

4-2019

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Recommended Citation

Dreisiebner, Ph.D., Gernot and Slepcevic-Zach, Ph.D., Peter (2019) "Implementing an e-portfolio to foster students' ability for (self)-reflection: Lessons learned and issues still to be addressed," *International Journal for Business Education*: Vol. 159: No. 1, Article 2.

DOI: 10.30707/IJBE159.1.1648132234.833695

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Implementing an ePortfolio to foster students' ability for (self-)reflection: Lessons learned and issues still to be addressed

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ABSTRACT

The purpose of this paper is to review the role of software within an ePortfolio (ePF) initiative for students of a five-semester master's program for Business Education and Development. The didactical aim of the ePF initiative presented is to enhance students' ability for (self-)reflection. An accompanying study of the implementation process allows for evaluating the impact of the ePF initiative as well as for the evaluation of its implementation. At six points of time students fill in questionnaires regarding their self-perception of their own competences and their rating of the side conditions of the implementation, leading to 1,925 questionnaires up to September 2018. Results show a positive impact on students' self-perception of their own competences and the perceived importance of self-reflective learning. Regarding the ePF implementation, students generally value the ePF work, especially with regard to the support of their reflection process by an external coach. However, they criticize the time intensity of the reflection process, resulting in the need of a clear communication of the aims of portfolio work to uphold students' motivation. Although the software only represents a side condition in the ePF initiative discussed, students have specifically criticized the software provided – leading to the conclusion that the software might act as hygiene factor on students' motivation to reflect. From these findings arises the need for further research, which is subject to an interview study among the participants of the ePF initiative being currently in preparation.

Keywords: ePortfolio (ePF), reflection, competence development, Business Education and Development, accompanying study

Introduction

Portfolio concepts represent valuable tools to support students' ability for reflection and self-reflection, especially with the focus on pre-service teachers (Beck, Livne, & Bear, 2005; Lin, 2008). The ability to reflect upon one's own action and to adjust future actions to the insights gained, is considered an important aspect of every professional's skill-set (Lynch, 2000; Schön,

1983). With the use of electronic portfolio concepts the results of this reflection process might be documented independently of time and place, thus increasing learner ownership over the portfolio and supposedly also learners' motivation (Barrett, 2005). The aim of this article is to show the implementation process of an electronic portfolio (ePortfolio, ePF) with the very specific learning goal of enhancing students' ability for (self-)reflection and to evaluate supporting and inhibiting factors for a successful portfolio work.

The ePF implementation presented is embedded into the curriculum of a master's program for Business Education and Development at an Austrian University. Business Education and Development is a master's program with a twofold objective, which entitles students to various professions in the fields of business (e.g. accounting, human resources) as well as to becoming a business teacher at vocational schools. Due to the polyvalent nature of the master's program, Business Education and Development (as implemented at Austrian Universities) shares many similarities with programs of teacher education (e.g. a teaching practice for pre-service teachers), although it is not a teacher training program in the strong sense.

The ePF initiative started in 2009 with the aim to assist students in their reflection and self-reflection processes (Stock & Winkelbauer, 2012). Up to now, 1,925 questionnaires from students who have successfully completed an ePF allow an insight into the impact of the specific ePF implementation. In the past eight years, the ePF has been proven as a tool to enhance students' (self-)reflection (Dreisiebner, Riebenbauer, & Stock, 2017; Slepcevic-Zach, Riebenbauer, Fernandez, & Stock, 2015; Slepcevic-Zach & Stock, 2018; Stock & Winkelbauer, 2012). However, since starting the ePF initiative, technology has rapidly evolved with online and mobile learning becoming increasingly important.

The individual acceptance for an ePF is strongly dependent on the individual's attitude towards the ePF (Chen, Chang, Chen, Huang, & Chen, 2012). Literature regarding the implementation of ePFs for pre-service teachers suggests that technology-related issues might be one obstacle for a successful ePF implementation (Lin, 2008; Oakley, Pegrum, & Johnston, 2014). If so, technological factors might act as hygiene factors for ePF work, which should bear close examination whenever implementing an ePF. The term hygiene factor originates in the *dual-factor theory* (Herzberg, Mausner, & Snyderman, 1959) and describes an aspect of (workplace) motivation, which solely contributes to dissatisfaction. In the case of the ePF-implementation, a dissatisfying software might have a negative impact on the readiness to reflect (while a satisfying software might have no positive effect either). In the face of the technological development since 2009, the aim of this paper is to review the 'e' within the ePF. Formally, the technological aspect has been just a side condition to enable the reflection processes.

