

The duality of the teacher portfolio: A tool for showcasing teacher achievement or self-assessment?

Annemarie Eckes-Shephard, Susana Garcia Dominguez, Liam Kendall & Bibiana Prinoth

ABSTRACT

Assembling a teaching portfolio is an integral part of a teacher's own learning improvement and career progression. Specifically, a portfolio can both provide an important means of self-reflection for personal development and showcase teaching experience and competency for career advancement. However, portfolios written for these two contrasting aims can be inherently contradictory by design, and may therefore differ considerably in their content. In this project, we assess to what extent this discord in portfolio aims manifests in the content of two portfolios used to apply for a lecturer position in Lund University (LU). Since both portfolios were written for the same purpose, our hypothesis was that their narrative would be very similar. To analyse the two portfolios, we used deductive coding and text mining. Specifically, we used the concept of an existing dichotomy between portfolios (formative/developmental vs. summative/evaluative) in order to create a theory-based evaluation criteria. We found that the two portfolios are very different in writing style and focus, which was exemplified by different content of their word clouds. Based on our criteria, but contrary to our hypothesis, these two portfolios fall into opposing portfolio categories. Thus, the context in which a portfolio is constructed does not necessarily result in the same type of portfolio. Nevertheless, we believe that both portfolios convince the reader that their author would be a suitable candidate for a lecturer position. For us as early career teachers, we conclude that it does not seem to matter how the portfolio is written, if it conveys teaching ability, enthusiasm, and the willingness to learn and improve.

INTRODUCTION

Teaching portfolios entered teaching practice in the 1980's, with the aim of consolidating independent sources of teacher evaluations (e.g. student evaluations, publication lists) (Seldin & Miller, 2008). As such, early descriptions of portfolios describe them as short (3 – 5 pages), summarising one's teaching accomplishments, alongside anecdotes and limited commentary (Millis, 1991). Yet, even early on, it was acknowledged that teacher portfolios must be dynamic, and developmental by design (Millis, 1991). More recent descriptions have defined portfolios as a “reflective, evidence-based collection of materials that documents teaching, research and service performance” (Seldin & Miller, 2008, pp. 22). Attempts at defining different types of teacher portfolios can be found in the literature, which were developed through assessments of case studies of teachers (see Table SII for two different sets of portfolio types found in the literature). For instance, Smith and Tillema (2003) divide portfolios into four types: dossier, reflective, training, or personal development, the first two considered relevant for career advancement, and the latter for developmental purposes. Bunker and Leggett (2004) and Leggett and Bunker (2006) also offer four portfolio types: emergent, virtual, practitioner and mythological. However, in this case, only the practitioner portfolio focuses on personal development.

Both sets of examples of portfolio types described above still share a clear dichotomy between portfolios formulated for career advancement, which are more summative, and those constructed for personal development, which are more formative and reflective (Buckridge, 2008; Smith & Tillema, 2003; FitzPatrick & Spiller, 2010; Trevitt et al., 2012). For early career researchers/teachers, both portfolio types may play an important role in shaping their identities/careers as teachers. Thus, a critical evaluation of these differences, alongside examples, will enable Early Career Teachers (ECTs) to make informed decisions regarding how and when to construct each type of portfolio.

The structure and content of a teacher portfolio invariably differs depending on if the portfolio has been constructed for career advancement, or personal development. Seldin and Miller (2008) offer a five-section template: consisting of a preface describing the portfolio's purpose, independent sections on teaching, research, and service, which detail the teacher's teaching philosophy, i.e., a “*rationale that focuses on the important components defining*

effective teaching and learning in a particular discipline and/or institutional context” (Schönwetter et al., 2002, pp. 84), and annotated anecdotes demonstrating key activities, improvements, and student evaluation, among others. Lastly, their template contains a final section regarding professional accomplishments and goals. However, the manner in which teachers will document their teaching philosophy, in conjunction with examples of their teaching experience, will be different depending on whether the portfolio is developed for career advancement or developmental purposes. For example, previous studies have acknowledged that summative/evaluative portfolios can stifle critical evaluation of oneself as a teacher, limiting the potential for personal growth. These rather self-critical evaluations are seen as inappropriate for summative examinations of teaching performance (FitzPatrick & Spiller, 2010; Buckridge 2008). Thus, summative/evaluative portfolios are more likely to be more selective (e.g., the virtual type in Leggett & Bunker 2006), addressing “what works” rather than “what I would like to incorporate” (formative/developmental type, see Box 1). In the context of a portfolio's structure, this may manifest through the use of pre-existing philosophies, with accompanying examples, rather than prospective ideas for further development in teaching philosophy and practice.

The summative/evaluative portfolio

- Documentation of a teacher's accomplishments that provides evidence of successful implementation and performance of teaching activities (Smith & Tillema, 2003).
- Needs frequent revision at each stage of the professional career, to contain the status quo and must be updated for future use (Buckridge, 2008).
- Provides insight into the consistency of teaching and offers the opportunity to quantify success, while it leaves out any information about the teaching style or philosophy in particular.

