

Bert Slof<sup>1</sup>, Liina Malva<sup>2</sup>, Michel Berendsen<sup>1</sup>, Geraldine Clarebout<sup>3</sup>, & Marieke van der Schaaf<sup>1</sup>

<sup>1</sup> = Utrecht University, The Netherlands; <sup>2</sup> = University of Tartu, Estonia; <sup>3</sup> Maastricht University, The Netherlands

## Implementing and evaluating a learning analytics enhanced E-portfolio in a Dutch teacher education program

### Abstract

Teacher education programs foster student teachers' professional development at the institute and workplace. Unfortunately combining assessment data and workplace-related circumstances often results in low quality - impersonalized - feedback, which hinders the development. The EU WatchMe project addresses this by enhancing an E-portfolio with a: (1) probabilistic student model monitoring the professional development (2) feedback module providing personalized feedback (JIT module) and (3) visualization module that visualizes the feedback in terms of the personal development over time (VIZ module). An iterative design approach was used to develop the E-portfolio, to implement it in the curriculum, and to evaluate its usability. This contribution focuses on the implementation and evaluation of an E-portfolio enhanced with the student model and JIT module. The E-portfolio was implemented and evaluated in three mentor groups at the department of teacher education Utrecht University. In total 38 student teachers used the E-portfolio during their first internship. At the end of the internship a usability questionnaire was administered to gain more insight into student' perception of the usability (*ease of use*, six items; *usefulness* personalized feedback, eight items) of the E-portfolio. All questions were rated on a 5-point Likert scale ranging from 1 ("fully disagree") to 5 ("fully agree"). The preliminary findings indicate that student teachers had to invest a lot of time and effort to use the E-portfolio (*ease of use*) and mixed findings were obtained for the personalized feedback (*usefulness*). The latter may be due to the shift in the assessment procedure. When students submit all assessment data (incl. context information) at the end of the internship they benefit less from using the E-portfolio than when submitting the data more gradually. Based on the findings and suggestions for improvement the E-portfolio and training sessions will be modified before the next evaluation phase begins.

## Introduction

Providing feedback on student teachers' workplace-related activities could foster their professional development (Darling-Hammond & Richardson, 2009). Unfortunately student teachers often receive low quality - impersonalized - feedback (Ferguson, 2011), which hinders their development (Hattie, 2009). A possible explanation might be that combining assessment data and workplace-related circumstances is difficult for supervisors (Miller & Archer, 2010). The EU WatchMe project addresses this by implementing and evaluating a learning analytics enhanced E-portfolio in a Dutch teacher education program. The project aims at improving workplace-based feedback by enhancing the E-portfolio with a: (1) probabilistic student model monitoring the professional development and (2) feedback module providing personalized feedback (JIT module), and (3) visualization module visualizing the feedback in terms of the personal development over time (VIZ module).

## E-portfolio

An iterative design approach (Badii & Fuschi, 2008) was used to develop the E-portfolio, to implement it in the curriculum, and to evaluate its usability. In *phase 1* a Delphi study was conducted to determine the pedagogical knowledge about learning at the workplace. For Dutch teacher education this resulted in 11 professional activities, 4 performance levels and different kinds of assessment instruments (Van der Schaaf et al., 2015). In *phase 2* the pedagogical knowledge was translated into a probabilistic student model (i.e., statistical model for selecting relevant feedback and predicting future performance) and the JIT and VIZ modules (*phase 3*). In *phase 4* the prototype of the E-portfolio (see Figure 1) was implemented and evaluated in a Dutch teacher education program. Based on the findings the E-portfolio configuration will be modified, and in *phase 5* (August 2016) the usability and its effects on professional development will be evaluated with a larger sample size.