Literature Review

The following aspects are intended to become clear within this literature review: (1) Reflection and self-reflection are a (circular) process of reflecting upon past actions and developing or improving future actions. This process is a vital component of every teacher's skill set. (2)

Electronic portfolios might take a multitude of forms. In this specific case, an implementation of an electronic portfolio fostering students' ability to (self-)reflection is discussed. (3) Herzberg's dual-factor theory (Herzberg, Mausner, & Snyderman, 1959) may be used to explain students' motivation to reflect upon their competences in the current setting of the ePF-implementation.

Reflection and self-reflection as basis of portfolio-work

Reflection is a key component of every professional's skill set to enable a person to commence processes of continuous learning (Lynch, 2000; Schön, 1983). Reflection might be directed towards the own environment as well as specifically towards one's own action in the form of *self-reflection* (Helsper, 2001). This self-reflection might take two forms (Schön, 1983): *Reflection-in-action* refers to reflection processes which take place while still in the situation reflected upon. The reflecting individual becomes a „researcher in the practice context“ (Schön, 1983, p. 68), thus constructing „a new theory of the unique case“ (Schön, 1983, p. 68), still being able to influence the situation reflected upon. After the event, *reflection-on-action* might take place as “thinking back on what we have done” (Schön, 1983, p. 26). In this case, the reflecting individual might benefit from the insights gained in future actions, but not in the action reflected upon.

As indicated by Schön (1983), reflection processes are of circular nature: Both reflection-in-action as well as reflection-on-action might result in alternative methods of action, which lead to new situations to be reflected upon. The *ALACT model* (Korthagen, 1999) can be used to visualize this process within five steps (see figure 1): The starting point of each reflection process is an *action*, followed by *looking back on the action* and on the own desires and feelings during the action. In a third step the individual gets *awareness of essential aspects* (e.g. the reasons for a specific issue). Based on these insights, the individual begins with *creating alternative methods of action* by formulating aims, considering advantages and disadvantages and reviewing their feasibility. The alternatives are tested out in a final *trial*. In the circular reflection process this trial represents another action to be reflected upon and the process starts anew.

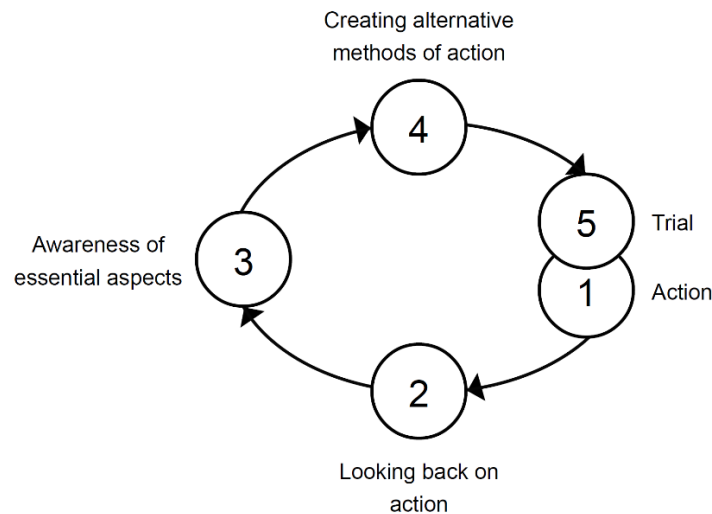
Figure 1: ALACT model

Figure 1. The ALACT model (Korthagen, 1999, p. 193) refers to reflection as a five-step-process of circular nature. Graphic adapted from Korthagen (1999, p. 193).

Introducing the concept of a competence development portfolio

Baumgartner (2009) differentiates between three types of portfolios: reflection, development and presentation portfolio. For every type of portfolio Baumgartner (2009) introduces a personal and an organizational type of portfolio: *personal portfolios* are owned by the learners. These portfolios might serve their purpose without giving the organization (e.g. university teachers) insight into the portfolios. They might even serve their purpose better if they remain private (e.g. by limiting socially desired tendencies in reflection portfolios). *Organizational portfolios*, on the other hand, may only serve their purpose if they do not remain private to the organization (e.g. an assessment portfolio may only serve its purpose if a teacher is allowed insight into the portfolio). Each of the three main portfolio types might be implemented with regard to its personal or organizational nature (Baumgartner, 2009):

- Reflection portfolio
(*personal*) *learning portfolio* (reflection about specific learning product or process as a whole as primary goal), (*organizational*) *assessment portfolio* (documentation of the student's learning process through individual assignments or through the whole curriculum, in some case to facilitate grading of students)
- Development portfolio
(*personal*) *development portfolio* (fosters the development of predetermined qualifications or – more generally defined – competences), (*organizational*) *career portfolio* (focusses the planning process of the rise to the next hierarchy level within a company or for an individual's career as a whole)
- Presentation portfolio
(*personal*) *demonstration portfolio* (the aim of this type is to demonstrate one's own

competencies for job applications), (*organizational*) *business portfolio* (aiming at advertising a specific product or the company as a whole)

