

The use of e-portfolios in higher education: From the students' perspective

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This study sets out to discern the students' perspective on the value/usefulness and importance of the e-portfolio, as well as their own performance and effort. The participants were 121 preschool and primary school initial teacher education students in a private university in Spain. They were enrolled in three asynchronous undergraduate sections of an elective course on ICTs in education. Our data suggest that students are willing to use e-portfolios in the future, and do not just view them as coursework to be completed for a grade. The respondents acknowledged the value of e-portfolio as a learning and evaluation tool. Students recognise the e-portfolio as a job search tool as well as a resource for career advancement. They reported both competence and satisfaction with their work. The strongest impetus of intrinsic motivation, as indicated by our research, was an appreciation for the value and usefulness of the e-portfolio, followed by the students' perspective of competence.

Introduction

In the days before the digital revolution began to transform the world of education, a physical portfolio was used by many educators to create collections of student output for specific purposes, such as assessment, or the documentation of capabilities. Professionals in many fields, such as design, writing, and photography, also kept portfolios to document personal development and to showcase their work. Once digital capabilities became more commonplace, the e-portfolio has eclipsed its physical counterpart, while increasing the capabilities, functions, and portability of these collections. The e-portfolio is now the platform that students can use to compile, organise, and formulate a digital presentation across various types of media and can be updated and adapted over time for different purposes and audiences. According to Bolliger and Shepherd (2010), e-portfolios are widely used in higher education in order to help students develop critical thinking and problem-solving skills as well as to prepare them to be lifelong learners. The value and potential of the e-portfolio is garnering attention within the world of higher education, and the Association of American Colleges & Universities has designated the e-portfolio as a high-impact practice (Watson, Kuh, Rhodes, Light & Chen, 2016).

Though researchers and educators alike can agree that the e-portfolio has great potential as a tool for assessment, learning and employability (Bolliger & Shepherd, 2010; Pegrum & Oakley, 2017), unless the students personally invest in the tool, it is unlikely that the e-portfolio will be utilised to its full potential. In fact, Barrett (2005) identified the challenge of fomenting intrinsic motivation in the learner as one of the main issues that must be addressed in order to help students readily engage in the e-portfolio process. Intrinsic motivation is key for adoption of new technology, as well as an integral part of self-regulated learning (Winne & Hadwin, 2008), which is linked to academic success (Zimmerman, 1990).

The construct of intrinsic motivation has been widely researched and applied in the field of education (Pintrich & Schunk, 2006). Ryan and Deci (2000) defined it as undertaking an activity “for its inherent satisfaction rather than for some separable consequence. When intrinsically motivated, a person is moved to act for the fun or challenge entailed rather than because of external products, pressures or reward,” as in case of the extrinsic motivation (p. 56).

The aim of this research is to explore facets of students' intrinsic motivation as related to their experiences with the e-portfolio. The following research questions were identified:

RQ1: How important is the e-portfolio to teacher education students?

RQ2: How do teacher education students perceive their competence related to e-portfolio development?

RQ3: What is teacher education students' perspective on the value/usefulness of e-portfolios?

Answers to these questions can contribute to the understanding of how aspiring teachers perceive their e-portfolios and how faculty can motivate students to promote their learning and professional growth through this medium.

Background

The e-portfolio has been described and defined in various ways in the growing pool of research. Moseley and Ramsey (2005) defined the e-portfolio as “a fusion of processes and product -- the process of reflection, selection, rationalization, and evaluation, together with the product of the process” (p. 25). Perhaps a more detailed and comprehensive description is provided by Hilzensauer and Hornung-Prähauser (2005, p.4, translated)

... a digital collection of 'skillfully produced work' (artefacts) of a person purporting to document the product (learning outcomes) and the process (learning path/growth) of their competence development within a certain time and for certain purposes and illustrate if the person concerned has made the selection of the artefacts itself and if it is organized in terms of the learning goal itself. As the owner this person completely controls who, when and to what extent it is allowed to view information from the portfolio.

The e-portfolio is a dynamic tool that can be used for many functions, which can be divided into three categories: learning, evaluation/assessment, and employability/career development. We will examine briefly the benefits of the e-portfolio for each of these functions.

