Implementation of E-Portfolio in the First Academic Year at the University of Teacher Education St.Gallen

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***Abstract*—The students of the university of teacher education St.Gallen (PHSG, Switzerland) document aspects of their learning process affiliated with their first experiences in a practical training class during their first academic year linked with an E-Portfolio (Weblog). The first presented study reports findings (n= 129; questionnaire; Man Withney U-Tests; Wilcoxon Signed Rank Tests) concerning the attitude of the students to the E-Portfolio in the domains of precognition, attitude, interests, use, relevance, learning progress, effort and motivation. The second study reveals first findings concerning the implementation of E-Assessment with a first strategic focus on the work schedule of involved professors and process orientated assessment, which assesses the learning process on the E-Portfolio on a weekly basis (n=13; interview; development of an assessment scale).**

***Index Terms*—E-Portfolio, E-Assessment, University of teacher education .**

I. INTRODUCTION

The students of the university of teacher education St.Gallen (PHSG, Switzerland) document aspects of their learning process (course *Professional and Study Skills*) affiliated with their first experiences in a practical training class during their first academic year linked with an E-Portfolio (Weblog) or on paper (traditional Portfolio). Connected with the comparison between the E-Portfolio group and the Paper-group regarding precognition, general attitude, interests, use, relevance, learning progress efforts and motivation relied on the E-Portfolio or Portfolio on paper (study 1), first experiences have been made with E-Assessment of E-Portfolios (study 2).

II. THEORETICAL FRAMEWORK

In comparison with a traditional Portfolio, which basically consists of the collection of papers or documents of an assessed learning process, an E-Portfolio contains a broad *digital* collection of personal artefacts, controlled by the owner, documenting self organised learning processes and/or learning products as well as the description of the development of professional competences over a certain period of time in relation to a predefined aim (Hornung-Prähauser, Geser, Hilzenhauser & Schaffert, 2007). Regarding the assessment of an E-Portfolio, Hornung-Prähauser et al. (2007) sum up all methods, combining the feed-back and the assessment concerning a documented learning process and the achieved competences. Thereby, the authors define E-Portfolios on the one hand as an instrument for learning and development processes and on the other hand as instruments for alternative assessment procedures. Concerning a mature E-Portfolio, Challis (2005) proposes a checklist of five categories, which offers a theoretical reference system for assessing E-Portfolios (selection of material; level of reflection; content, use of multimedia, design, navigation).

For the implementation of an E-Portfolio on the technical level, there is a general choice between web.2.0-tools (Weblogs; Wikis) and specific E-Portfolio software (commercial and open source software; learning management systems, content management systems, integrated systems).
The overriding importance of the implementation of E-Portfolios on the level of high schools has to be situated in an enlarged culture of learning processes, which for instance does not only contain assessed term papers at the end of a semester, but although study works, which show the construction and assessment of knowledge and competences over a certain period of time in the course of studies (Baumgartner, 2004).

III. RESEARCH QUESTIONS

The aim of the first study was to explore the attitude of the students to the E-Portfolio on a Weblog in the domains of precognition, attitude, interests, use, relevance, learning progress, efforts and motivation in comparison to the students, who worked with a traditional Portfolio on paper. On the basis of the results in both samples, students of the E-Portfolio-group were expected to show significantly higher ratings concerning the variables attitude, interest, use, relevance, learning progress, effort and motivation.

The aim of the second study was concentrated on the implementation of E-Assessment with a first strategic focus on the work schedule of the professors involved and a second strategic focus on the development of process orientated criteria, which assess the learning process on the E-Portfolio. Based on reported work schedule of the participating professors, an increase of working hours was expected when assessing E-Portfolios on a weekly basis. Based on the self-developed assessment scale for E-Portfolio, first explorative information concerning the practicability of the scale was expected.

IV. MATERIALS AND METHODS

A. *Participants*

For the first study, the sample comprised 129 students in the first academic year at the university of teacher education St.Gallen (PHSG; Switzerland). The average age was 21 years. 116 students were female (90%), 13 students were male (10%). All students started their studies in the fall semester of 06/07. 74 students worked with an E-Portfolio (Weblog), 55 students worked with paper (traditional Portfolio). For the second study, 53 E-Portfolios (Weblog) were assessed weekly by 4 professors. Traditional Portfolios on paper were assessed at the end of the course by 10 professors.

