University students' perceptions of e-portfolios and rubrics as combined assessment tools in education courses

Abstract

This paper presents a study with a two-fold research aim: 1) to ascertain university students' perceptions on two combined assessment tools (e-portfolios and formative rubrics); and 2) to identify if among students there were differing perceptions on the use of e-portfolios, and what factors favoured acceptance of these. The data gathering method was a questionnaire administered to 247 students on the Education Degree at the University of Barcelona. Regarding our first aim, it was confirmed that although the portfolio and rubrics were used in combination, students viewed each of them independently. Regarding the second aim, we identified four groups and a range of factors that may explain the varying perceptions of the portfolios and rubrics. Favourable factors were, in first place, greater teacher experience in using the digital

portfolios; second, continuous technical support for their use; third, their having greater weight in assessment; and fourth, smaller class sizes.

1. Introduction

1.1. Using e-portfolios in assessment

With the spread of ICTs in higher education the use of the digital portfolio or e-portfolio as an assessment (Love, McKean, & Gathercoal, 2004; Stefani, Mason, & Pegler, 2007; Zubizarreta, 2009) and as an authentic evaluation tool has become common (Meyer, 1992; Mueller, 2014; Rennert-Ariev & College, 2005; Sabirón & Arraiz, 2013).

Many authors and studies (oriented towards both the institutional and teaching points of view, and including those investigating students' perceptions) concur that e-portfolios have considerable advantages for students in developing transferable skills; mainly reflection, critical thinking, learner autonomy, professional development, and the ability to organize and self-regulate the learning process (Cambridge, 2010; Heinrich, Bhattacharya, & Rayudu, 2007; Lopez-Fernandez & Rodriguez-Illera, 2009; Rodrigues, 2013; Rubio & Galván, 2013; Sánchez Santamaría, 2012; Zubizarreta, 2009). Also worth noting are the development of digital competences and collaborative competences, such as peer feedback in the use of net portfolios or shared portfolios (Barberà & Martín, 2009; Brandes & Boskic, 2008; van Aalst & Chan, 2007). Further, e-portfolios can boost motivation in learning (Bolliger & Shepherd, 2010; Hinett, 2002)

and greatly facilitate the acquisition, assimilation and accumulation of knowledge (Chang, Liang, Tseng, & Tseng, 2014).

But the benefits of e-portfolios are not without controversy, especially from the students' point of view, and this can cause problems in their implementation (Tzeng, 2011), due to the workload involved, the cost-benefit ratio in terms of learning (Oblender, 2002; Roblyer, Davis, Mills, Marshall, & Pape, 2008), and other factors. Barberà (2005) found that that it was not easy for students to accept an e-portfolio culture at the outset since it requires time to set in place, both for the portfolios themselves and for the digital platform. Since their use is sporadic rather than continuous across various years, this may also influence not only their long-term effects, but also students' perceptions on them (Salomon, Perkins, & Globerson, 1992; Wetzel & Strudler, 2006). The perception of usefulness and ease of use has been shown to be influential in acceptance in a study by Chen, Mou-te Chang, Chen, Huang, & Chen (2012) based on the TAM model (Technology Acceptance Model). Students' previously acquired skills in using tools needed for the e-portfolio (writing abilities, organizing and representing ideas and analyses) seems also to have an effect, according to Wray (2007), on their acceptance of them. Also formative and technical back-up are key elements in the portfolio's success; and the importance of the teacher's role in its design and technical problem-solving has also been underlined (Delandshere & Arens, 2003; Tosh, Light, Fleming, & Haywood, 2005). The use of e-portfolios for individual-work and group-work portfolios in multi-collaborative environments requires different methodological strategies (Parada G., Pardo, & Delgado-Kloos, 2011; Romero-Cerezo, 2008), different settings work spaces structure

(Parada G. et al., 2011) and produces different effects on students (Al-Qadi & Smadi, 2014). On the other hand there appear to be no appreciable differences between more or less technologically competent subjects (Shepherd & Bolliger, 2011); IT skills help, but they are not decisive in the success of e-portfolio.