The e-portfolio as a learning tool

One of the benefits of the e-portfolio is that, when properly implemented, it helps students to think critically, and become active, independent and self-regulated learners (Abrami, Venkatesh, Varela & Lysenko, undated). E-portfolio users must be active

participants in “constructing knowledge, refining their understanding, and learning socially through sharing with peers and teachers” (Chau & Chen, 2010, p. 933). Ciesielkiewicz and Coca (2013) as well as Alexiou and Paraskeva (2010) concurred that the e-portfolio encourages students to be active and autonomous learners and has the potential to enhance self-regulated learning skills. In fact, if used as a learning strategy it can be beneficial to students by using it as “a scaffolding approach of understanding and engagement” (Alexiou & Paraskeva, 2010, p. 3052). It is precisely this scaffolding that Beckers, Dolmans and van Merriënboer (2016) found to have a positive influence on self-directed learning. This is particularly important because research conducted by Cheng and Chau (2013) indicated that the students who are better equipped to handle the ever-changing environments of the 21st century are those who have developed self-regulated learning strategies. He pointed out that the digital environments in which an increasing amount of learning is taking place lack the organisation and supervision that were common in traditional classroom settings. It is this lack of formal structure that makes self-regulated learning strategies necessary. Figure 1 illustrates these relationships.

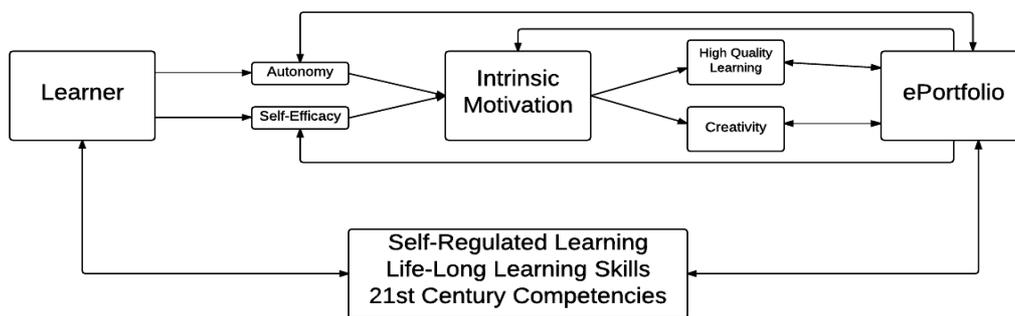


Figure 1: Developing self-regulated learning skills through the e-portfolio.

Paris (1998) claimed that students who are not motivated to learn, find it difficult to assimilate and develop learning skills. Because the e-portfolio documents students' accomplishments and successes during the learning process, students can readily review and reflect on their accomplishments (Pegrum & Oakley, 2017). This in turn, can provide learners with the motivation needed to keep studying and investing effort (Bolliger & Shepherd, 2010; Welsh, 2012). Likewise, it helps them to maintain interest in the use of e-portfolios for professional purposes (Wakimoto & Lewis, 2014). The e-portfolio also helps learners to set personal goals related to their learning and to establish realistic objectives, as well as to identify short and long-term goals which are necessary to achieve their individual goals (Chang, Tseng, Liang & Liao, 2013; Ciesielkiewicz & Coca, 2013). These are key strategies for effective lifelong learning (Laal, 2011).

Assessment with e-portfolios

There are various types of assessment for which the e-portfolio can be used successfully. First, it can be used as a formative and/or summative evaluation tool in the classroom (Strivens et al., 2009). Cummins and Davesne (2009) asserted that the e-portfolio is better

suited than standardised tests for student assessment, given the multitudinous and complex aspects of student learning. Program-wide assessment is also facilitated by the use of e-portfolios. Zhou and Helms (2015) stated “the documents, materials and artefacts in the e-portfolios are often used for accreditation and other course and program-embedded documentation for validation of learning by faculty and peer-review committees” (p.120).