The formative/developmental portfolio

- Conscientious reflection by the teacher of their own teaching principles and experiences in its most crude form (i.e. both good and bad, no exclusion of bad teaching experiences; Buckridge, 2008).
- Dynamic, long-lived document, containing discussions with colleagues and feedback from students, and reflections on how to move forward as a teacher, in identity, philosophy and teaching practices (Saroyan & Trigwell, 2015).
- Focuses on one's never ending learning to become a better teacher for the students' success (Pelger & Larsson, 2018).

Box 1: Definition of the outer extremes along the portfolio spectrum (Figure 1).

PROJECT AIMS

A multitude of portfolio types have been identified in the literature (Smith & Tillema, 2003; Bunker & Leggett, 2004; Leggett & Bunker, 2006). Principally, however, while they can also be grouped into different categories, they share aspects of a clear dichotomy between “summative/evaluative” and “formative/developmental” (see Figure 1). This means that portfolios would likely be situated along an axis with these two dichotomous poles at either end.

Our aim is to analyse two teaching portfolios and situate them along this axis, comparing them in terms of structure and content, and to assess how, and in what context, teaching portfolios of different structure/narrative can be constructed in order to maximise their benefit to early career teachers.

METHODS

To obtain portfolios for this study, we initially browsed the Internet for potential teaching portfolio examples, but did not find many examples, and only few were related to the natural sciences, the area we believed would be the most useful for us to study, as we all have a natural science background. Therefore, after consultation with our project supervisor, we decided to contact several Excellent Teaching Practitioners (ETP) in Lund University (LU) via email. ETPs are all teachers that have applied and been admitted to the pedagogical academy in the Faculty of Science, which promotes excellent education practices within the science faculty. Due to time constraints, only two ETPs came back to us with their portfolios (P). Both ETPs had successfully applied for a lectureship position in LU, portfolio 1 (P1) in Chemistry during 2010, and portfolio 2 (P2) in Educational Development during 2015.

For placement of the two portfolios along a dimension/spectrum of “clearly summative/evaluative” and “clearly formative/developmental” (see Figure 1), we defined these two extreme cases based on literature (see Box 1). We hypothesise that both portfolios are similar in tone and format, given that their use served a summative/evaluative purpose (see Figure 1, filled icons).

To analyse the portfolio texts, we applied a combination of qualitative content analysis (Mayring, 2000) which involved deductive coding (according to Kuckartz, 2019), and quantitative content analysis, which involved text mining. For deductive coding of the texts, we selected three dimensions from Buckridge (2008), “where distinct developmental and summative representations could be discerned” (Buckridge, 2008, pp. 120): (i) Focus on student experience, (ii) reflectiveness and (iii) alignment of philosophy. Within these dimensions, we defined categories to analyse the text (see coding agenda in Appendix I, Table S1). These categories were defined based on hypotheses, rooted in theory, on how the narrative and style of the two portfolios would differ between summative/evaluative and formative/developmental portfolios.

- **C1: Focus on student experience:** We hypothesise that formative/developmental portfolios may contain more language from the student’s point of view (Buckridge, 2008) including student problems and struggles, whereas in a summative/evaluative portfolio, student-focus may be more connected with one’s own achievements.
- **C2: Alignment of philosophy:** We hypothesise that formative/developmental portfolios may contain a narrative that provides evidence of striving to improve one’s own philosophy and identity as a teacher (Smith & Tillema, 2003). In contrast, summative/evaluative portfolios may highlight how the teaching already successfully aligns with one’s philosophy.
- **C3: Reflectiveness:** We hypothesise that formative/developmental portfolios may have the propensity to mention peer-learning experiences with fellow teachers (Saroyan & Trigwell, 2015), and awareness of areas that need improvement (FitzPatrick & Spiller, 2010; Hoesktra & Crocker, 2015). In contrast, we hypothesise that summative/evaluative portfolios may focus the most on the author and their achievements, and will be less self-critical (FitzPatrick & Spiller, 2010; Buckridge, 2008). We hypothesise a more frequent omission of peer-discussions. We expect reflections to be from the perspective of “the methods having worked” rather than “students’ learning having increased”.

Text mining was undertaken in the R computing environment (v4.0.5, R Core Team, 2020) using the “tm” package (Feinerer & Hornik, 2020). From both portfolios, we excluded

frequently occurring words that were not connected to the subject (see Appendix III, lists “wordstrm”).

DISCUSSION

Purely summative/evaluative or formative/developmental portfolios represent the two extremes along a spectrum of aims for teaching portfolios. We set out to analyse two teaching portfolios in order to determine whether their tone and content reflects these career-oriented vs. self-improvement aims. Originally, it was expected that the two portfolios analysed would have a similar character, as they were both used to apply for a lectureship position at LU (see Figure 1, filled icons). It was also expected that both portfolios would focus very strongly on their performance and, thus, would be classified in the more summative/evaluative part of the spectrum.