B. *Procedure*

All students of the first academic year filled out questionnaires at the beginning and at the end of the fall semester (t_1:week 43/06; t_2:week 03/07; 7 learning groups; study 1) during the course *Professional and Study Skills.* The students of five learning groups and their ten professors were then introduced to work with the E-Portfolio on a Weblog (week 43-44/06). Out of these ten professors, four professors started working with process orientated E-Assessment weekly (week 45/06; two leanrning groups; study 2). The E-Assessment ended after the students had accomplished their first training in a practical class after the end of the semester (week 10/07). The students were informed about their scores twice during the research period (hand-over of individual printscreen) and after the training in the practical class. Furthermore, the students were shown a total sum of all reached points in the learning group during the first four weeks together with two excellent posts (cognitive modeling; w46-49). The cycle of the E-Assessment study with two learning groups is shown in table 1:

TABLE I.
CYCLE E-ASSESSMENT FS 06/07, UNIVERSITY OF TEACHER EDUCATION ST.GALLEN (PHSG; SWITZERLAND)

week	**E-Assessment/ Instruction**	**Feedback to students**
43-44	instruction E-Portfolio	
45	start E-Assessment	
46-51	**w46-w49:** cognitive modeling / 2 excellent posts E-Assessment	**w46-48/ 50-51:** total sum of all reached points in the learning group **w49:** hand-over of individual printscreen 01
52	holidays	
01-03	E-Assessment	**w01-02:** total sum of all reached points in the learning group **w03:** hand-over of individual printscreen 02
04-05	interdisciplinary week (all students of the university); holidays	
06-10	E-Assessment	**w6-w10:** training in a practical class; no feedback
16	handing over certificate E-Portfolio (2 ECTS)	

Six professors and their three learning groups chose to work on E-Portfolios or Portfolio on paper with product orientated assessment at the end of the semester. The working schedule of all participating professors was recorded (week 45/06 to week 10/07). Information about the practicability of the developed assessment scale was gathered by mail questioning (week 10/07). Four professors (two learning groups) chose not to participate in study 1 nor in study 2.

C. *Instruments*

1) *Technical Instruments*

All participants of the E-Portfolio group worked with a Weblog, provided by the firm Kaywa AG (http://www.kaywa.ch). This Weblog can be used by internet, mobile, phone or PDA. Each post can be published (admin view) or can be kept in a password protected area (private view), which allows the owner to control his E-Portfolio. So, each student can choose at any moment whether they want to compose public or private posts, whereas the access to private posts can be offered to invited guests at any time.

With the help of an aggregator, the last feeds of E-Portfolios have been gathered on a portal (http://www.eportfolio-phsg.ch), which allows interested readers an efficient overview on activities around the Weblogs. All costs involved have been paid by the university of teacher education St.Gallen (PHSG; Switzerland).

2) *E-Portfolio at the department of professional and study skills (PHSG, Switzerland)*

According to Hornung-Prähauser et al. (2007), an E-Portfolio includes a broad digital collection of personal artefacts controlled by the owner, documenting self-organised learning processes and/or learning products as well as the description of the development of professional competences over a certain period of time in relation to a predefined aim. In association to the aim of an E-Portfolio, participating students were told to document their learning processes and reflections in relation to the contents of the course *Professional and Study Skills* (30 minutes by teaching section). The posts should be associated to the categories *my learning, my motivation to be a teacher*, *the teaching profession* and *my social and personal skills.* With these four categories, the course *Professional and Study Skills* strives for a reflection of relevant topics in the beginning phase of teacher education in addition to three other learning fields in the course (my professional and study skills; my learning group; my learning in a practical class). In order to ensure a professional monitoring, each learning group is taught by two professors.

3) *Questionnaire (study 1)*

The questionnaire measuring precognition (1 item), attitude (2 items), interest (2 items), use (2 items), relevance (2 items), learning progress (2 items), effort (2 items) and motivation (1 item) of the students while working with an E-Portfolio or a Portfolio on paper was partially made following the VBVOR (Fragebogen zur studentischen Evaluation von Hochschulveranstaltungen; Diehl, 1998; Likert scale 1-5). Means of pre- and post-tests of the E-Portfolio and the Portfolio paper group were

compared within and between the two groups (t_1: week 43/06; t_2: week 03/07).

4) Work schedule of the professors (study 2)

The professors who worked with E-Assessment recorded weekly work hours while reading and assessing the E-Portfolios (process orientated assessment; week 45/06 to week 10/07). Each professor assessed 12 to 14 E-Portfolios (weekly, 1 post). The other professors reported the number of work hours when assessing the E-Portfolios or Portfolios on paper at the end of the period of investigation (product-orientated assessment, week 10/07).