Strivens (2009) points out that the e-portfolio is also being used in professional settings to “standards of performance and competency” (p. 89) such as might be found in state teacher licensing programs in the USA. Vozzo et al. (2014) attested that the e-portfolios helped primary teacher education students from three different universities who participated in their study to effectively demonstrate evidence of achieving the AITSL Australian Professional Standards for Graduate Teachers. These professional accountability standards were developed by the Australian Institute for Teaching and School Leadership (AITSL) and are organised in four teaching career stages – Graduate, Proficient, Highly Accomplished and Lead (AITSL, 2019).

The e-portfolio lends itself to self-assessment. In the research performed by Sharifi, Soleimani and Jafarigohar (2016), over 85% of the respondents indicated that using the e-portfolio was of benefit, noting that “it helped immensely with self-assessment by enabling them to examine their growth and to become aware of their strengths and weaknesses” (pp. 7-8).

The e-portfolio as a tool for career development and employability

Because the e-portfolio is, by nature, flexible and adaptable, an e-portfolio begun during one's university career can be updated and incorporated into professional networking platforms as a job search tool, or for purposes of career advancement (Collin, 2011; Fung & Wong, 2012; Tzeng & Chen, 2012; Perks & Galantino, 2013). Mobarhan, Rahman and Majidi (2015) found that students viewed the e-portfolio as a tool that could be used to enhance their professional careers and had the intention to keep using it. In the research performed by Wakimoto and Lewis (2014), the participants were graduate students in counseling or psychology programs. The responses indicated that the students accepted the e-portfolio for career development as well as for a job search tool. In fact, 86% of the respondents indicated that they planned on sharing their e-portfolios with potential employers.

However, there is contradicting research. In the study performed by Birks, Hartin, Woods, Emmanuel and Hitchens (2016) the respondents were graduate and undergraduate students in the nursing and midwifery programs. In this study, only 36% of participants thought that the e-portfolio would be of benefit when seeking employment after graduation. The e-portfolio has been integrated into a program in the UK that helps unemployed adults, 45 years and older, to reintegrate into the labour force (Stevens, 2008). Participants reported that though they had limited opportunities to present their e-portfolios to potential employers, they had benefited from the elaboration as it helped them to reflect on their skills, appreciate their own knowledge base, as well as gain

confidence in their ability to find a position. However, there is evidence that employers are increasingly aware of and willing to accept e-portfolios to evaluate job candidates (Arnaud, 2006; Ciesielkiewicz, 2015; Ciesielkiewicz, 2019; Giovannini & Baldazzi, 2016; Hart Research Associates, 2013; Judd et al., 2016; Lyons, 2008; Moretti, 2011; Munday & Rowley, 2017; Strohmeier, 2010; Woodbury et al., 2008).

Research on students' perceptions

Recent research indicates that students are consistently recognising the benefit of the e-portfolio as a learning tool (Chau & Cheng, 2010; Klampfer & Köhler, 2015; Nguyen & Ikeda, 2015; Sharifi et al., 2016; Welsh, 2012; Wuetherick & Dickerson, 2015). Bolliger and Shepherd (2010) found that 85% of participants agreed that the e-portfolio actually increased their desire to learn. This was mirrored in research by Wakimoto and Lewis (2014) in which 90% of the participants agreed that the e-portfolio was beneficial, even though 45% of the participants thought that the activity, in and of itself, was confusing. Welsh (2012) found that those students who used the e-portfolio demonstrated an increased development of metacognitive skills, as well as increased motivation and self-esteem as compared to the control group that did not use the e-portfolio. The summative evaluations for the experimental group were also higher, as were learning gains in general. The e-portfolio was generally found to foment and support metacognition and reflection on learning (Bolliger & Shepherd, 2010; Nguyen & Ikeda, 2015; Sharifi et al., 2016). Klampfer and Köhler (2015) set out to determine the factors that influenced motivation and attitude towards e-portfolios. Perceived usefulness and relevance were found to be the two cognitive and contextual factors that most affected levels of motivation. Autonomy was also shown to contribute to students' motivation to put effort into the e-portfolio (Chau & Cheng, 2010; Mobarhan et al., 2015).