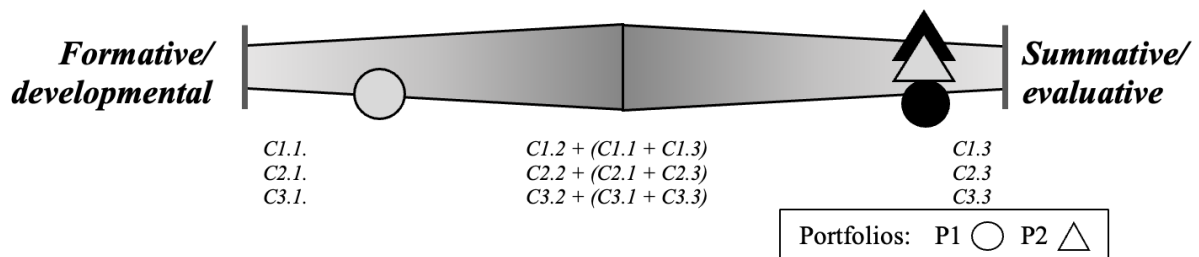


Figure 1. Spectrum of portfolio types along the dimension formative/developmental <-> summative/evaluative. The outer extremes of the spectrum are defined in Box 1. The coding agenda in Table S1 defines C1-3, which are categorised so that they can locate portfolio content along this spectrum. Placement of a portfolio in the middle of the spectrum results from the frequent presence of code categories of Cn.2, or a relatively even combination of codes of category Cn.1 and Cn.3. Placement of a portfolio on the edges of the spectrum results from the presence of code categories Cn.1 or Cn.3, respectively. Hypothesised placement of the two portfolios are filled with black. Actual portfolio location, as derived from criteria used in this study are filled in with grey.

Teaching portfolio P1 is very much built on reflections and contains personal experiences and lessons learned over the years as a teacher. Most of the relevant aspects of the portfolio fall into categories C1.1, C2.1, and C3.1, suggesting a clear tendency toward a formative/developmental teaching portfolio. Throughout the portfolio, the focus is clearly on self-development and successes are cited as examples to illustrate what went wrong initially, how improvement was achieved, and in what way the teaching philosophy has changed. This

pattern, in which the writer describes “testing” and then “refining” one’s practice, demonstrates that the writer is intent on a “continuing cycle of learning” (Buckridge, 2008). Underlying teaching theories or seminars where this philosophy was studied/learned are highlighted, but citation frequency is generally low. Many aspects of personal/student experiences are emphasised to direct the reader to the general teaching philosophy, and highlight the important role teacher development can have in shaping a student’s learning.

In contrast, portfolio P2 is clearly aimed towards a professional audience. Individual teacher performance is the central focus, rather than student outcomes and their feedback - student-teacher interactions are described from a more general perspective, and do not delve into specific experiences with particular students. In this way, the writer is attempting to demonstrate “consistency and success” (Buckridge, 2008, pp. 120). Although there is some reflection and pedagogical changes in courses are related to theory, the author does not explicitly acknowledge academic failures or discussions with peers. The writing style is always formal, and all reported experiences are used to foreground the teacher's competence. The majority of the relevant aspects of the portfolio fall into the categories C1.3, C2.3 and C3.3, which indicates a tendency towards the summative/evaluative portfolio.

Contrary to the initial expectation that the two portfolios must be of very similar style, they offered completely different ways of achieving the same aim, which is convincing the reader that their teaching style, philosophy and expertise makes them a suitable candidate for hiring as lecturer. P1 chose to convince the reader by showing the development throughout the years of as a teacher to where they are today, and where they want to be in the future. In contrast, while P2 also mentions future plans, the portfolio is more focussed on the highlighting of knowledge, achievements and where they stand with their teaching at the time of application.

Not just the overall narrative differed between the two portfolios, but also their content: Comparing the word clouds that resulted from text mining (see Figure 2), we demonstrate that the authors differ greatly in how they represent themselves as teachers. P1 has a major focus on the terms “students”, followed by “learning”, while P2 displays more frequent words such as “science” and “teaching”, followed by “training” and “education”. P2 uses a formal tone, with a wider teaching vocabulary and references to their own and other’s literature. In contrast, P1’s vocabulary is more conversational; academic literature is used

specifically to reason about new teaching methods or personal experiences with students. In this case, their experiences with students and teaching, thoughts, and peer-help experiences are described and personally reflected upon. The words ‘problem(s)’ is in total used 17 times in 12 pages of the portfolio, the words ‘student(s)’ is named 57 times on 12 pages. This may suggest a focus on development and growth of the teacher alongside their students, as has also been shown through deductive coding. For P2, a multitude of teaching and learning methods stand out from the word cloud (word-frequencies: *supervision(s)* (20), *lecture(s)* (17), *workshop(s)* (14), *seminar(s)* (8); *writing* (22), *discussions* (12)), highlighting the lecturer’s ability and probably also conviction to apply a large mix of learning methods. Both authors talk about conducting lectures or seminars, but ultimately decide on a different approach: P1 chooses students as a starting point, while P2 relies on the theory behind course design and pre-existing achievements.