1.2. The use of rubrics in assessment

Similarly to e-portfolios, the use of rubrics as an assessment (Hafner & Hafner, 2003; Mertler, 2001; Moskal & Leydens, 2000; Raposo & Martínez, 2011; Tierney & Simon, 2004) and formative evaluation tool, oriented towards learning and the acquisition of competences (Andrade, Du, & Mycek, 2010; Cebrián, 2008; Fallas, 2005; Kan, 2007; Martínez-Figueira, Tellado-González, & Raposo-Rivas, 2013; Torres & Perera, 2010), is spreading in universities, along with learning-centred teaching models, largely promoted by the European Higher Education Area.

Many authors discuss the positive views that teachers and students have on the use of rubrics in a range of contexts and disciplines (Jonsson, 2014), while to a lesser extent there are studies showing a connection between rubrics and higher performance (Andrade et al., 2010; Andrade & Du, 2005; Kocakülah, 2010; Popham, 1997).

Panadero and Jonsson (2013), in a review of studies on the use of rubrics in formative assessment, discuss ways in which these can help improve students' performance: increasing transparency in assessment criteria, reducing anxiety, aiding the feedback process, improving self-efficacy, and supporting self-regulation through the revision of assignments before delivery (Steffens & Underwood, 2008). In the same line other studies also indicate the advantages of rubrics in promoting consistency in students'

progress (Andrade & Du, 2005; Cebrián, 2007; Jonsson & Svingby, 2007; Powell, 2001; Schneider, 2006) and in developing competences (Stevens & Levi, 2005; Torres & Perera, 2010).

From the teachers' point of view, rubrics promote the development of reflective practice, provide them with more information on its effectiveness, help them to offer better quality feedback to their students, serve as a support for students in assessing their own work, and boost students' engagement in tasks (Jonsson & Svingby, 2007; Schamber & Mahoney, 2006).

However, resistance from teachers to the use of rubrics has also been found (García-Ros, 2011; Reddy & Andrade, 2010), as well as doubts about their utility on the part of students. Thus various studies affirm that students may perceive rubrics more as a tool for satisfying their teachers than as a representation of standards and quality criteria to take into account in their work (Andrade & Du, 2005), or that students can doubt their usefulness for self-assessment and better interpretation of feedback (Baron & Keller, 2003). Therefore, the institutional efficacy of rubrics may be seriously affected if, for example, students think that they do not include the key criteria for carrying out a task, that they are not useful for improving the outcomes of their work, or that they do not enable them to assess the quality of their work properly. Other studies confirm the importance of involving students in developing rubrics in order to ease their comprehension and application (García-Ros, 2011; Huba & Freed, 2000; Stix, 1997; Taggart, Phifer, Nixon, & Wood, 2001).

1.3. Aims

Up to now there has been a plentiful literature on the technological, institutional and didactic conditioning factors for the use and adoption of the e-portfolio among students, but the varying typology of university students, resulting in the use of portfolios not being "universally valid", has not been studied. Nor is the rubric a tool fully accepted among students. For these reasons, the aims of this study were:

In the first place, to determine students' perceptions on two combined assessment strategies: a system of e-portfolios and formative rubrics.

Secondly, to identify whether there exist among students different ways of seeing the use of the e-portfolios and rubrics, and what factors favoured the acceptance of the tools.

2. METHOD

2.1. Design

The study was carried out using a quantitative, descriptive and retrospective survey (Torrado Fonseca, 2004).

The procedure followed was to choose a group of modules from the Education Degree at the University of Barcelona on which the e-portfolio and the rubric for formative assessment were used during the second trimester of the 2012-13 academic year. In all of the selected modules, part of the e-portfolio consisted of answering some questions

in order to explain how students chose the topic or subject of an essay, and they knew that this decision-making process was going to be assessed with a detailed rubric (see the example rubric in Table 1 used to assess the task in Figure 1).

All the teachers of the chosen groups had received training in the use of these tools, and at the beginning of their courses all the students participating also received specific formative in the digital platform used for the digital portfolio at the University of Barcelona, Digital Folder (Rubio & Galván, 2013). According to module requirements or their personal interest, students completed an individual-work portfolio, or a group-work portfolio, or both, individual and group-work portfolios.