Student motivation is a two-way street, as it were, with regard to the e-portfolio. Students consistently report that they feel more motivated to learn because of the e-portfolio (Klampfer & Köhler, 2015; Nguyen & Ikeda, 2015; Sharifi et al., 2016). On the other hand, those students who reported low motivation had a negative evaluation of the e-portfolio. However, a negative evaluation of the e-portfolio was often associated with low scores on measures of student learning strategies (Cheng & Chau, 2013). Likewise, the level of performance in the execution of the e-portfolio is affected by the type and level of the students' motivation. Cheng and Chau (2013) found that students who reported mastery goals (which correspond to intrinsic motivation) as well as performance goals (extrinsic motivation) performed better on e-portfolio assignments than those students with only mastery or only performance goals. It is also important to note that those students who reported low motivation and had a negative evaluation of the e-portfolio also scored low on measures of student learning strategies. It seems clear then that in order to improve learning strategies and have better learning outcomes, student motivation with regard to the e-portfolio must be addressed.

Even though the e-portfolio can benefit students in a number of ways, its effectiveness is limited and even negated when it is not implemented correctly (Eynon & Gambino, 2017). The creation of an e-portfolio is a complex process that requires training for both

faculty and students (Cheng & Chau, 2013). Harrington and Luo (2016) reported that when the e-portfolio was first implemented in their university, students did not perceive the benefits of the e-portfolio. They particularly failed to grasp how the e-portfolio could be used to integrate many aspects of their formation. However, when the researchers went back to examine the design of the program, they found that the e-portfolio was not implemented in such a way as to support the stated objectives of the courses and program of study. Furthermore, upon review of the e-portfolio assignments that were included to stimulate reflection, the same often did not support the development of metacognition. In response to these findings, educators adapted the e-portfolio program so as to better support the development of metacognitive skills. Instructors also increased the amount of e-portfolio support in order to help students create e-portfolios that could better reflect their academic careers. As a result, students who participated in the modified e-portfolio program were able to recognise the e-portfolio as a tool that could integrate their learning experiences, and also provide a benefit extending beyond its formation during university courses.

The learner's comfort level with the technology used in their e-portfolio is also an important facet of student motivation. Intrinsic motivation is key to adoption of new technology (Winne & Hadwin, 2008) and self-efficacy (competence) is a prerequisite for motivation (Deci & Ryan, 2008). Mobarhan et al. (2015) noted that problems with IT infrastructure and the system used for the e-portfolio negatively affected students' motivation. The same study found a positive correlation between the computer literacy of e-portfolio students and their perception of the e-portfolio. It should be noted, however, Klampfer and Köhler (2015) did not find a significant correlation between either computer literacy or attitude towards technology and motivation to use e-portfolio. Zainal-Abidin, Uisimbekova and Alias (2011) linked students' positive evaluation of the e-portfolio to ease of use, user friendliness and infrastructure reliability.

In one particularly interesting study (Birks et al., 2016), the majority of participants in the study left free text comments regarding problems with the technological platform. Complaints ranged from problems with site navigation, the system not being user friendly, to issues with uploading documents and sharing the portfolios. After experiencing these issues, it seems that their overall perception of the e-portfolio was affected negatively as only 30% thought that the e-portfolio had helped them become an effective and independent learner. In contrast, participants in the research performed by Wakimoto and Lewis (2014) emphasised the importance of the support that they received in both the computer labs and from their peers. One student commented that their anxiety was lessened by the availability of help during class time. Another student stated they felt overwhelmed, but that with the support they received from the librarian the assignment became easier. Ninety percent of these participants concurred that the e-portfolio was beneficial. Klampfer and Köhler (2015) found a very high correlation between perceived support and motivation to use the e-portfolio. Feedback and support from peers and tutors were important for self-regulated learning (Chau & Cheng, 2010; Welsh, 2012). Students also had a negative perception of e-portfolio when the demands of the e-portfolio were not properly balanced with other coursework (Sharifi et al., 2016). These findings highlight the necessity of providing ample support during the e-portfolio process.