5) E-Portfolio: Assessment scale (study 2)

According to the main contents of the course *Professional and Study Skills* and partially associated to the five categories of Challis (2005) a first assessment scale was developed by the four participant professors (table 2):

TABLE II.
CRITERIA E-ASSESSMENT FS 06/07 (1. VERSION)

Criterion	points
Language correctness (linguistical, ortography)	1
Contents relevance/ coherence sententiousness relation to theoretical contents of the course/texts graphics in accord to E-portfolios purpose relevant to the teaching profession incorporates and is responsive to feedback of others	7
linking up gives feedback to others/ is hyperlinked	2
Total	**10**

In order to reach the learning target, 70% of all possible points had to be obtained during the investigation period (119/170 points). The individual scores were handed over to each student twice during the semester (individual printscreen; table 3):

TABLE III.
INDIVIDUAL PRINTSCREEN E-ASSESSMENT FS 06/07

Professional and study skills (BSK1, FS06/07)				
Assessment *E-Portfolio*	11.10.06-10.03.07			
name: Petra				
week	**language**	**contents**	**linking up**	**total**
w44	1	3	1	***5***
w45	0	4	1	***5***
w46	1	7	2	***10***
w47	0	7	2	***9***
w48	1	7	1	***9***
w49	1	7	1	***9***
w50	1	7	2	***10***
w51	1	7	0	***8***
w01	1	7	1	***9***
w02	0	7	1	***8***
w03	1	6	1	***8***
w04	1	6	0	***7***
w06	1	7	2	***10***
w07	1	5	1	***7***
w08	0	6	1	***7***
w09	1	6	1	***8***
w10	1	6	1	***8***
total	12	98	17	**137/170**

V. RESULTS

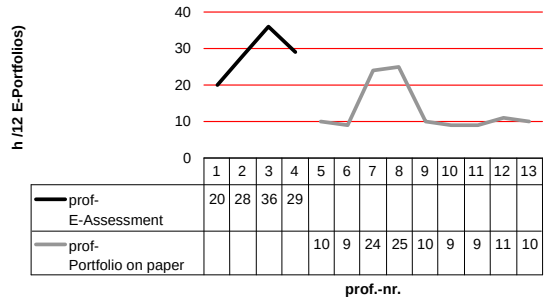
The reported ratings of the students to the E-Portfolio (E-Assessment) or the Portfolio on paper (traditional assessment) were compared with Man Withney U-Test (intergroups; t_1, t_2) and with Wilcoxon Signed Rank Tests (intragroups, t_1-t_2) and show the following results (table 4, study 1):

TABLE IV.
SUMMARY RESULTS COMPARISON E-PORTFOLIO GROUP AND PORTFOLIO ON PAPER GROUP FS 06/07

	n t1	M t1 (SD)	p (Z)	n t2	M t2 (SD)	p (Z)	p t1-t2 (Z)
precognition							
Portfolio on paper	71	1.60 (.86)					
E-Portfolio	53	1.48 (1.07)	.05 (-1.976)				
attitude							
Portfolio on paper	72	3.70 (.63)		67	3.02 (.90)		.00 (-3.897)
E-Portfolio	53	3.56 (.66)	.33 (-.978)	47	3.50 (.67)	**.00** (-2.822)	.71 (-.372)
interest							
Portfolio on paper	72	4.02 (.64)		67	2.74 (.88)		.00 (-5.228)
E-Portfolio	53	3.83 (.70)	.12 (-1.550)	47	3.21 (.77)	**.00** (-2.753)	.00 (-5.082)
use							
Portfolio on paper	71	3.75 (.68)		67	2.91 (.90)		.00 (-4.408)
E-Portfolio	53	3.58 (.56)	.12 (-1.555)	47	3.15 (.70)	.16 (-1.410)	.00 (-3.671)
relevance							
Portfolio on paper	72	3.64 (.64)		67	3.13 (.90)		.00 (-3.392)
E-Portfolio	53	3.51 (.73)	.40 (-.848)	47	3.14 (.63)	.93 (-.085)	.00 (-3.217)
learning progress							
Portfolio on paper	72	3.74 (.62)		67	2.86 (.85)		.00 (-5.078)
E-Portfolio	53	3.59 (.59)	.31 (-1.018)	47	3.36 (.61)	**.00** (-2.961)	.04 (-2.034)
effort							
Portfolio on paper	72	3.63 (.67)		67	2.84 (.66)		.00 (-1.88)
E-Portfolio	53	3.61 (.70)	.96 (-.057)	47	3.31 (.62)	**.00** (-3.448)	.04 (-4.714)
motivation							
Portfolio on paper	45			45	2.49 (.843)	**.00** (-3.329)	
E-Portfolio	67			67	3.10 (.971)		