Table 1. Rubric for assessing decision-making competences

Criterion	Level 0	Level 1	Level 2	Level 3
Process of making decisions on the module and theoretical framework: information	Has no information and does not seek it	Wrongly assumes that s/he has information and therefore does not seek it	Does not have information but seeks it inappropriately	Has information, or if not, seeks it appropriately
Process of making decisions on the module: comparing options	There is no comparison of options	Largely inappropriate criteria for comparing options are used	Some valid criteria for comparing options are used	Arrange of valid criteria for comparing options is used
Decision-making process: making choices	Options are chosen without reasoning	Reasoning for selection is inappropriate	Reasoning for selection is appropriate	Reasoning for selection is appropriate and well-argued

Questions for students:
On choosing a subject
Information
• Do you believe that you have enough information to choose the right subject?
• If you didn't have it, where did you go to look for the necessary information?
Weighing up options
• What options did you have in choosing the subject?
• Did you compare different options, weighing up the pros and cons of each?
• Why did you rule out the other subjects? (subject insufficiently instructive, inaccessible sample, not very motivating, insufficient knowledge, other reasons)
On choosing sources of documentation
Information
• Do you think you had enough information to choose the best sources?
• If you didn't have it, where did you go to look for the information you needed?
Evaluating options
• What sources did you consult? Which did you choose?
• Did you compare the various options, weighing up the pros and cons of each?
• Why did you rule out the other sources? (unknown author, offering information of little relevance, subject of the source not directly related to yours, others)

Figure 1. Task on students' decision-making process

The tool used for gathering data was a purpose-designed 43-item questionnaire probing the perceptions of students on the use of the digital portfolio and assessment using rubrics. It was administered in June of the 2012-13 academic year, face-to-face in the classroom (guaranteeing the confidentiality of individual replies), to the following groups:

- four groups on the "Theory and Practice of Educational Research" module (TPER) (two in the morning and two in the afternoon),

- two groups on the "IT Applied to Educational Research" module (ITAER) (one in the morning and one in the afternoon), and

- one morning group on the "Tools and Strategies for Information Gathering" module (TSIG).

To address the aims of this study we consider here the following parts of the questionnaire: a set of questions characterizing the sample, and two scales: 1)

students' evaluation of the use of e-portfolio s, divided into two subdimensions (motivation and reflection on learning) with six and nine items respectively, and 2) students' evaluation of assessment using rubrics (three items). The scalar items featured scores from one to six (from 'completely disagree' to 'completely agree'). The reliability study (Cronbach, 1951) showed an internal consistency of 0.96 and 0.95 respectively for the scales of each dimension (according to Nunnally (1978), values greater than 0.7 are acceptable as research instruments).

2.2. Participants

The sample consisted of 247 students: 66% from TPER, 26% from TSIG, and 8% from ITAER. The majority were women (82.7 %), and the average age was 21. 79.3% also took part in non-academic activities, to which they devoted a weekly average of 12.3 hours. 66.8% already had experience of paper portfolios, 17.8% were aware of the University of Barcelona portfolio (Digital Folder), and 22.7% had used other portfolios. 62% of the students considered the tool to be complex, which broadly coincided with the percentage of students who had no previous experience of either digital or paper portfolios; and even some who had already used them deemed insufficient their initial training in using the platform (74. 2%).

Regarding the modules chosen for the study, each had its own particular characteristics. On the optional module (ITAER), the group size was smaller, numbering forty students, while the other modules featured groups averaging sixty. The ITAER module teacher had previous experience in digital portfolios, unlike the other modules; and all modules had continual technical support for using the platform.

Finally, in TSIG the assessment weighting of the portfolios was 30%, in TPER it was 55%, and in ITAER 100%.

2.3. Data analysis

For the first aim of the study, we used a descriptive statistical analysis of the results, reporting the normal indices of frequency, position and dispersion.