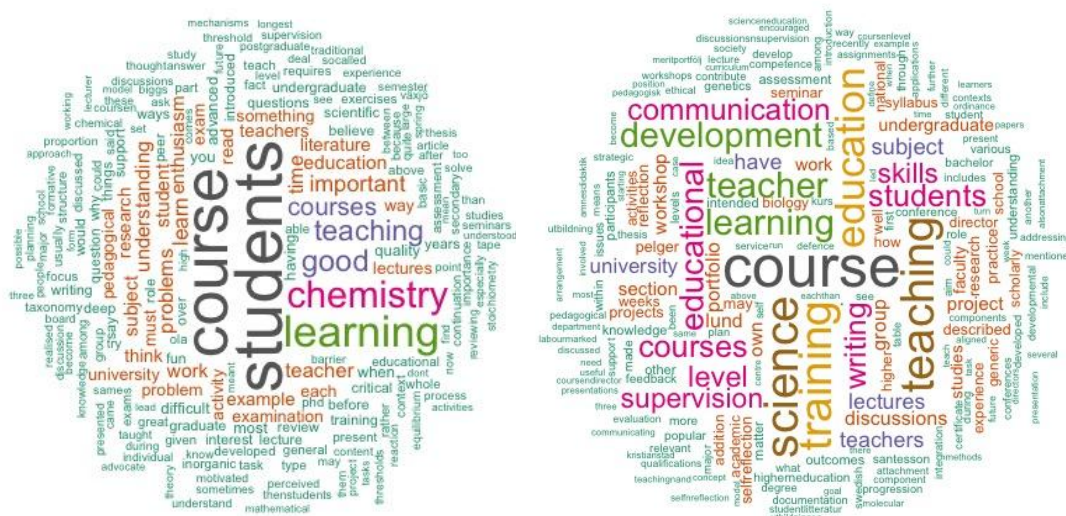


Figure 2. Word clouds for P1 (left) and P2 (right).

Overall, despite similar objectives in the writing of the portfolios, the authors have taken a distinctly different approach, which according to our categorisation scheme would place them into two opposing ends along the formative/developmental - summative/evaluative spectrum (Figure 1). The difference in tone might be caused by individual choice in style or even the character of the teacher, but it might also be due to different requirements in what needed to

be communicated in the application (i.e. there were five years between the application, so recruitment specifications might have changed). Not only the interval length between the time of application, but also the fact that each portfolio was constructed to apply in different fields (Chemistry vs Educational Development), may explain the differences in tone and writing styles. We are therefore aware that analysing just two portfolios, from different years, and in different fields, may create some selection bias. Despite this, both authors applied for the same type of position (i.e. lecturer) and succeeded, which indicated that they competently showcase their ability as teachers, a belief that we shared as readers. What is more, reading each portfolio leaves the reader wishing to witness each in a teaching setting (e.g., attending a lecture, or seminar, or even a discussion session).

CONCLUSION

mīlle viae dūcunt hominēs per saecula Rōmam. - “a thousand roads lead men forever to Rome” - *Liber Parabolarum*, 591 (1175), by Alain de Lille

We conclude that there are a multitude of different ways to represent oneself as a teacher when writing a portfolio, even with the same aim (i.e., applying for a lecturer position). In this way, the dichotomy in teaching portfolios, provided by the literature, does not always reflect their purpose. On the one hand, P1 relied heavily on reflection; by explicitly mentioning their failures or weaknesses alongside intent to overcome them, P1 demonstrated their ability and willingness to improve their teaching. On the contrary, P2 comprehensively demonstrated their competence through experience.

By acknowledging and critically evaluating these differences in portfolio content, we now better understand how portfolios can be used to reflect not only our experience, but also our goals as teachers. Importantly, this knowledge also informs how we can improve our students' learning. Specifically, through writing and reading others' teaching portfolio and the reflections therein, in conjunction with the literature, one improves one's teaching and therefore students' learning (Biggs and Tang, 2007). It is fascinating to reflect on how different these two portfolios are, considering both applicants were successful in obtaining the positions they applied for. This demonstrates that there may not necessarily be a right way to formulate a teacher portfolio for an academic position. Whether it be for a job

application with a specific selection criteria, or an exercise only for private personal development, a successful teacher portfolio should profile achievement, alongside an honest depiction of one's burgeoning or established identity as a teacher.