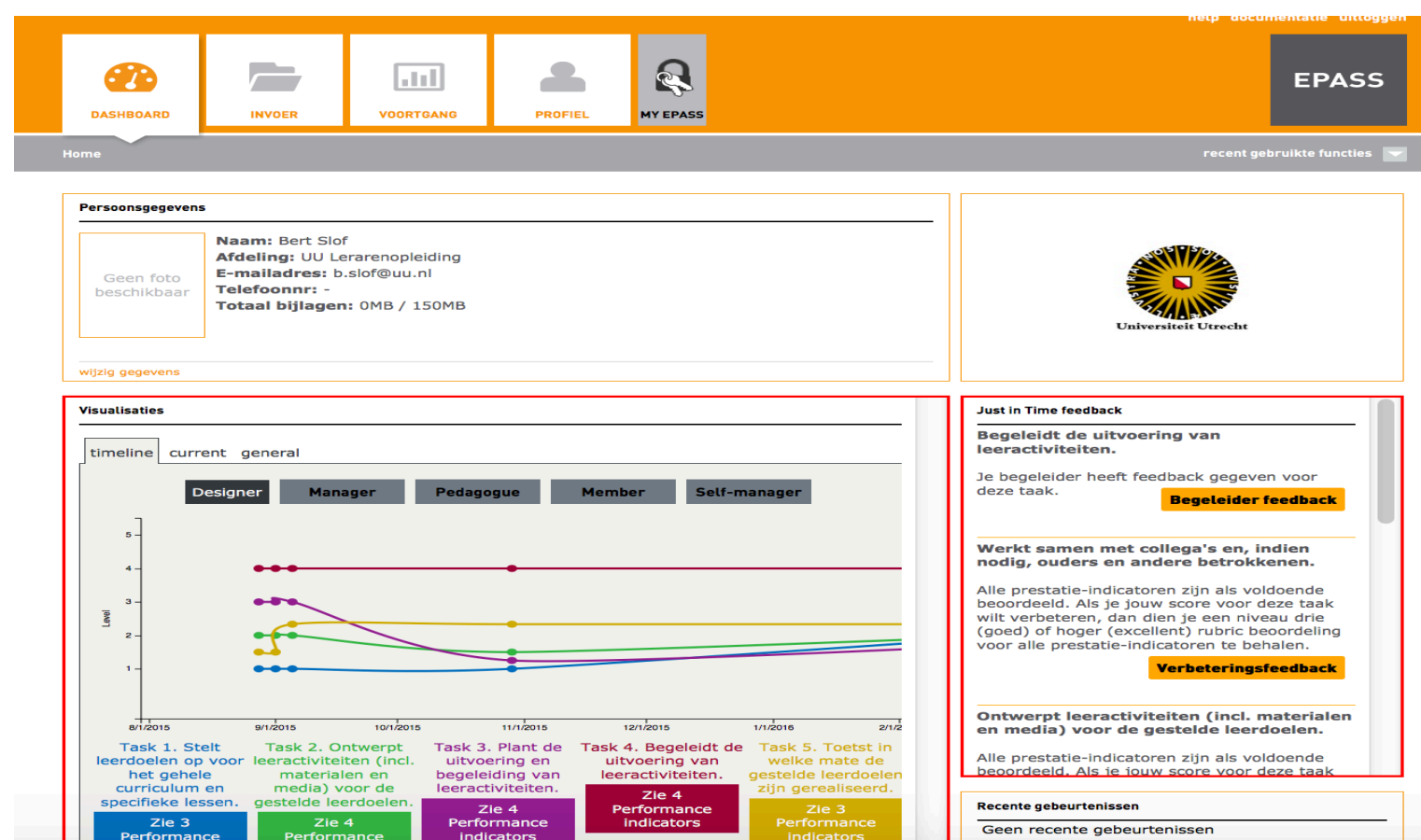


Figure 1. Configuration prototype E-portfolio teacher education

## Aims of this contribution

This contribution focuses on the implementation and evaluation of an E-portfolio enhanced with a probabilistic student model and JIT module. During the presentation a more detailed description will be provided so other teacher educators may gain from the a) pedagogical knowledge and b) tips and tops regarding the implementation of the E-portfolio. In addition the *phase 4* evaluation preliminary results (i.e., a second cohort is still working with the system) will be presented. The remainder of this contribution describes the evaluation of the E-portfolio. The evaluation aimed at determining how student teachers perceived the usability of the a) E-portfolio (i.e., filling in assessment forms etc.) and b) personalized feedback (i.e., concrete suggestions for reaching a higher proficiency level) provided by the JIT module.

## Method

The E-portfolio was implemented and evaluated in three mentor groups at the department of teacher education Utrecht University. In total 38 student teachers used the E-portfolio during their first internship (August 2015-February 2016); they filled in the electronic assessments form (context info and performance scores) and requested their supervisors to validate the forms. The supervisor agreed/disagreed with indicated performance level(s) and provided feedback (tips and tops). After a form was validated the student model generated the personalized feedback (see Figure 1). At the end of the first internship (February 2016) a usability questionnaire was administered, during a mentor group, to gain more insight into student' perception of the usability of the E-portfolio. Based on the work of VenKatesh, Morris, Davis and Davis (2003) the questions focused on the perceived:

- 1) *ease of use* (6 items; Cronbach's Alpha = .74), e.g., use of e-portfolio supports a faster development of my professional activities during my internship,
- 2) *usefulness of the personalized feedback* (8 items; Cronbach's Alpha = .67), e.g., the feedback e-portfolio provides me shows me how I have developed over time.

All questions were rated on a 5-point Likert scale ranging from 1 ("fully disagree") to 5 ("fully agree"). Furthermore, student teachers had the opportunity (open-end question) to add additional comments about the E-portfolio.