For the second aim, we used a twostep cluster analysis, which enabled us to automatically choose the optimum number of clusters (Bacher, Wenzig, & Vogler, 2004). Since all the variables in the procedure were continuous, the result of the two-stage cluster analysis, once the optimum number of clusters was known, was validated by applying K-means clustering (MacQueen, 1967) to the same data. To calculate the index of agreement between both classifications (twostep and K-means) we applied the Kappa intraclass correlation coefficient measure as an estimate of inter-rater reliability.

All the above operations were carried out using the statistical package SPSS, version 18.

3. Results

3.1. Rating of the use of e-portfolio s

Motivation by the portfolio and learning subdimension

In general, students rated the e-portfolios poorly. As Table 2 shows, the average rating was 2.27 on a scale of 1 to 6.

Item	N	Mean	Stand. dev.
I enjoyed creating the e-portfolio	244	2.41	1.398
I liked the working structure of the portfolio	244	2.51	1.353
I think the portfolio was important in this module	244	2.59	1.413
It had an impact on my motivation	244	2.25	1.266
I will continue working with the e-portfolio in the future	243	1.94	1.178
It boosted my desire to learn	244	1.90	1.112
TOTAL	**244**	**2.27**	**1.287**

If we analyse each item on the scale in detail we obtain similar data. The use of the portfolio did not seem to have any great impact on students' motivation or on their learning. The scores they gave in this dimension are noticeably low, especially regarding: (a) the intention to keep using the portfolio in future, and (b) whether the e-portfolio promoted their desire to learn.

Transferable skills subdimension

The scores in the area of transferable skills boosted by the e-portfolios are significantly below average for the scale, with writing skills the lowest of all (Table 3).

Item	N	Mean	Stand. dev.
It helps you to reflect on your personal goals	243	2.45	1.213
It helps you improve your learning	245	2.57	1.284
It helps you plan tasks	245	2.62	1.342
It helps you organise assignments better	245	2.71	1.444
It helps you to be more autonomous	245	2.45	1.326
It helps you take decisions	245	2.26	1.193
It helps you write better	245	2.03	1.162
It helps you to be more creative	245	2.22	1.287
It gives you more confidence to publish on the internet	245	2.32	1.289
TOTAL	**245**	**2.40**	**1.090**

3.2. Evaluations of assessment and the use of rubrics

The students' evaluations of module assessment and the use of rubrics were higher than those for the e-portfolio were. The average obtained for this scale was above the theoretical mean (3.6 out of 6), as Table 4 shows.

Table 4. Descriptive data of the scale subdimension: 'Evaluations of assessment using rubrics'

Item	N	Mean	Stand. dev.
The rubrics were useful for understanding assessment	242	3.77	1.646
The rubrics helped me improve my learning	242	3.63	1.663
The rubrics helped me improve my awareness of transferable skills	241	3.44	1.596
TOTAL	**242**	**3.62**	**1.562**

The scores for the items on this scale were similar, consistently with the previous section. Students deemed useful the use of rubrics in assessment. More specifically, the rubrics helped them to understand assessment better and to gain awareness of the skills they needed to develop. In general, the students judged that they were a positive tool in formative assessment, since they aided learning.

3.3. Grouping opinions on the e-portfolio and rubrics

The twostep cluster analysis of the two scalar variables (scores for the e-portfolio and scores for assessment and the rubrics) identified four high-quality clusters, as shown in Figure 2. With differing percentages of students classified in each cluster, a cluster size quotient was calculated from larger to smaller, yielding a result of 2.86. The twostep was applied four times, reordering the cases randomly as the test requires. In all cases, similar results showed good quality clusters (profile cohesion mean higher than 0.5).
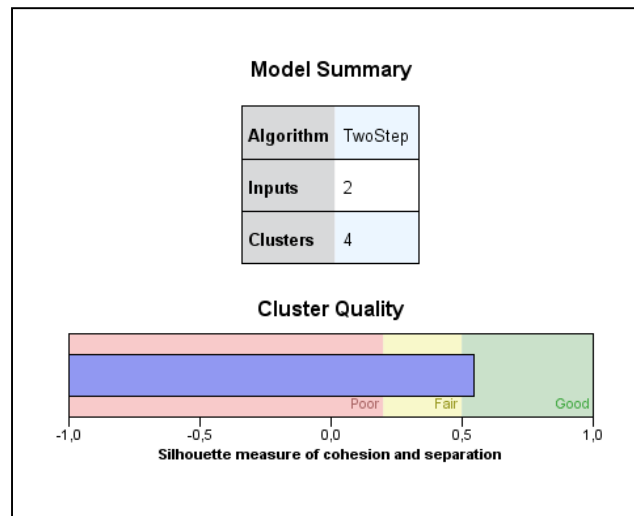
Figure 2. Summary of model and cluster quality in the twostep cluster