This process has also allowed considerable peer-reflection among us, which is a core component in learning (Saroyan & Trigwell, 2015), and of great benefit, to any teaching portfolio (Smith & Tillema, 2003). To summarise these reflections, we have learned how teaching portfolios are structured, what they contain, and how they can be written very differently, but still achieve the same outcome. It is also worth noting the value that educational courses can have in terms of aiding developing teachers to construct a teacher portfolio. Despite this, courses can lead to differing interpretations of portfolios (c.f. *training* type in Smith and Tillema (2003) with personal development type in Leggett and Bunker (2006)). Training programs offer an avenue for early career teachers to gain the variety of skills needed to construct a portfolio, in order to “successfully represent their teaching competency” (Meeus et al., 2009). It is thus likely that we will endeavour to undertake such a course, in order to compile our own teaching portfolios.

PROCESS REPORT

AES and LK created the portfolio evaluation criteria. LK undertook the initial literature review. AES created the word clouds. LK and AES drafted the coding agenda and discussed its validity for portfolio analysis with BP and SGD. BP and SGD read the portfolio examples, and suggested analysing the two portfolios considered in this work. BP and SGD read and evaluated the two portfolio examples according to the evaluation criteria. All authors attended all the scheduled meetings, participated in the informal discussions and contributed with comments and suggestions to the report manuscript. We roughly divided the manuscript between the group members so the workload was shared, with different sections and tasks assigned to different members. We valued each other's ideas and comments, and no major decisions were made without the consent of all the group members. Therefore, all authors have read and agreed upon the content of this manuscript.

FEEDBACK REPORT

Overall, feedback on our report was very positive. Minor but useful comments were made both by our opponent group and our project supervisor. In the Abstract, the recommendation was to remove the quote and our citation with the argument that this part of a paper should be self-explanatory. We agreed with this view, and removed the quote and citation. The Methods section required some clarification in our data collection process as well as our reasoning behind our choice in portfolio examples. In the Discussion section, we have included a paragraph to emphasise the differences between the portfolios with regards to applied positions and the time of application. As was mentioned during our feedback meeting, this might bring up a selection bias, which has to be made clear too. We also addressed feedback on the lack of consistency in our wording when referring to the two types of portfolios (i.e., ‘formative/developmental’ and ‘summative/evaluative’) throughout the report.

It was mentioned during our feedback meeting that another method for analysing language within a text, is "discourse analysis" (Johnstone, 2017). Given that the application context for the two portfolios was different (i.e. lecturer in chemistry vs. lecturer in educational development), it might have been a useful method to determine to what extent this context was responsible for the difference in tone and content in these two summative portfolios, which we believed to be similar in that regard. Last but not least, the length of our report was brought up too, since the instructions recommended a length of five pages. In response, we have not shortened our report, for three reasons: (1) our group consisted of four members, as opposed to two or three in most other groups, which permitted us to use more space (2) our report does not exceed the recommended length, taking into account four authors, if figures and boxes are omitted and the layout and typesetting changed, which we decided against to accommodate for readability and understanding for the reader, (3) we believe that the length of the report is needed to fulfil the project goals we set at the start.

REFERENCES

- Biggs, J., & Tang, C. (2006). *Outcomes-Based teaching and learning (OBTL): What is it, Why is it, How do we make it work?*
- http://www.cetl.hku.hk/system/files/OBTL_what_why_how.pdf
- Buckridge, M. (2008). Teaching portfolios: Their role in teaching and learning policy. *International Journal for Academic Development*, 13(2), 117–127.
- <https://doi.org/10.1080/13601440802076566>
- Bunker, A., & Leggett, M. (2004). Being wise about teaching portfolios: Exploring the barriers to their development and maintenance. *Research and Development in Higher Education*, 27, 92–101.
- Feinerer, I., & Hornik, K. (2020). *Tm: Text Mining Package*. R package (0.7-8) [Computer software]. <https://CRAN.R-project.org/package=tm>.
- FitzPatrick, M. A., & Spiller, D. (2010). The teaching portfolio: Institutional imperative or teacher's personal journey? *Higher Education Research & Development*, 29(2), 167–178.
- <https://doi.org/10.1080/07294360903470985>
- Johnstone, B. (2017). *Discourse analysis*. John Wiley & Sons.
- Kuckartz, U. (2019). Qualitative text analysis: A systematic approach. In G. Kaiser & N. Presmeg (Eds.), *Compendium for early career researchers in mathematics education* (pp. 181–197). Springer, Cham.
- Leggett, M., & Bunker, A. (2006). Teaching portfolios and university culture. *Journal of Further and Higher Education*, 30(3), 269–282. <https://doi.org/10.1080/03098770600802297>
- Mayring, P. (2000). Qualitative Content Analysis [28 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 1(2), Art. 20.