There are conflicting findings with regard to students' perceptions of the usefulness of e-portfolios for employability or career development. In research performed by Wakimoto and Lewis (2014), graduate students in psychology and counseling programs were required to create an e-portfolio, appropriately named 'Professional Practice Portfolios'. Students used this portfolio to document competencies deemed necessary for professional licensure in their state, as well as for a national professional association. Given this particular functionality, it is not surprising that the majority of participants considered the e-portfolio as helpful for job searches and career development. In fact, 86% of the students indicated that they planned on sharing their e-portfolios with potential employers. However, in a similar study (Birks et al., 2016) in which the e-portfolio was implemented in both graduate and postgraduate level nursing programs, only 36% considered that the e-portfolio would be helpful in terms of employability and only 30% reported that they would maintain their e-portfolio after graduation. It is possible, however, that one of the reasons for such a low perception of the value of the e-portfolio, in this particular study, is that the students had consistent issues with the platform used for the e-portfolio.

Method

In order to obtain an understanding of students' perspective on e-portfolios, as well as to inquire what intrinsic factors could motivate them to successfully create and use an e-portfolio, a pragmatic and quantitative approach was used. The author aimed to discern students' perspective on value/usefulness and importance of e-portfolio, as well as their own performance and effort, through a survey adapted to the objectives of the research.

Sample

In this study, the participants were preschool and primary school education students (N=121) in a private university in Spain. They were enrolled in three asynchronous undergraduate sections of an elective course on ICTs in education. This course was taught onsite by the same professor, during the second semester of the academic year, which lasted approximately 14 weeks. All students were in their second year of their four-year degree program. All the participants were between 18 and 20 years of age. Eighty five percent of them were female and fifteen percent were male.

The e-portfolio was a primary formative and summative component of this course. The students were required to upload class assignments to their e-portfolio, created on *Google Sites*, during the semester, and had to present a completed portfolio, designed to serve as a multimedia *curriculum vitae* by the end of the course. The content of the class was outlined in a course portfolio, and the students had access to both descriptions of the assignments, as well as examples. The students were at liberty to choose their own artefacts to evidence their learning outcomes. A wide variety of media, such as text, image, audio and video files, were present in the students' e-portfolios. In the beginning of the course, students had access to their classmates' portfolios, but this access was limited when students began to upload more sensitive information.

Instrument

For the purposes of this study the author used an online, quantitative survey, administered through Google Forms. This twelve-item survey was adapted from the Intrinsic Motivation Inventory (IMI) which was designed to accurately assess a participant's subjective response to a specific activity. The IMI is one of several surveys available online (Self-Determination Theory, 2019) for those wishing to use them for academic research only. The IMI's validity was explicitly examined and confirmed in research by McAuley, Duncan and Tammen (1989). The IMI has also been used successfully in various studies measuring self-regulation and intrinsic motivation (e.g. Ryan, Mims & Koestner, 1983; Ryan, Koestner & Deci, 1991; Ryan, Connell & Plant, 1990). In order to adapt the IMI to the present research, the author chose only three of the original six subscales included in the instrument, namely: perceived competence, value/usefulness, and effort and importance. All items of the survey used a seven-point Likert-type scale: 1 = Strongly disagree; 2 = Disagree; 3 = Somehow disagree; 4 = Neither agree nor disagree; 5 = Somehow agree; 6 = Agree; 7 = Strongly agree.

Results

Having tabulated the results, the data were examined for missing values. The total percentage of missing values was quite small at 0.82%. Next it was necessary to determine whether or not the values were missing at random. For this we used Little's MCAR (Missing Completely At Random) test, and it indicated that the values were indeed missing completely at random ($\chi^2 (77, N = 121) = 71.043, p = .670$). Because no pattern of missing values was detected, and the total percentage of missing values was 0.82%, it was determined that the missing values could be imputed. The authors used the expectation maximisation algorithm of *SPSS* version 25. This version was used for all other statistical calculations during this research.

Subsequently, Cronbach's alpha coefficient was calculated in order to assess the internal reliability of the data. The overall reliability of the survey results was high (alpha = .86) and the reliability within the subscales was also acceptable: effort/importance (alpha = .65), perceived competence (alpha = .79), and value/usefulness (alpha = .91). See Appendix B for descriptive statistics of each item and variable.