These four clusters represent four distinct profiles of student perceptions on the e-portfolio and assessment using rubrics. To specify the composition of the groups (Figure 3):

- Favourable group, made up of 29 students giving a high score to the e-portfolio and assessment using rubrics.

- Moderate group, made up of 49 students giving a middle score to both the e-portfolio and assessment using rubrics

- Controversial group, made up of 81 students who despite giving the e-portfolio a low score, rated assessment using rubrics more highly.

- Unfavourable group, made up of 83 students giving a low score to both e-portfolios and assessment using rubrics.
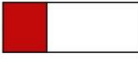
Cluster	4	3	2	1
Label	Unfavourable group	Controversial group	Moderate group	Favourable group
Description	Low score of e-portfolios and assessments using rubrics	Low score of e-portfolios and high score of assessment using rubrics	Medium score of e-portfolios and assessment using rubrics	High score of e-portfolios and assessment using rubrics
Size	34,3% (83)	33,5% (81)	20,2% (49)	12,0% (29)
Functions	Scale 07. ePortfolio / Scale 08. Assessment (P40, P41 y P42)	Scale 07. ePortfolio / Scale 08. Assessment (P40, P41 y P42)	Scale 07. ePortfolio / Scale 08. Assessment (P40, P41 y P42)	Scale 07. ePortfolio / Scale 08. Assessment (P40, P41 y P42)

Figure 3. Features of the clusters in the twostep cluster analysis

This grouping was validated with a K-means cluster analysis from which similar results were obtained. Analysing the measure according to the subject classification obtained in the twostep cluster and that obtained from the K-means cluster (Table 5), we obtained a Kappa value of 0.81, which according to Altman's classification (1991) represents a very good measure.

15

Table 5. Contingency clusters with twostep and K-means

		Clusters with K-Means				
		Favour-able	Moderate	Controversial	Unfavourable	Total
Clusters with twostep	Favourable	29	0	0	0	29
	Moderate	2	46	1	0	49
	Controversial	0	9	72	0	81
	Unfavourable	0	22	0	61	83
Total		31	77	73	61	242

a. Features of the clusters

Thus, these four profiles are valid, and in the following section, we describe in more depth the features of each, in line with participants' contextual variables and the specific features of the modules and groups in which the experiments in assessment and e-portfolios were carried out. In particular, we highlight the statistically significant differences, summarized in Table 6, where it can be seen, for example, that favourable cluster is characterized by students with an average age (and different from other clusters) of 24, the percentage of students with experienced teachers in e-portfolios was 24.1, the average weighting of portfolio in the module assessment of these students was 64.14 %, the average class size was 55.2 students, the percentage of students with continuous technical support was 24.1, 31 % of the students in this

cluster completed group portfolios, 6,9 % completed individual portfolios, and 62.1 %
completed both group and individual portfolios.