-
- Meeus, W., Van Petegem, P., & Engels, N. (2009). Validity and reliability of portfolio assessment in pre-service teacher education. *Assessment & Evaluation in Higher Education*, 34(4), 401–413. <https://doi.org/10.1080/02602930802062659>
- Millis, B. J. (1991). Putting the Teaching Portfolio in Context. *To Improve the Academy*, 220, 215–232.
- Pelger, S., & Larsson, M. (2018). Advancement towards the scholarship of teaching and learning through the writing of teaching portfolios. *International Journal for Academic Development*, 23(3), 179–191. <https://doi.org/10.1080/1360144X.2018.1435417>
- R Core Team. (2020). *R: A language and environment for statistical computing v.4.1.0* (4.0.5) [Computer software]. <https://cran.r-project.org/>
- Saroyan, A., & Trigwell, K. (2015). Higher education teachers' professional learning: Process and outcome. *Studies in Educational Evaluation*, 46, 92–101. <https://doi.org/10.1016/j.stueduc.2015.03.008>
- Seldin, P., & Miller, J. E. (2008). *The academic portfolio: A practical guide to documenting teaching, research, and service*. John Wiley & Sons.
- Smith, K., & Tillema, H. (2003). Clarifying different types of portfolio use. *Assessment & Evaluation in Higher Education*, 28(6), 625–648. <https://doi.org/10.1080/0260293032000130252>
- Schönwetter, D. J., Sokal, L., Friesen, M., & Taylor, K. L. (2002). Teaching philosophies reconsidered: A conceptual model for the development and evaluation of teaching philosophy statements. *International Journal for Academic Development*, 7(1), 83–97. <https://doi.org/10.1080/13601440210156501>
- Trevitt, C., Stocks, C., & Quinlan, K. M. (2012). Advancing assessment practice in continuing professional learning: Toward a richer understanding of teaching portfolios for

learning and assessment. *International Journal for Academic Development*, 17(2), 163–175.

<https://doi.org/10.1080/1360144X.2011.589004>

APPENDIX I

Table S1. Coding agenda to discern along a spectrum of portfolios between formative/developmental and summative/evaluative categorisation of portfolios (Box 1). Colour-coding of the categories are used to highlight the portfolios (Appendix II).

Category	Code	Definition	Examples from the portfolios
C1: Focus on student experience		We hypothesise that the formative/developmental portfolios may contain more language from the student's point of view (Buckridge, 2008) including student problems and struggles, whereas in a summative/evaluative portfolio, student-focus may be more connected with one's own achievements.	
	C1.1: Clear focus on student experience	"focus on student's learning" (Pelger & Larsson 2018) -> describing from the student's point of view -> describing the outcome for students, given a teaching action	"They know best themselves what support they need in their learning" (<i>tr. to engl.</i> p.5, P1)
	C2.1: Ambiguous focus on student experience	One of the above. Acknowledge that change had to be made, but do not show evidence that they have followed up on this.	"...no one had read the article! This can just be a coincidence, but I have also thought about other reasons" (<i>tr. to engl.</i> p5, P1).
	C1.3: Lack of focus on student experience	Omission of above definitions for clear focus on student experience. -> Students will be more connected with one's own achievements. -> portray student achievement of ILOs thanks to change in method and evaluate this as method 'has worked' rather than the student 'has learned'.	"...if students are to fulfil the requirements stated for a certain degree, a crucial factor is the progression of knowledge and skills during education [...]. My intention is, thus, to initiate and support a revision course syllabi, so that subject-specific as well as generic knowledge and skills are systematically trained within each major. Accordingly, intended learning outcomes should be thematically listed in a progression plan making a complement to the programme syllabus." (p. 20, P2).
C2: Alignment of philosophy		We hypothesise that formative/developmental portfolios may contain a narrative that provides evidence of striving to improve one's own philosophy and identity as a teacher (Smith & Tillema, 2003). In contrast, summative/evaluative portfolios may highlight how the teaching already successfully aligns with one's philosophy.	
	C2.1: Striving towards alignment	-> Evidence of trying to improve towards one's teaching philosophy. -> Evidence of adjustment and re-tuning of philosophy.	"I have previously noted that the reduction of our undergraduate courses to 7.5 credits has not facilitated deep learning, and I therefore developed a syllabus for a new 15 credits undergraduate course in general and inorganic chemistry, in which I introduced some new learning activities involving applications and "formative assessment", i.e. teacher feedback that is not an examination." (<i>tr. to engl.</i> p.10, P1)