The ePF implementation described within this paper shares characteristics with multiple types of electronic portfolios (see Figure 2): First, the portfolio might be characterized as *reflection portfolio* (specifically as learning portfolio) aiming at developing students' ability to reflect. However, it is not the goal of the ePF to act as basis for students' assessment. Second, the portfolio might be characterized as *development portfolio* since the competence dimensions to be reflected upon are predetermined. Students are required to reflect upon their most distinctive competences in the following four dimensions: professional, methodological, social and self-competence. The idea behind this concept is that only through interaction of all four competence dimensions holistic "learning empowerment" (Stock & Winkelbauer, 2012, p. 50) might be achieved. As a result, the portfolio implementation presented can be described as an *electronic competence development portfolio* (Stock, Slepcevic-Zach & Dreisiebner, 2019, in Print, translation by authors).

Figure 2: Taxonomy of electronic portfolios

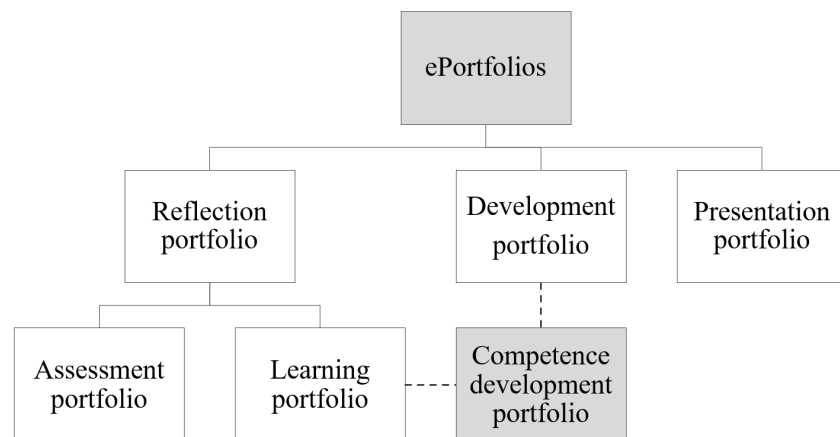
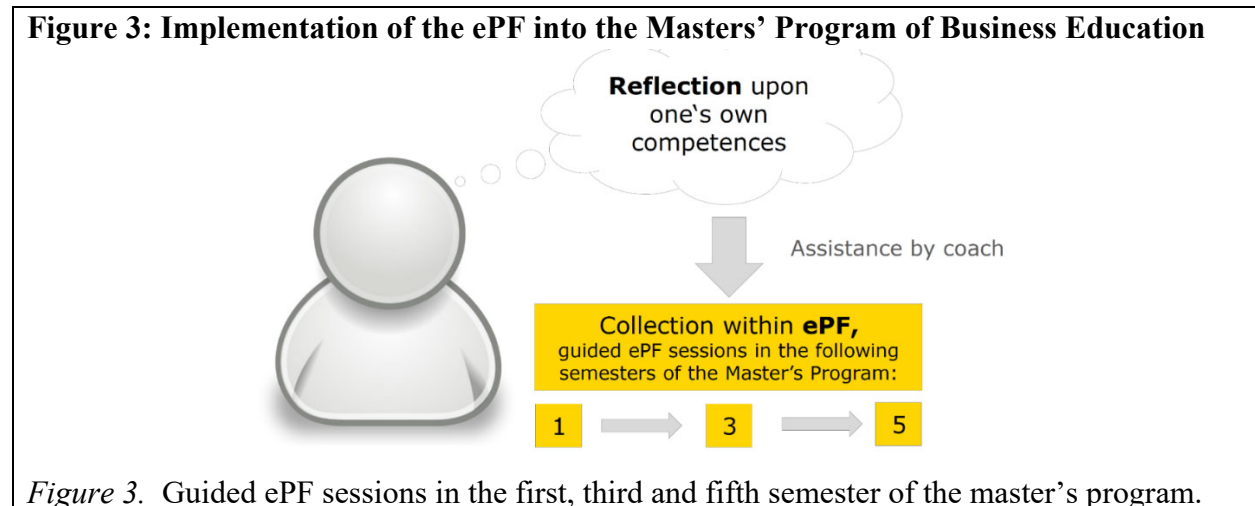


Figure 2. Competence development portfolios as a combination of reflection and development portfolios. Graphic adapted from Baumgartner (2009, p. 33) and Stock, Slepcevic-Zach and Dreisiebner (2019, in Print).