	Clusters			
	Favour-able	Moderate	Controversial	Unfavourable
Average age	**24**	21	20	21
% with teachers experienced in using the e-portfolio	**24.1**	8.2	4.9	**2.4**
Average weighting of portfolio in assessment	**64.14**	54.08	**44.88**	52.17
Average class size	**55.2**	58.3	59.0	**59.5**
% with continuous technical support	**24.1**	8.2	4.9	**2.4**
% completing group-work portfolios	31.0	24.5	**53.1**	**20.5**
% completing individual-work portfolios	6.9	6.1	6.2	**15.7**
% completing both group and individual-work portfolios	62.1	**69.4**	**40.7**	63.9

Looking into the features of the profiles we had outlined, we found the significant
factors to be students' age, class size, teachers' experience, the assessment weighting
of portfolios, whether students had continuous support for the e-portfolio or not, and
whether they completed individual and/or group-work portfolios. The variables of the
non-significant relations were self-perceived competence in previous experiences of
portfolios, pedagogical support during the module, time spent, and self-perception of
group participation and collaboration. Below we go into more detail on these relations.

Favourable group

This is the smallest cluster, with 29 students. This group gave a high score to both the e-portfolio and assessment using rubrics.

In this cluster we found the oldest students (F=8.251, p=0.000). This was in fact a small group on the Education degree, specifically located in this cluster.

Regarding class size among students in this cluster, they were the smallest in the sample (F=5.747, p=0.001).

These students had the highest weighting of the portfolio in assessment (F=10.765, p=0.000).

In addition, there was a higher number of students with continuous support for the digital portfolio (Chi-square=16.4, p=0.001).

Finally, we should note that students in this cluster more often had teachers with experience in the digital portfolio (chi-square =16.35, p=0.001).

Moderate group

The group we have called "moderate" was made up of 49 students giving a moderate score to both the e-portfolio and assessment using rubrics. Its outstanding feature is that it is the group with the highest number completing both individual and group portfolios at the same time.

Controversial group

The group we have called "controversial" while rating the digital portfolio poorly, gave a high score to assessment with rubrics.

It is made up of 81 students whose outstanding feature was that their portfolios had lower weighting in assessment (F=10.765, p=0.000).

It is also worth noting that, as Table 6 shows, the students in this cluster are those who most frequently completed only group portfolios (chi-square =25.671, p=0.000).

Unfavourable group

Finally, the "unfavourable" group is the largest cluster: 83 students giving a low score to both the digital portfolio and assessment with rubrics.

This group is characterized by having a lower number of students with continuous support for the e-portfolio over the academic year (chi-square=16.4, p=0.001).

It includes a higher proportion of students completing only individual portfolios (chi-square=25.671, p=0.000).

In addition, we observed a tendency to be the youngest cluster, with lower weighting of the portfolio in assessment, and with teachers less experienced in using e-portfolios.

When the opinion clusters are arranged in a quadrant diagram (Corvalán, 2011) according to the score of the portfolios (*y*) and of assessment using rubrics (*x*) an imbalance in group distribution is clearly in evidence (see Figure 4).