The means and standard deviations for each subscale were calculated. The mean score for the effort/importance subscale was 6.3 (SD=0.9), while the mean score of the perceived competence subscale was 5.8 (SD=1.1), and the mean score of the value/usefulness subscale was 6.4 (SD=0.8) (Figure 2).

A higher score represents a more closely held positive association between the statement in the survey and the subject.

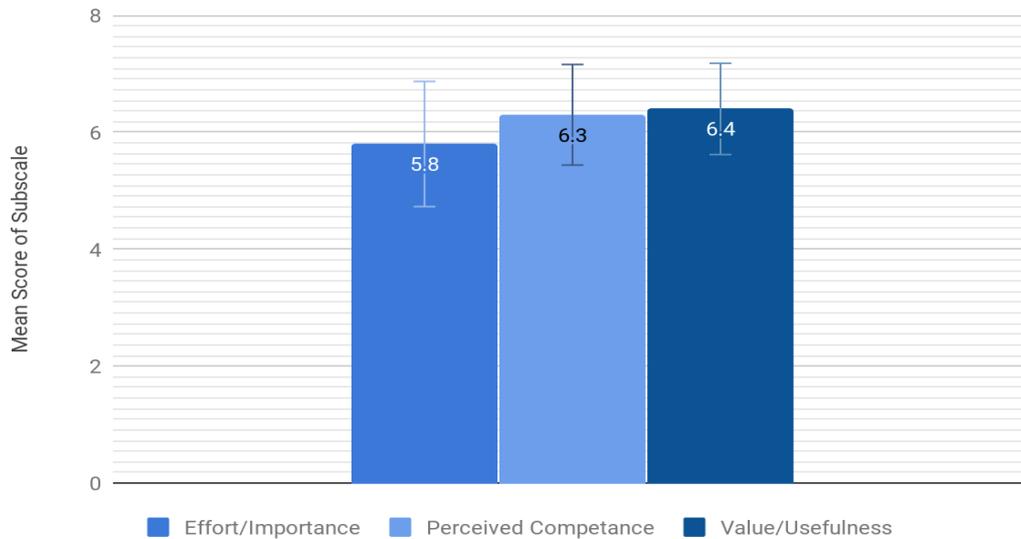


Figure 2: The mean scores of each IMI subscale with standard deviation

Effort/importance

RQ1: How important is the e-portfolio to teacher education students?

In this study, 85% ($n = 103$) of students polled, reported that the statement “I put a lot of effort into preparing my portfolio” was true or very true, while no students characterised this statement as untrue or very untrue. Likewise, 85% ($n = 103$) of students identified the portfolio as an important activity, while only one student indicated that the e-portfolio was unimportant. These were the only two items that corresponded to the effort/importance subscale, however both the Cronbach's alpha score as well as communalities of these two items were acceptable, so they were included in the analysis.

Perceived competence

RQ2: How do teacher education students perceive their competence related to e-portfolio development?

Of the three subscales, this one showed the least positive identification with the statements set forth in the survey. On average, only 65% of the respondents responded that these items were true or very true.

The average response for the question “I believe that I did pretty well with my e-portfolio compared with other students” was 4, which corresponds to neutral. Fifty-eight percent of respondents ($n = 70$) indicated that this statement was either “slightly true,” “neutral” or “slightly untrue” of their perspective on competence as related to their own e-portfolio. However, 74% ($n = 85$) of the students reported that it was true or very true that they felt pretty competent after having completed the e-portfolio, and 93% of respondents ($n = 113$) were satisfied with their e-portfolio.

Value/usefulness

RQ3: What is teacher education students' perspective on the value/usefulness of e-portfolios?

The students reported their most positive responses in this subscale. In fact, there was an average 97% positive response rate (either very true, true, or somewhat true) for these questions, and this is the subscale with the highest internal reliability rating ($\alpha = .92$). A key question in this subscale asks the student to reflect on future use of the e-portfolio: "I believe that this activity could help me in my professional career and help me do a better job." It is interesting to note that no student responded negatively to this question, and only six recorded a neutral response. Moreover, over half of the students recorded the most positive response available on the survey. See Figure 3.