Important factors for conceptualizing a competence development portfolio

The ePF initiative presented closely follows existing guidelines for portfolio implementations (Breault, 2004; Paulson, Paulson, & Meyer, 1991). The ePF is closely embedded into the curriculum of the master's program Business Education and Development and therefore mandatory for all students. Since reflection in the sense of Korthagen (1999) is considered a circular process, it was deemed important for all the students to engage into reflection processes at multiple points of time: Students are required to attend three designated courses in the first, third and fifth semester of their master's program (see figure 3). All three courses consist of an attendance phase, followed by an online phase where students work at their

individual portfolios. During both phases, students receive intensive support by an external coach (Slepcevic-Zach & Stock, 2018). Questionnaires handed out at the beginning and the end of all three courses provide data for the ongoing accompanying research of the ePF-implementation (described in more detail in the methodology-section). After successfully attending the courses and handing in their portfolios, students are granted credit points to value the time and effort behind the reflection processes conducted.



At the beginning of the very first session, the aims of the portfolio are clearly communicated to all students: The portfolio is a tool to enhance students' (self-)reflection. It captures students' self-perception of their own competences, but it does *not* provide a formal assessment of these competences. It is neither a tool to assess the competences of the students nor a tool to assess students' ability to reflect (Dreisiebner et al., 2017; Slepcevic-Zach & Stock, 2018). The portfolio itself is not graded and is not visible for any university teacher, except for a coach from an external institution (Stock & Köppel, 2012). Students have the possibility to make parts of the portfolio invisible to the coach, thus granting them an even greater amount of privacy.

The role of the coach within the first ePF session is to introduce the students to reflection and portfolio work. All sessions are conducted according to the principle *collect – select – reflect – connect* (Barrett, 2005). Students *collect* all competencies they think to have obtained so far (partly in group-work), they *select* their most distinctive ones and *reflect* how they might enhance their competence profile and *connect* their competences on four competence dimensions (professional, methodological, social and self-competence) to gain insight into their "holistic ability to take action" (Stock & Winkelbauer, 2012, p. 50). After the students have finished a first draft of their portfolio, they receive feedback and additional impulses for reflection from their coach.

Digitalizing the reflection process – Bringing the ‘e’ into ePF work

An extensive part of the students’ reflection process is scheduled to take place after the initial attendance phase. Students have the possibility to carry out their reflection processes at a venue and point of time of their choice and document their insights on an electronic platform. One intention behind introducing multimedia tools to the didactical setting is to help to “maintain learner intrinsic motivation to willingly engage in the portfolio process” (Barrett, 2005, p. 16). Within the presented ePF-implementation in the curriculum of the master’s program Business Education and Development at the University of Graz, a custom-made software is utilized: Students are able to work online on their portfolios, while the basic structure of the portfolios is predetermined by the software. In addition, the portfolio might be transferred into a presentation-portfolio, which might be shared online with other persons, e.g. future employers.

However, the core aspect of the ePF work – *students’ reflection* – cannot be digitalized since reflection is solely a process of thought. Nevertheless, the *results* of this reflection process might be very well verbalized and documented digitally. If so, the electronic component of the portfolio work is just a supportive measure to ease the organizational procedure rather than being the sole purpose of the portfolio work. The intention behind utilizing an electronic platform is not to make the students digitally competent (which would require a very different didactical setting), but to gain various other advantages:

(1) The simple design requires students to follow the given structure of the reflection process (e.g. to reflect about all four competence dimensions instead just about their professional competences) and requires them to solely focus on the content of their portfolio instead of design issues. This initial institutional guidance – as proposed by Barrett (2005) – is replaced by full learner ownership regarding content, purpose and development process of the portfolios as soon as the learners have finished the last ePF course.

(2) The ePF work is conceptualized to last over the course of 5 semesters. With a central electronic portal where all data is stored, it is ensured that all students have the possibility to continue the work at their very own portfolio without the risk of data loss. Therefore, students might truly engage into a circular process, where reflection can focus on the actions undertaken since the last ePF session. In this case, the electronic storage works as “convenient central location” (Mandel Glazer, Rooman, & Luberto, 1996, p. 80), which is considered a vital component of every portfolio implementation (electronic or non-electronic).

(3) Since the portfolio is already online (although not publically available), it can be easily transferred into a presentation portfolio and shared with others (e.g. to be added to a letter of application as hyperlink for a future employer).

Motivators and hygiene factors for portfolio work

Previous research regarding the present ePF implementation (Dreisiebner et al., 2017, pp. 39–41; Slepcevic-Zach et al., 2015, pp. 80–81; Slepcevic-Zach & Stock, 2018) suggests that external factors (e.g. job application, obligation) are primary triggering events for students' reflection. This raises the question whether students' motivation to engage into the portfolio work might be linked to side conditions of the ePF implementation.