	C2.2: Medium alignment	-> Show some knowledge of teaching theory, but limited integration with and reflection on their personal practice. -> theory is stated but not applied, because it doesn't fit, or is not easy to implement..	“Here I think a very important role is the role model, that is, to show a model of how to act as a researcher. This involves all aspects of research from how to ethically approach research to how to choose and conduct experiments and present your results in publications. In this respect, it is of course of utmost importance that I myself maintain and develop my competence in, for example, experimental methods.” (<i>tr. to engl.</i> p.6, P1)
	C2.3: Strong alignment	-> All aligned, clear evidence of connections between theory and personal practice. -> Evidence of emphasising on the existing alignment between one's philosophy and one's practice.	“Another major contribution to my teaching practice is the academic teacher training course. As a course director I am responsible for the design of learning and assessment activities - and for the courses to be constructively aligned [...]” (p.18, P2)
C3.1: Reflectiveness	We hypothesise that formative/developmental portfolios may have the propensity to mention peer-learning experiences with fellow teachers (Saroyan & Trigwell, 2015), and awareness of areas that need improvement (FitzPatrick & Spiller, 2010; Hoesktra & Crocker, 2015). In contrast, we hypothesise that summative/evaluative portfolios may focus the most on the author and their achievements and will be less self-critical (FitzPatrick & Spiller 2010; Buckridge, 2008). We hypothesise a more frequent omission of peer-discussions. We expect reflections to be from the perspective of “the methods having worked” rather than “students' learning having increased”.		
	C2.1: Learning and teaching improvement - related reflections	-> Admission of things going wrong -> Evidence of discussion with peers	“I also got some advice (during a conversation with a colleague within a pedagogic course) to...” (<i>tr. to engl.</i> p.5 P1). “..no one had read the article!” (<i>tr. to engl.</i> p.5, P1)
	C3.2: Medium reflection	-> making connections between teaching and learning outcome -> making connections between teacher and student	“I think that it is [therefore] very important to introduce such discussions in our early courses” (<i>tr. to engl.</i> p8, P1). “I also believe that the lectures become more personal and I appear more as an individual to the students. To occasionally also express controversial opinions or explanations tends to arouse interest and commitment. Thus, in lectures I have discussed [...]” (<i>tr. to engl</i> p.8 P1)
	C3.3: Career-focused reflections	Reflections are focused on the achievements, rather than students	“I have written several publications and conference papers on teaching and learning in science education. One of the major contributions is the book [...], addressing academic teachers, especially in the science field.” (p. 20, P2) “Another major contribution to my teaching practice is the academic teacher training courses. As a course director I am responsible for the design of learning and assessment activities - and for the courses to be constructively aligned (Biggs 2003).” (p. 17, P2)

APPENDIX II

The sample portfolios

For the purpose of colour-coding, the portfolios were brought into plain text format. Please refer to the original documents when reading.

P1 portfolio link:

https://docs.google.com/document/d/10vxNAbvFKbPpQ_ak-O4cA50p91E6KWKxuCknbptlMu0/edit?usp=sharing

P2 portfolio link:

https://docs.google.com/document/d/1_BqqDha17IEWPB9zTa381UFmqFOzTbTaY0J3pWnObD4/edit?usp=sharing

Table SII. Definitions of the types of teacher portfolios. Adapted from Smith and Tillema (2003) and Leggett and Bunker (2006).

Purpose	Type	Definition
<i>Smith and Tillema (2003)</i>		
Career	Dossier	A collection of work or a record of achievement, developed against criteria for competency, such as for application or promotion purposes.
	Reflective	Building on the dossier portfolio, the reflective portfolio compiles evidence of personal development, and past accomplishments, for application or promotion purposes. It is set against professional competency criteria, self-reflection is selective, and serves to describe progress and teaching understanding over time.
Development	Training	The training portfolio is undertaken during a professional teaching course. This portfolio serves to document students' work and achievements. It can involve some self-reflection.
	Personal development	The personal development portfolio represents a critical evaluation of oneself as a teacher, and one's professional development through time. The collection of artefacts are discussed, in terms of finding one's identity as a teacher. A key goal is to refine, through reflection, such as with peers and colleagues, one's growth through time.
<i>Bunker and Leggett (2004); Leggett and Bunker (2006)</i>		
Career	Emergent	This portfolio consists of a collection of artefacts; "a precursor for other documents requiring evidence of teacher effectiveness, performance management, promotion applications". It is seen as a strategic document, from which more developed portfolios can arise.
	Virtual	This is a career-enhancing portfolio designed for self-promotion, having been developed for a job application. Consists of evidenced descriptions of teaching ability, which have been paired to judgement criteria of a job. Often highly selective, it lacks validity in assessing performance as focusses on success. Public, fairly common.
Development	Practitioner	A reflective portfolio, most often developed during a training course. These portfolios provide critical evaluation of oneself as a teacher, alongside evidence of a teaching philosophy. It lacks usefulness for promotion, as it is focussed on reflection, improvement, deficiencies, and less on successful teaching outcomes.
Both	Multipurpose	A selective portfolio which demonstrates teacher effectiveness for a variety of purposes, but is ultimately aimed toward career enhancement. Contains both formative (reflective) and summative (evidence) elements, therefore useful for both development and career enhancement.