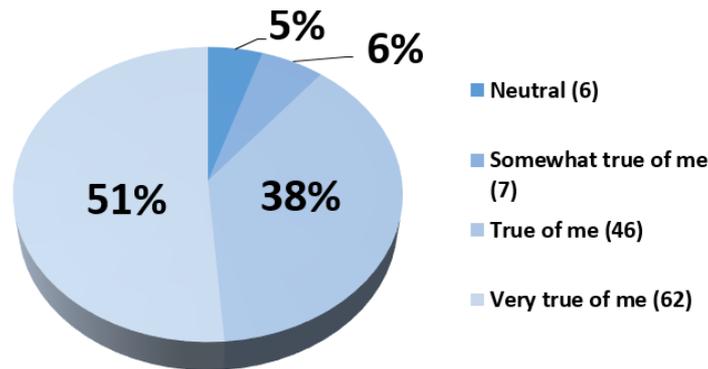


Figure 3: Responses to "I believe that this activity could help me in my professional career and help me do a better job."

Factor analysis

Before conducting the factor analysis, the factorability of the 12 IMI items was examined. The Kaiser-Meyer-Olkin measure of sampling adequacy is used to determine how suited a given data set is for factor analysis. The KMO for this data set was .87, which according to Dziuban and Shirkey (1975) is meritorious, the second highest rating, and far exceeding the general standard of .60. Bartlett's test of sphericity is another calculation to determine whether or not the data set is suitable for factor analysis. The results were statistically significant, $\chi^2 (66, N = 121) = 791.42, p < .01$, as required for a successful factor analysis. Additionally, all items had a communality of above .5, which is necessary for data to be considered suitable for factor analysis. Given these results, the factorability of the items was determined to be acceptable. An exploratory factor analysis, using the principal component analysis and Promax, an oblique rotation method with Kaiser normalisation was then conducted. Three principal factors were detected by SPSS, each having an eigenvalue greater than .95, and visually confirmed by the leveling off of the scree plot after the third factor. These three factors accounted for 71% of total variance (Table 1 and Figure 4).

Table 1: Total variance explained with initial eigenvalues

Component	Initial eigenvalues			Extraction sums of squares loadings			Rotation sums of squares loadings
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total
1	5.224	43.532	43.532	5.224	43.532	43.532	4.761
2	2.297	19.143	62.675	2.297	19.143	62.675	3.111
3	0.995	8.295	70.97	0.995	8.295	70.97	2.357
4	0.664	5.537	76.507				
5	0.604	5.036	81.543				
6	0.46	3.834	85.377				
7	0.429	3.579	88.956				
8	0.378	3.149	92.104				
9	0.306	2.547	94.651				
10	0.251	2.091	96.742				
11	0.215	1.791	98.533				
12	0.176	1.467	100				

Extraction method: Principal component analysis.