Based on the reported work schedule of the participating professors in study 2, an increased number of working hours was found for the professors, who assessed E-Portfolios ($M_{prof.process}$=28.25; $M_{prof.product}$=13; table 5):

TABLE V.
WORK HOURS OF PROFESSORS E-ASSESSMENT FS 06/07



Regarding the self-developed E-Assessment scale for E-Portfolio, first feedbacks of the participating professors and students indicated five weak points of the scale. Firstly, the scale of 7 points for the criterion *contents* was chosen too low. Improved performances could not be appreciated. Secondly, the criterion *incorporates and is responsive to feedback of others* caused internal agreements to post comments in order to get a point, without real involvement of the students. Thirdly, the cognitive modeling instructions promoted the perception of social concurrence between the students. Fourthly, the criterion *is hyperlinked* gave no evidence to the assessing professors which reference system (website, weblog) should be assessed nor whether the quality of the linked site should be assessed as well. Finally, the E-Assessment scale could not really assess the experiences that were described in the training with the practical classes.

VI. DISCUSSION

The two present studies promoted the technical implementation of E-Portfolio activities at the university of teacher education St.Gallen (PHSG; Switzerland) and the implementation, testing and investigation concerning selected research questions. In cooperation with the firm Kaywa AG, the technical implementation has been successfully built up during the last two years (Weblog; portal).

All students of the first academic year of the department of *Professional and Study Skills* participated in questionnaires concerning their precognition, attitude, interest, use, relevance, learning progress, effort and motivation at the beginning and at the end of the fall semester of 06/07. Data show significantly higher, positive ratings of attitude of the students who worked with E-assessed E-Portfolios (E-Assessment) in comparison to students who worked with Portfolios on paper (product assessment). Data show as well significantly higher positive ratings of interest for the E-Portfolio students, although the comparison of intragroups points at a significant reduction of interest within both groups. The reduction within the comparison of intragroups can be explained by the adjustment of high interest at the beginning of the first academic year towards a pragmatic level of interest in order to cope with normal study requirements. Both groups do not vary concerning the rating of the use and the relevance of an E-Portfolio to the future profession of being a teacher, the rated average is situated in the middle of the Likert scale (1-5). Data show significantly higher and positive ratings of the E-Portfolio students concerning the learning progress and efforts made while working with process assessed E-Portfolios. A strong point of study 1 is the fact that students of the Portfolio paper group report significantly lower ratings at the end of the investigation period concerning learning progress and effort. This might highlight the fact that students clearly appreciate working with E-assessed E-Portfolios. Ratings of the motivation also show strong empirical evidence in favor to the E-assessed E-Portfolio group. On the basis of study 1, the conclusion is that the implementation of E-portfolio at the university of teacher education St.Gallen (PHSG, Switzerland) can and must be continued, particularly because working with E-Portfolios is supported by the clearly positive attitude of the participating students.

Study 2 focussed on the implementation of process orientated E-Assessment with a first strategic focus on the work schedule of participating professors and the development of an assessment scale. On the basis of the present study, clear additional work was found if E-Portfolios are assessed weekly. This fact underlines the statements of Schiefner (2007), who puts the necessary working hours for process orientated E-Assessment on the same level as the assessment of term papers or final year projects. Whether higher work schedule of professors are related only to the introduction phase of E-Assessment has to be found out during further investigation. The work with the self developed assessment scale points out the necessity of clear improvements, which have to be realized in connection to the following proceedings.

The interpretation of the findings of study 1 and study 2 show encouraging results. Future applied research in the area of E-Portfolio implementation at the university of teacher education St.Gallen (PHSG; Switzerland) in the next years will firstly have to focus on the integration of more participating professors (relying on incentive concept and further instruction; institutional level), secondly on the integration of the findings concerning the use of the developed E-Assessment scale (didactic level), thirdly on the development of technical structures on the technical level and finally on further development towards the integration of project orientated, empirical and competence orientated E-Portfolios on the portal of the university (institutional and technical level).

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