The *dual-factor theory* by Frederick Herzberg relies on two aspects to explain work motivation: motivators and hygiene factors (Herzberg et al., 1959). Motivators directly refer to the content of the work (e.g. sense of achievement), whereas hygiene factors are of contextual nature (e.g. working conditions). *Motivators* refer to work satisfaction of an individual who might be satisfied or dissatisfied with the work. *Hygiene factors*, however, do not contribute to workplace satisfaction, but solely to dissatisfaction: If the working conditions are bad, the individual is dissatisfied with a negative impact on work motivation being the result. If, in turn, working conditions are well, the individual is just 'not dissatisfied' (but not satisfied either). The dual-factor theory has previously proven to hold for academic motivation instead of workplace motivation (Magoon & James, 1978).

One possible implication for ePF work is that hygiene factors deserve special attention when evaluating the implementation of an ePF. As long as these hygiene factors are fulfilled, they are unrecognized since they do not affect motivation positively. However, as soon as they become unfulfilled, students become dissatisfied with a negative impact on their motivation to reflect being one possible outcome. If the software used would truly act as a hygiene factor, then a well-working software would not be recognized in a positive way by the students. But as soon as the software is not fulfilling students' expectations, this would lead to negative evaluation results and a negative impact on students' motivation.

Research Methodology

Since students' portfolios are only visible to the external coach for the purpose of enhancing the reflection process, these portfolios cannot provide a data source for an insight into students' perception of portfolio work. However, an accompanying study of the PF work gives insight into this matter and reveals which factors might be considered motivators and which factors might be considered hygiene factors.

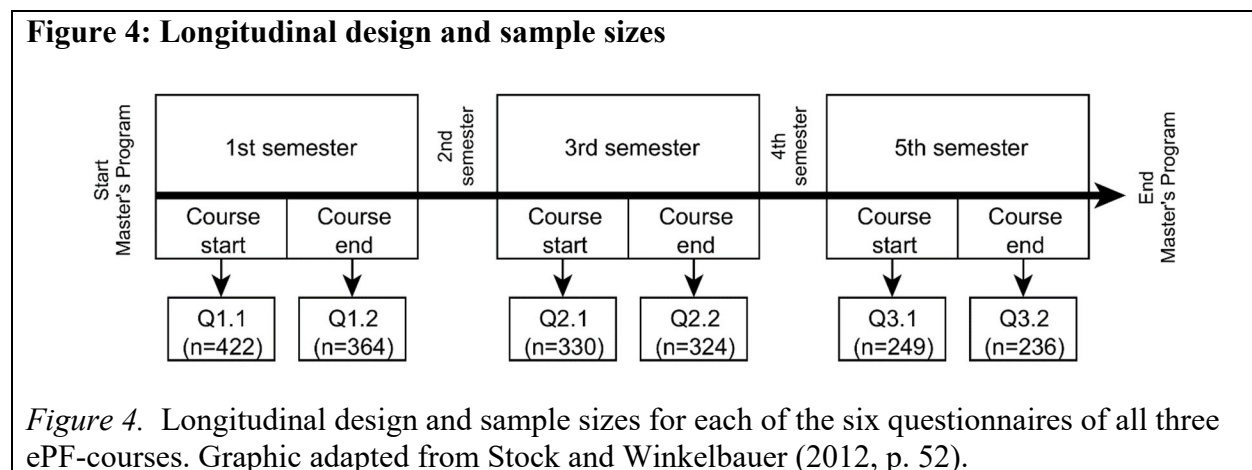
Participants

The current sample exists of 1,925 questionnaires which have been collected from all students studying Business Education and Development at the University of Graz since 2011. The students represent a homogenous sample: Within the first ePF course students are in the first semester of their master's program. All of these students have successfully completed a bachelor's program with a business or economic focus, but they have not yet received any

pedagogical training regarding Business Education and Development (e.g. subject “didactics accounting”). Almost all (85.9 %) of the participants in the first semester have no previous experience regarding portfolio work.

Procedure

At the start and the end of each of the three ePF courses, students are required to fill out questionnaires regarding their competence development, their triggering events for reflection and their evaluation of the implementation process. Figure 4 shows the longitudinal design and the corresponding sample sizes starting with questionnaire Q1.1 at the beginning of the first ePF session in the first semester and ending with questionnaire Q3.2 after the last ePF session in the fifth semester of the master’s program.



