take future decisions. - Acknowledges a connection between the teaching and learning activities and the effects on student learning. - Can comprise a discussion about how the teacher has changed the way s/he looks at the impact of a certain intervention and its effects in students' learning.
Link to theory	- **Educational theory** is included, but no practice. Or practice is included but little or no link to theory. Or educational theory and practice are included but there is no link from theory to practice. - Can state the knowledge achieved after the study but does not appraise the knowledge.	- The analysis shows the knowledge of the theory and the capacity to link **educational theory and practice**; or shows how the teacher uses theories to describe practice.	- The analysis shows that the teacher is ready to use theory to develop new teaching practices or even further develop an educational theory. - **Conclusions** are offered in relation to the extent to which the objectives of the portfolio are achieved.

Annex 2. Rubric Assessment of Reflective Thinking in PROJECTS:

Levels of reflective thinking in PROJECTS			
Dimensions:	**Descriptive Project**	**Reflective Project**	**Critical Reflective Project**
Subject matter	– Describes superficially the context and subject matter in which the project will take place. It shows **what is explored and** in what context or discipline superficially. The objectives of the study are generally stated. The problem is barely set. No research questions are exposed, or they are too general, and they don't address the concrete problem. – It shows a general understanding of learning as a starting point for an intervention.	– It shows a comprehensive exploration of **what is explored** and in what context or discipline. Explains why the topic/problem was chosen in favour of others. The objectives of the study are precisely stated. The problem is adequately set, and precise research questions are exposed. – It shows a comprehensive understanding of learning as a starting point for an intervention. – Can show awareness of how a specific course fits in the overall curriculum.	– It shows a comprehensive exploration of **what is explored** and in what context. Explains why the topic/problem was chosen in favour of others. Addresses concepts or aspects that are difficult and how these difficulties could be solved. – The problem is adequately set, and precise research questions are exposed. The objectives of the study are precisely stated. – It shows a comprehensive understanding of learning as a starting point for an intervention. – Can become aware of why the research study is of use in the didactics of the discipline.
Methodological design	– Describes the **research design** (planning of the research) superficially: **how** the study has been planned, implemented, data collected and analyzed. – Describes the research **method** without justifying or explaining why certain processes are chosen in favour of others. – Intervention is limited to one teaching session or it is superficially described.	– It shows a comprehensive exploration of the **research design** (planning of the research) and **how** the study has been planned, implemented, data collected and analyzed. – Describes the research **method** and acknowledges that there can be other possibilities to address the same goal, and what is achieved by making this choice. Justifies the chosen processes. There is one teaching intervention thoughtfully explored or two or more teaching interventions are explained. – Can include a discussion about the research process and gathering of data, and the role of the teacher as researcher.	– It shows a comprehensive exploration of the **research design** (planning of the research): **what is explored**, in what context and **how** the study has been planned, implemented, data collected and analyzed. Describes the research **method** and acknowledges other possibilities to address the same goal, and what is achieved by making this choice. Justifies the chosen processes. There is one intervention thoughtfully explored or two or more interventions are explained. – Can include a discussion about the challenges of the research approach, its process and gathering of data, and how the role of the teacher as researcher has made him-/herself aware of or has even changed the way s/he looks at teaching or his/her held ideas with regard to his/her role in the advancement of the didactics of the discipline.

Effects on teaching and learning	– Describes the **effects** as good/bad and better/worse, without acknowledging that there is a connection between the teaching and learning activities and the effects on student learning. – Few data are included. Data is generally analyzed and shows no or little evidence (qualitative or quantitative) of the effects of the intervention. – The **final** analysis shows understanding of what happened but there is little or no connection with personal assumptions, theoretical background or others' views. There is little or no reflection on the effects on student learning. – **Conclusions** are superficial or not related to the achievement of the projects' objectives	– A connection between pedagogical action and student learning **(effects)** is acknowledged together with a reflection about what could be the reasons for a certain effect. – Assumptions are based on personal experience and data collected in a systematic way. **Data** is systematically analyzed, it shows good evidence (qualitative and/or quantitative) of the effects of the intervention. – There is a reflection on the **effects on student learning** and a valid judgement is made from which to take future decisions. – Acknowledges a connection between the teaching and learning activities and the effects on student learning. – Can comprise a discussion regarding the effects in relation to learning outcomes. – **Conclusions** are offered in relation to the extent to which the objectives of the project are achieved.	– A connection between pedagogical action and student learning **(effects)** is acknowledged together with critical thoughts about what could be the reasons for a certain effect. – Assumptions are based on personal experience and data collected in a systematic way. **Data** is systematically analyzed, it shows good evidence (qualitative and/or quantitative) of the effects of the intervention. – There is a critical reflection on the **effects on student learning** and a valid judgement is made from which to take future decisions. – Acknowledges a connection between the teaching and learning activities and the effects on student learning. – Can comprise a discussion about how the teacher has changed the way s/he looks at the impact of certain interventions and its effects in students' learning. – **Conclusions** are offered in relation to the extent to which the objectives of the project are achieved.
Link to theory	– The analysis shows little knowledge of the theory and a superficial link between **educational theory and practice**, or how to use theory to describe practice. – Can state the knowledge achieved after the study but does not appraise the knowledge.	– The analysis shows the knowledge of the theory and the capacity to link **educational theory and practice**; or shows how the teacher uses theories to describe practice.	– The analysis shows that the teacher is ready to use theory to develop new teaching practices or even further develop an educational theory.

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Annex 3. Codification of interviews' answers:

Nr. Category	Subcategory	Description/ Definition
A: Topics/Highlights		
A1	Highlights	Concrete mention of special/highlights during the CAS
A2	Topics	Mention of topics dealt in the portfolio or project
B: Change		
B1	Teaching-learning philosophy/Teaching conceptions	Mentions of changes in the teaching-learning understanding
B2	Concrete implementations	Things that have been newly introduced/adopted into teaching
B3	Competence acquisition	Statements on competence acquisition (also negative - nothing new)
B4	Change of attitude	Changes in the behaviour or attitude
B5	Reflection process	Statements about reflection on teaching/your own role; reflection on teaching, when, about what, with whom, how, etc.
B6	Students' perspective	Statements that show the adoption of the students' perspective
C: Support of the learning process		
C1	Key moments in the learning process	Statements on key moments in the learning process
C2	Role of Lecturer CAS	Support of Lecturers
C3	Rolle of fellow students	Support / Role of fellow students
C4	Difficulties	Irritation in general
C5	Role of own institution	Statements on the role of own institution
C6	Further support	Statements on further support
D: Portfolio/Projekt		
D1	Lerning Process Portfolio/Projekt	What have the participants learned through the teaching project/portfolio? What has become important?
D2	Important teaching aspects	What were important teaching aspects of the portfolio/project?
D3	Difficult aspects	What were difficult aspects of the portfolio/project?
D4	Influence on practice/implementation	What was taken from the portfolio/project?
E: Other		

E1:	New goals for further development	What are your next goals?
E2:	Feedback from CAS	Any feedback on the CAS that could be useful for further development