APPENDIX III

R-script to generate the word clouds

```
# portfolio group assignment
# Script to create word clouds from two teaching portfolios
# P1 was translated into English through an automated software before it was used here.
# P2 portfolio was pre-processed from image to text format usin an online platform
# 16.02.22 Annemarie Eckes-Shephard

#####
#settings
#install required packages, if necessary
#install.packages("pdftools")
#install.packages("tm")
#install.packages("SnowballC")
#install.packages("wordcloud")

# load required packages
library(pdftools)
library(dplyr)
library(tm)
library(SnowballC)
library(wordcloud)

#####
#import pdfs
files <- list.files(pattern = "pdf$")
files = c("P1.pdf","P2.pdf") # portfolio names are anonymised
portfolios <- lapply(files, pdf_text)
lapply(portfolios, length)

#####
#### P2 ####

#Create a vector containing only the text
text <- portfolios[2]# Create a corpus # 2
docs <- SimpleCorpus(VectorSource(text),control = list(language = "en"))

# data cleaning
rmwords =c("the","has","and","they","their","can","this","were",
           "was","lost","one","two","that","was","from","with","for","are","is",
           "will","also","which","had","att","f\u00f6r","not","all","where","both",
           "isbn")

docs <- tm_map(docs, content_transformer(tolower))
docs <- docs %>%
  tm_map(removeNumbers) %>%
  tm_map(removePunctuation) %>%
```

```

tm_map(stripWhitespace) %>%
tm_map(removeWords,rmwords)

#termdocumentmatrix
dtm <- TermDocumentMatrix(docs)
matri <- as.matrix(dtm)
words <- sort(rowSums(matri),decreasing=TRUE)
df <- data.frame(word = names(words),freq=words)

# detect frequency of the words
# NB: some of theses are content of a table, but I think still meaningful
#lectures , discussions, writing, workshop, supervision,seminar
df[df$word=='lectures',]$freq + df[df$word=='lecture',]$freq
df[df$word=='discussions',]$freq # singular not found
df[df$word=='writing',]
df[df$word=='workshop',]$freq + df[df$word=='workshops',]$freq
df[df$word=='supervision',]$freq #+ df[df$word=='supervisions',]$freq
df[df$word=='seminar',]$freq + df[df$word=='seminars',]$freq

# word cloud:
set.seed(1234) # for reproducibility
jpeg(filename="P2_wordcloud.jpeg")
wordcloud(words = df$word, freq = df$freq, min.freq = 1,
          max.words=200, random.order=FALSE, rot.per=0.35,
          colors=brewer.pal(8, "Dark2"))

dev.off()
#####
##### P1 #####

#Create a vector containing only the text
text <- portfolios[1]# Create a corpus
docs <- SimpleCorpus(VectorSource(text),control = list(language = "en"))

# data cleaning
rmwords =c("the","has","and","they","their","can","this","were",
          "was","lost","one","two","that","was","from","with","for","are","is",
          "will","also","which","had","att","f\u00f6r","not","all","where","both",
          "isbn","have","she","does","much","him","here","about","more","thus",
          "only","what","other","much","many","our","into","then","first","like",
          "few","get","her","its","but","very","how","such","been","always",
          "therefore","often","who","make","lot","some",
          "out","nmr","his","however","there","kema","out")

docs <- tm_map(docs, content_transformer(tolower))
docs <- docs %>%
  tm_map(removeNumbers) %>%
  tm_map(removePunctuation) %>%
  tm_map(stripWhitespace) %>%

```

```
tm_map(removeWords, rmwords)

#termdocumentmatrix
dtm <- TermDocumentMatrix(docs)
matri <- as.matrix(dtm)
words <- sort(rowSums(matri),decreasing=TRUE)
df <- data.frame(word = names(words),freq=words)

# detect frequency of words:
df[df$word=='problems',]
df[df$word=='problem',]
df[df$word=='students',]
df[df$word=='student',]

# word cloud:
set.seed(1234) # for reproducibility
jpeg(filename="P1_wordcloud.jpeg")
wordcloud(words = df$word, freq = df$freq, min.freq = 1,
          max.words=200, random.order=FALSE, rot.per=0.35,
          colors=brewer.pal(8, "Dark2"))
dev.off()
#####
#rmwords =c("detta", "kan", "ett", "är", "att", "för", "jag", "på", "man", "har", "til",
#           "med", "den", "et", "och", "the", "for", "dem", "år", "dock", "vid", "får",
#           "som", "till", "inte", "det", "var", "från", "också", "så", "men",
#           "därför", "mig", "där", "sig", "då", "eller", "denna", "min",
#           "dess", "blir", "två", "nog", "sin", "endast", "del", "vara", "här",
#           "något", "sina", "hela", "vis", "kom", "mitt", "efter", "mina",
#           "litet", "hon", "hur", "när", "kommer", "många", "mycket")
# Sources
# based on
# https://data.library.virginia.edu/reading-pdf-files-into-r-for-text-mining/
# and
# https://towardsdatascience.com/create-a-word-cloud-with-r-bde3e7422e8a
# with help from
# https://stackoverflow.com/questions/32225770/r-tm-removewords-function-not-removing-words
```