## Results

The preliminary findings indicate that the student teachers reported mixed findings for the perceived ease of use (see Figure 2) and perceived usefulness (see Figure 3). Focusing on the *easy of use*, it is, however, clear that the student teachers reported that using the E-portfolio required much tedious work and took a lot of their time. Regarding the effect on their professional development only a few students reported that the E-portfolio supports a qualitative better (seven students) and faster development (nine students) of their professional activities. Focusing on the *usefulness of the personalized feedback*, students perceived the feedback differently and no clear picture emerged. The relative large number "not applicable" scores will be addressed in the discussion section.

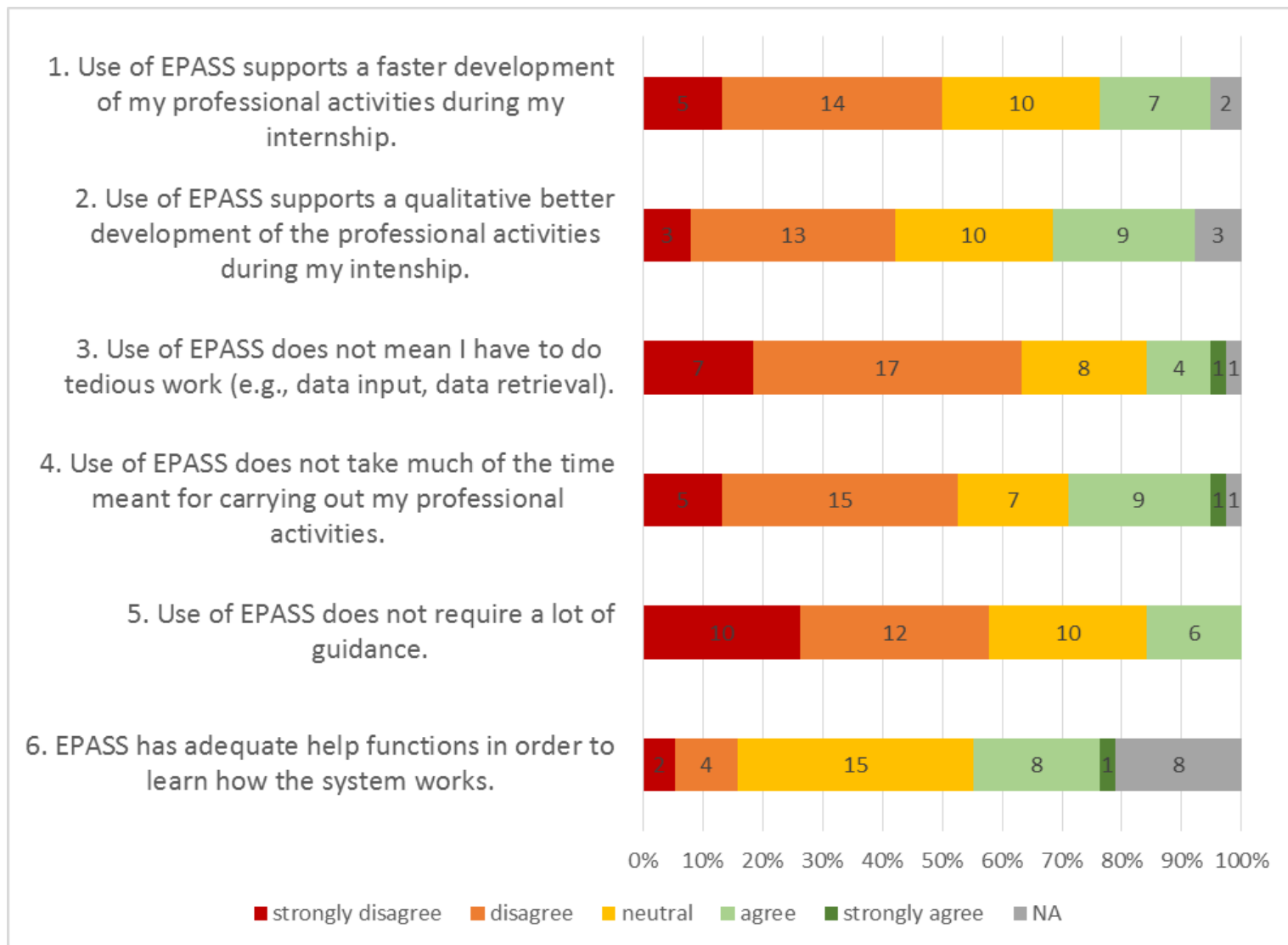


Figure 2. Preliminary results usability E-portfolio

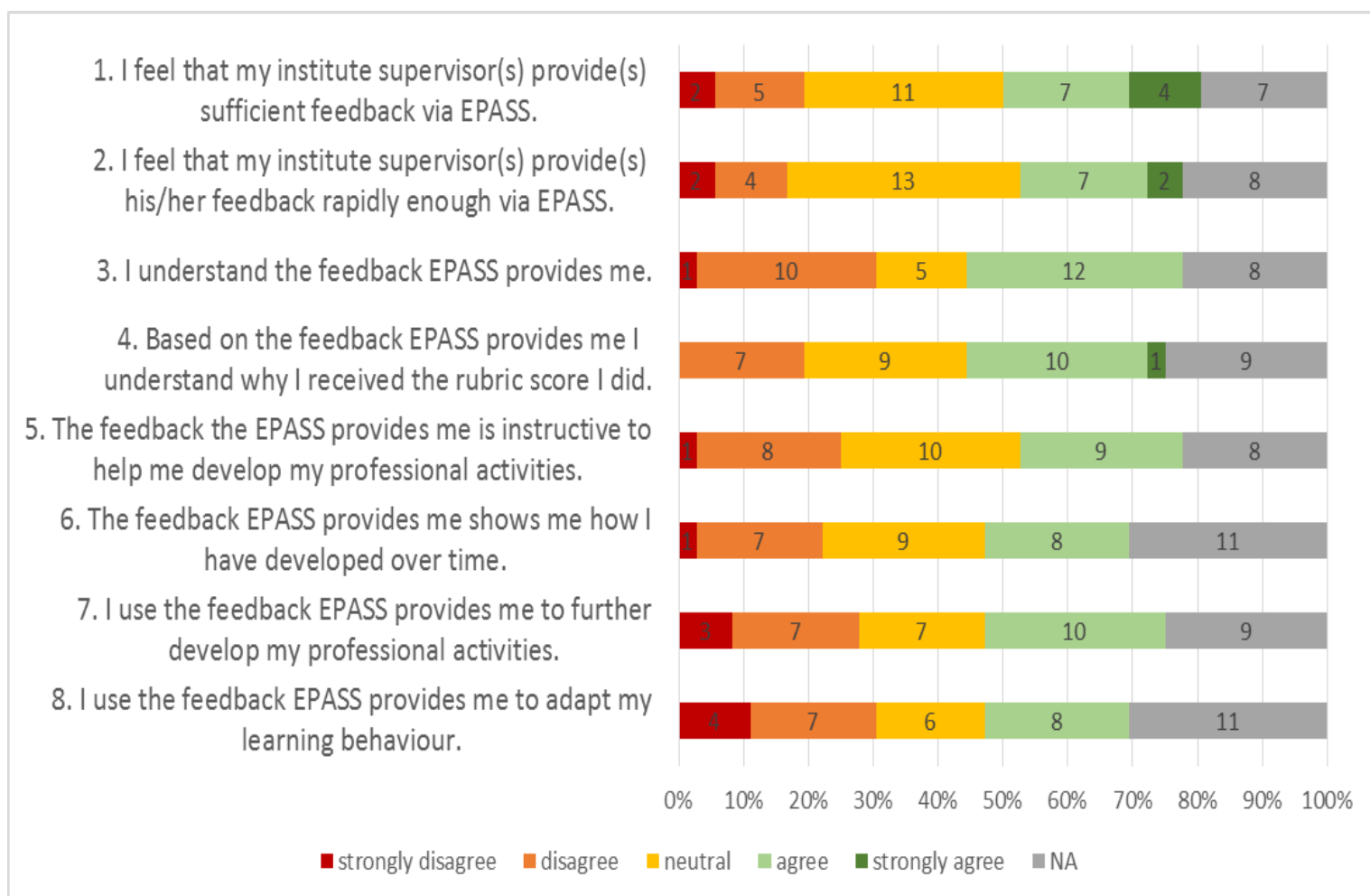


Figure 3. Preliminary results usability personalized feedback (JIT module)

## Discussion

When interpreting the findings, it seems that student teachers had to invest a lot of time and effort to use the E-portfolio. Whereas using new systems may have this effect (Shroff, Deneen, & Ng, 2011), the assessment forms (e.g., automatic fill for school and subject matter context-related information) and training session (e.g., specific assessment forms) will be improved based on the provided suggestions. Unfortunately no clear picture emerged for the perceived usefulness of the personalized feedback. The distribution of the scores and the relative large number “not applicable” scores may indicate that the perceived usefulness relates to how the student teachers used the E-portfolio. The rationale behind the E-portfolio is that students should gradually submit their assessment data (incl. context information) instead of solely submitting the data at the end of their internship. Only then the personalized feedback can be just in time and, thus, foster professional development. This is, however, not what most students in our department are used to do. This shift in the assessment procedure will be discussed with the supervisors and incorporated in the training for the cohort that will participate in the next evaluation phase (phase 5, August 2016).

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