There is a tendency towards scoring the portfolio and the rubrics equally, as the diagram shows, from *(-x, -y)* to *(+x, +y)*. This may represent a relationship between opinions on the e-portfolio and on the rubrics, although this tendency is upset by the "controversial" cluster, with its opposing score for the portfolio and the rubrics *(-x, +y)*. The presence of this group blurs the direct relation between opinions on both tools.
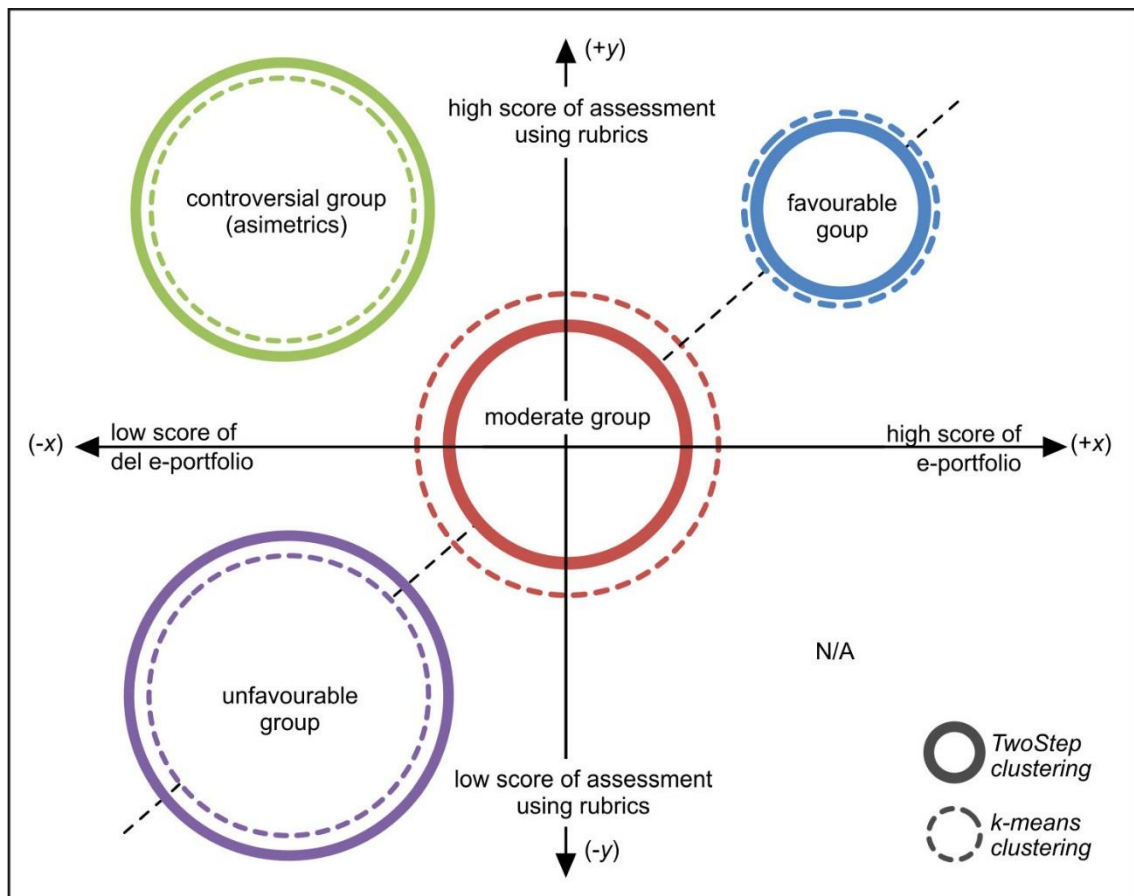

Figure 4. Quadrant diagram: distribution of the student clusters according to score of perceptions on e-portfolio (x) and assessment using rubrics (y)

4. Conclusions

In terms of the first aim of this study, we drew the conclusion that students had differing perceptions of the portfolio and the rubrics. It was confirmed that their perceptions on the portfolio and the rubrics were independent, even though these tools were jointly applied: while two thirds of students tended to score the two tools similarly, a third rated them opposingly.

Briefly, we found that students' assessment of the e-portfolio was that it had little impact on their motivation to learn, or to continue using it, or on its usefulness in boosting transferable skills. Turning to the rubrics we observed that students found them useful, specifically in that that the rubrics helped them both to understand assessment better and to become more aware of competences.

In terms of our second aim, four groups were identified, along with various factors that may explain the differing ratings given to the portfolio and the rubrics, as we explain below.

There are four contextual factors favouring students' positive perceptions on the combined use of portfolios and assessment using rubrics on their modules. These are (1) greater teacher experience in using the digital portfolio, (2) continuous technical support for the digital portfolio, (3) greater weighting of the portfolio in assessment, and (4) smaller class size.

As for personal factors, we found that only student age was a differentiating variable among opinions about acceptance of the digital portfolio and rubrics. The most favourable group was the oldest (24 years old, compared to the average of 21).

5. Discussion

The results obtained tend to concur with previous studies. In this sense, we should note the low opinion students have of e-portfolios and the possible factors associated with this, to which various authors have drawn attention. Thus, as some of these scholars have found (Barberà, 2005; Valero, Aramburu, Baños i Díez, Sentí, & Pérez, 2007; Wray, 2007), these first experiments with portfolios are not very encouraging, especially in students' first years of using them, as is the case in our study. According to Wray (2007), the frustrations shown by students in these first years are mainly due to their confusion in selecting material and organising the portfolio, their inability to complete the work in the requisite time, and their lack of clarity on the purposes of the portfolio. In addition, their perception of the ease or difficulty of the system has a bearing on their acceptance of portfolios (Chen et al., 2012), the difficulty of the platform being the main aspect students found unsatisfactory in our case.