Each of the six questionnaires is assigned an individual code by each student, allowing for tracking students’ development from the first to the fifth semester, while still granting anonymity to the individual student. All questionnaires contain quantitative as well as qualitative items. The *quantitative items*, using Likert-scales, target students’ impressions of the implementation process regarding factors like time, feedback or software. The *qualitative items* focus on students’ self-perception of their own competences: students report which competences they see as their most distinctive ones and which competences they could develop following the last ePF session. However, this data allows only an evaluation of students’ self-perception and does not enable a formal assessment of students’ competence development. Since this paper focuses specifically on the evaluation of the *implementation process* (with regard to the role of the software utilized), the reader is referred to prior publications (e.g. Dreisiebner et al., 2017; Slepcevic-Zach et al., 2015) for a more detailed description of the qualitative and quantitative items.

One specific item battery in the questionnaires Q1.2, Q2.2 and Q3.2 (i.e. the questionnaires at the end of each semester) is dedicated to the evaluation of the implementation process. Students are required to indicate how satisfied they were with the following aspects on a scale

from 1 to 5 (with 1 being equal 'very satisfied' and 5 being equal to 'dissatisfied'). In a free-text field students are able to offer additional explanations for their judgement. Specifically, students are able to evaluate the following aspects:

- *(physical and virtual) learning space*: point of time, facilities, software
- *different phases within the ePF course*: information phase, group working phase, creation process (at home), support and feedback
- *didactical setting as a whole*: workload, summative evaluation of the project as a whole

The variable 'point of time' refers to the point of time within the semester the ePF courses take place. In general, this consists of an attendance phase at the beginning of the semester, followed by a reflection phase and a final attendance session towards the end of the semester. The variable 'facilities' refers to the rooms where the attendance sessions were held, 'software' to the online-platform used and 'workload' to the perceived workload by the individual students. The variables 'information phase', 'group working phase', 'creation process' and 'support and feedback' gave the students the possibility to rate the corresponding phases of the ePF implementation. For every variable students were able to provide feedback in the form of a free text field.

A qualitative content analysis (Mayring, 2000) was conducted to gain insight into students' evaluation of the ePF implementation. Analysis was conducted for each cross sectional cohort (all students participating at the questionnaires Q1.2, Q2.2 and Q3.2). Students' free text answers are categorized, with the single categories being the result of an inductive process: Categories are not derived from theory, but directly from the material and are subject of constant revision during the coding process.

Findings

The positive impact of the specific ePF initiative evaluated within this paper is well documented. Specifically, utilizing the ePF as a tool for reflection and self-reflection, has helped the students to gain enhanced awareness of their own competence spectrum (Dreisiebner et al., 2017; Slepcevic-Zach et al., 2015; Stock & Köppel, 2012; Stock & Winkelbauer, 2012) and increased the importance of self-reflective learning (Slepcevic-Zach et al., 2015; Slepcevic-Zach & Stock, 2018). Extrinsic factors were identified as main motivators for students' portfolio work (Dreisiebner et al., 2017; Slepcevic-Zach et al., 2015). However, sustainability of the ePF initiative among graduates is given via the usage of the ePF for job application purposes, even though graduates mostly do not continue working on their ePF (Dreisiebner et al., 2017).

This paper solely focusses on the evaluation of the implementation process. The underlying data originates from the questionnaires Q1.2 (n= 363), Q2.2 (n=321) and Q3.2 (n=236). Mean values of the students' rating on a Likert scale ranging from 1 (very satisfied) to 5 (not satisfied) are shown in Table 1.

Table 1
Evaluation of the implementation process

Mean values	Q1.2 (n = 362)		Q2.2 (n = 321)		Q3.2 (n = 236)	
	M	SD	M	SD	M	SD
Point of time	1.96	(1.05)	1.83	(0.93)	1.96	(1.06)
Facilities	1.77	(1.03)	1.77	(1.02)	1.72	(0.99)
Software	2.24	(1.01)	2.20	(1.04)	2.24	(1.05)
Workload	2.32	(0.95)	2.21	(0.99)	2.50	(1.04)
Information phase	1.46	(0.71)	1.58	(0.79)	1.56	(0.75)
Group working phase	1.75	(0.87)	1.68	(0.83)	1.75	(0.96)
Creation process (at home)	1.92	(0.77)	1.97	(0.82)	1.94	(0.85)
Support and feedback	1.41	(0.76)	1.59	(0.84)	1.49	(0.79)
Overall project	1.80	(0.72)	1.91	(0.82)	1.90	(0.80)

1 = very satisfied, 5 = not satisfied

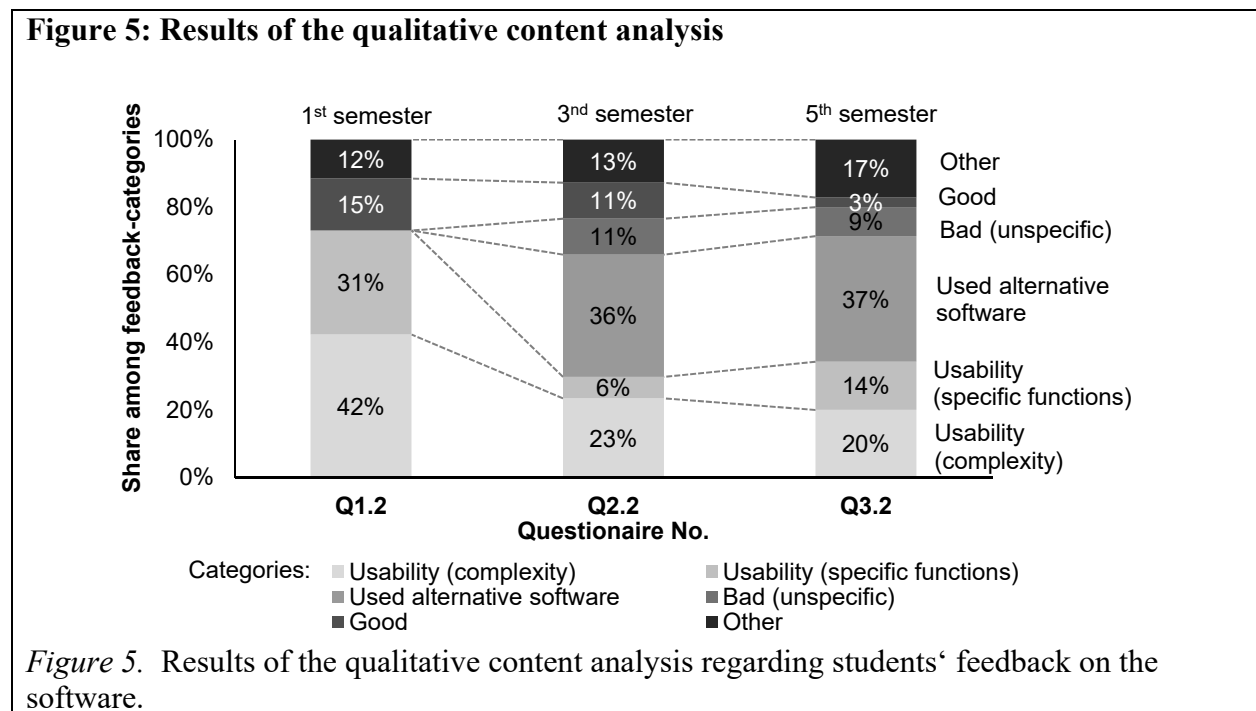
Above all, students value the support and feedback by the external coach. Within all three ePF courses, this is the best-rated aspect of the ePF implementation among the students, along with the information phase at the beginning of each ePF course. Since the dual factor theory suggests that hygiene factors never receive positive feedback but are just recognized if they are unfulfilled, especially items with solely negative verbal feedback are of interest during the analysis of the implementation process. Qualitative content analysis of students' feedback regarding the implementation process reveals that all aspects regarding the *different phases within the ePF course* (information phase, group working phase, creation process, support and feedback) did not receive any kind of negative verbal feedback by multiple students. However, for the following implementation variables numerous students issued negative feedback: *point of time* (negative: incompatibility with own time schedule), *facilities* (negative: room too small) and *workload* (negative: too time intensive).

Although not the core aspect of the ePF work, the *software*, received almost exclusively negative feedback within the questionnaires. Students who were satisfied with the software choose not to give any feedback (but gave feedback to other implementation variables they were satisfied with) and mostly students who were not satisfied choose to answer this item. Regarding students' feedback on the software, the following six categories emerged inductively:

- *Usability (complexity)*. Students reported to be unable to cope with the software's complexity (e.g. "confusing layout", "hard to work with").
- *Usability (specific functions)*. Students denoted the missing of specific functions (e.g. "problems with tables", "few layout options").

- *Used alternative software.* Students reported to have used alternative text-processing software to develop their portfolio.
- *Bad (unspecific).* Students reported that the software did not fit their needs, but did not specify which aspect (e.g. “not good”).
- *Good.* Students reported that the software fitted their needs. In some cases, they referred to a specific aspect (e.g. “easy to handle”).
- *Other.* (e.g. “new layout would be nice”, “layout outdated”, “a little bit special to work with”).