Wray (2007) suggests that these issues can be addressed by instructing students in the criteria for selecting and organising portfolio contents, and in how to plan their time and activities, and by providing examples showing the process to be followed. Students who receive specific advice on how to build and use the portfolio formulate their learning needs better, choose learning tasks more appropriately, complete practical tasks more thoroughly, and obtain better results than students who only receive feedback (Kicken, Brand-Gruwel, van Merriënboer, & Slot, 2009). In the same line,

Delandshere and Arens (2003) highlight the importance of the teacher's role in designing the portfolio and even in solving technological problems. Students need guidance when working on their portfolios and in addressing questions and problems stemming from them. Besides, planning the teaching-learning process to coincide with the required competences is essential in achieving valid results in developing these competences. In our experience, teachers who are novices in the use of portfolios in all probability influence their application negatively. Teachers need time to adapt to the use of portfolios, and should seek the best strategies for putting them into practice and motivating their students, as well as bringing learning activities into line with the competences best boosted by the tool (Salomon et al., 1992); and this requires a certain amount of experimentation, over more than one academic year.

Turning to factors that can make learning with e-portfolios effective, a recent study by Castaño Sánchez (2014) highlights assessment methods and training in using the tool, amongst other aspects. These findings coincide with our results: on the one hand, students considered that they needed more training in using the portfolios, and that the training they had received was lacking; and on the other, students in classes where the portfolio was given greater weight in assessment also rated the tool more highly, along with its ability to boost competences.

Lastly, our study confirms that feedback using rubrics is highly valued for its ability to give an overview of the complex picture of students' work, and as a guide to students' achievements (Nordrum, Evans, & Gustafsson, 2013). As the participants in our study stated, rubrics are useful for promoting awareness of competences and for making

assessment of these more transparent, as previous studies have also found (Allen & Tanner, 2006; Navarro, Ortells, & Martí, 2011; Raposo & Martínez, 2011).

6. Implications for teaching practice

The main finding of this study is the delineation of four groups of students according to the variables: perceptions on the use of portfolios and assessment with rubrics.

The results of this study have important implications for educational practice, and on this basis, we would underline the need to take into account the educational context. In particular, we would recommend:

- Improving teacher's skills on e-portfolio platform

- Improving e-portfolio teaching methods

- Assigning greater weight to the portfolio in assessment

- Providing students with continuous technical support for the portfolio throughout their course

- Prioritising group-work over individual-work portfolios when students first begin to work with them

In addition, we would recommend maintaining the use of rubrics combined with portfolios, since this can sustain a positive initial effect in the process of innovation. In our study the most highly rated item was that which argued that rubrics enhanced the transparency of assessment (they were useful for understanding assessment better). More strategies are needed to reduce initial resistance to the portfolio and the rubrics can be one of these.

7. Limitations of the study

This empirical study has some limitations. In the first place, the sample consisted solely of undergraduate modules at the Faculty of Education (University of Barcelona), where rubrics had been previously applied and where students' experience in using the portfolio was relatively recent. We would recommend expand this study to include other institutions in order to avoid the limitations of this sample. Secondly, the inclusion of students using both individual and group-work portfolios brings up some uncontrolled variables: from classroom activities design and strategies to students resistance to group-work as part of assessment, which supposes taking several recommendations for implementing group-work, such as recognition of effort, group size, incentives to deter problems "free-riding" inside work teams, among others (Davies, 2009). Thirdly, factors affecting users' behaviour are complex and diverse, and in this sense, there are important variables which were not taken into account in the research, and which may influence students' perceptions (Bolliger & Shepherd, 2010): types of group interaction, students' personal motivations in taking the course, their capacity for self-regulation, etc. These variables may define new groupings of students, and would therefore be recommendable to take into account for future study.

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