Figure 5 shows the distribution of the six categories of students’ feedback regarding the software from the first to the fifth semester. Within the first semester almost three quarter of the students criticized the usability of the software, either with regard to missing functions or the overall complexity of the system. In the third semester (Q2.2), 32 % of the students giving verbal feedback reported to use an alternative text-processing software to create their portfolios (which they transferred into the online-platform after completion). A similar situation becomes apparent when analyzing the software feedback of fifth semester students.



While other aspects of the implementation received positive as well as negative verbal feedback or exclusively positive feedback, almost all verbal feedback regarding the software was negative. However, students were generally quite satisfied with the software (as indicated in Table 1) and only a fraction of all students chose to give verbal feedback on the single items. Based on the results it can be concluded that the software might act as hygiene factor on students’ motivation: As long as the software satisfies the students’ needs, the students do not report anything (i.e. they do not report that the software was ‘good’). But as soon as there are

problems with the software, students notice them and report them in their evaluation. A negative impact on students' motivation to reflect might be the result – even though a 'good' software might not have a positive effect on students' motivation but might be taken for granted by the individuals.

Conclusion

The aim of the research presented within this paper is to give insight into an ePF initiative carried out for students of a master's program for Business Education and Development. When reviewing students' evaluation of the implementation process, three core aspects become apparent: (1) Students value the support and feedback of the external coach. (2) Motivating students to reflect is a key issue – especially due to the organizational control over content, purpose and process of the portfolio work, motivation seems to be of a rather extrinsic nature. (3) Side conditions of the portfolio work – in this case the software – have to be closely monitored in order to avoid a negative impact on students' motivation.

The coach as key factor in competence development portfolios

Students greatly value all aspects with regard to the external coach, specifically the support and feedback during the creation process as well as the previous information phase in the attendance sessions. However, with the current research design it is not possible to determine whether this effect is due to the course design or due to a good coaching process. The implementation of the portfolio as *electronic* competence development portfolio enhances the role of the coach since it enables the coach to support students' reflection processes independently from time and location. The possibility to interact with the coach directly within one's own portfolio, outside of the attendance sessions, is suspected to be one reason behind the positive evaluation results with regard to the coaches' support and feedback.

Time intensity – The necessity to motivate students

Within the evaluation results, specifically time intensity and workload represented issues for the students, even though the ePF work is embedded in the curriculum and students receive credit points for successfully developing their ePF. Increased learner ownership might be one solution to increase students' motivation to reflect within the given didactical setting. Currently, the *content* of the portfolio is predetermined (students' self-perception of their own competences and their developmental potentials) as well as the *purpose* (enhancing students' ability for self-reflection) and the *process* (timeframe of the designated ePF-courses). Barrett (2005) suggests that with an increased learner ownership over content, purpose and process, a shift from extrinsic to intrinsic motivation can be achieved.

Measures of increasing learner ownership have already been implemented during the early conception phase of the ePF initiative presented: As a first step towards learner ownership of the portfolio, privacy is guaranteed to all students, with only an external coach being able to

access the portfolios. Students are not assessed regarding their self-perception of their own competences. As reported in Table 1, students greatly value the current design of the ePF implementation and/or the work of their ePF coach. In addition, the implementation as *electronic* competence development portfolio increases learner ownership over the *process*, with the students now being able to decide when and how they wish to reflect upon their competences. A positive attitude of students towards the method of ePF is deemed important since this positive attitude towards the method itself is considered to have a strong influence on students' usage intentions (Chen et al., 2012). Therefore, the aims and advantages of the portfolio work are communicated to the students in the first ePF session.

Software as hygiene factor for the implementation of electronic portfolios

Electronic Portfolios might address very different issues: to assist students' learning and reflection processes, to act as basis for students' assessment or to help students to present their collected works to others (Baumgartner, 2009). With the portfolio being a *competence development portfolio* comes a very distinctive objective: The aim is not to make students digitally competent (as suggested by Lin, 2008, p. 45; Oakley et al., 2014), but to ignite processes of (self-)reflection among the students. In this setting, the 'e' within the portfolio just plays the role of a final documentation platform of the reflection processes. Nevertheless, the present results indicate that the software acts as hygiene factor (Herzberg et al., 1959) on student motivation to reflect. Although the software is not the key aspect of the ePF work, the software has to be considered as hygiene factor, which should be examined closely when evaluating the implementation of ePFs.

From these conclusions arises the need for further research, which is subject to a qualitative interview study currently in preparation among the participants of the ePF initiative. Further research is specifically needed to identify which effects can be contributed to the *coach* (e.g. positive effects through feedback and interaction with students during the ePF sessions) and which effects can be contributed to the *course design* (e.g. positive effects through three consecutive courses throughout the master's program). In addition, further research regarding students' triggering events for reflection might be utilized to purposefully create incentives for students to reflect upon their own competences.

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