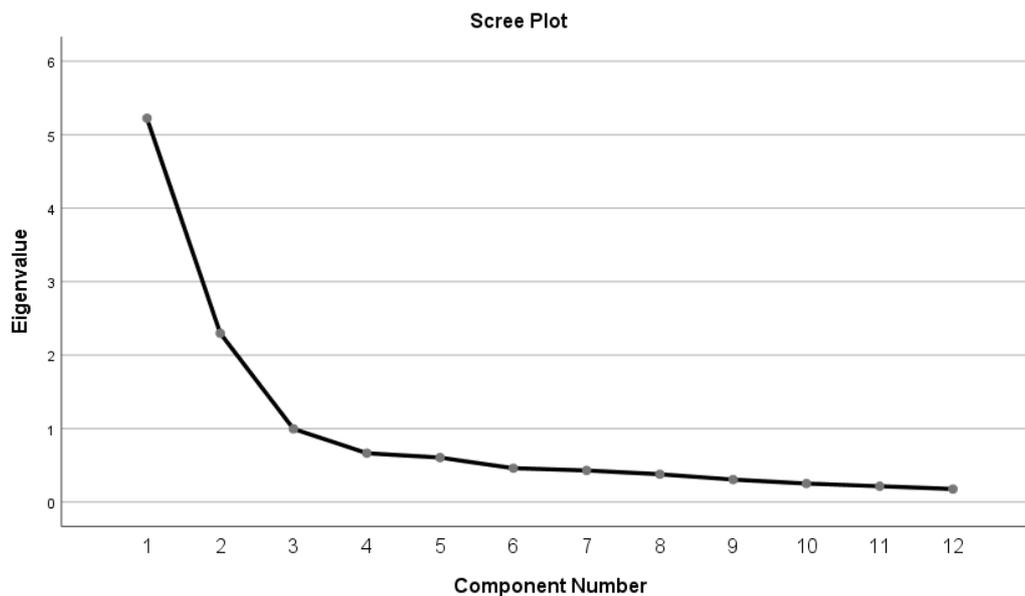


Figure 4: Scree plot

The factor load values of both the Pattern matrix (Appendix A) and the Structure matrix (Appendix B) coincided exactly with the classification of the items in their respective subscales.

As can be noted in Table 1, Component 1, which corresponds to Value/usefulness accounted for 43.5% of variation. This indicates that the students' perspective on the value of the e-portfolio is more likely to determine their intrinsic motivation, which is necessary for student engagement and the successful creation and use of an e-portfolio. Component 2, namely Perceived competence, accounted for 19.1% of the variance, indicating that though it is a significant factor for the intrinsic motivations of students, it is less crucial than that of the perceived usefulness. Finally, the third factor, Effort/importance accounted for 8.3% of the variance. It is interesting to note that the students' perspective on the value of the e-portfolio has a greater influence on their intrinsic motivation in relation to the e-portfolio than the amount of effort they expended or the importance they attributed to its creation.

Discussion and conclusion

This research addresses a crucial issue for educators who are implementing the e-portfolio, which has been shown to be a valuable tool for assessment and learning, as well as career development. Our data indicate that the single greatest factor that influences the intrinsic motivation of students to actively engage in the creation and use of the e-portfolio is their perspective on the value and usefulness. Students are willing to use e-portfolios in the future, and do not just view them as coursework to be completed for a grade. It is particularly significant considering that e-portfolios are not expected or mandatory to be presented to gain teacher registration or certification in Spain, or to demonstrate progress through teaching career stages. The respondents acknowledged the value/usefulness of e-portfolio as a learning and evaluation tool. This finding is consistent with the research conducted by Acosta and Liu (2006), Buzzetto-More (2010), Bolliger and Shepherd (2010), Mobarhan and Abdul (2015), and Wakimoto and Lewis (2014), in which participants considered the e-portfolio a useful tool that increased their learning or motivation for learning.

Additionally, 413 students who participated in the Chen et al. study (2012) valued positively different aspects of e-portfolio and found them useful, although these students did not have to create e-portfolios but rather were shown various examples and asked to evaluate them. Klampfer and Köhler (2015) considered perceived usefulness and relevance of e-portfolios the two cognitive and contextual factors that most impacted levels of motivation. The participants of this study also reported both competence and satisfaction with their work. This is consistent with the research conducted by Gülbahar and Tinmaz (2006), and Morales, Soler-Domínguez, and Tarkovska (2015). Moreover, students recognise the e-portfolio as a job search tool, as well as a resource for career advancement. This finding is in line with existing research indicating that students view the e-portfolio as a helpful tool to showcase their work to potential employers (Morales et al., 2015; Wakimoto & Lewis, 2014).

Our data suggest that faculty and educational institutions implementing e-portfolios in their courses and programs should include strategies that support intrinsic motivation, especially those that manifest the value and usefulness of e-portfolios. The results of this research should clearly show the value, multiple purposes and applications of e-portfolio

so students can appreciate it, not only during their course of study, but also continuing to use it far into the future as a personal and professional development tool.

According to several research studies, it is also very important to provide technical support for students, as well as for faculty since it can significantly impact students' motivation and their perception of the e-portfolio (Birks et al., 2016; Ciesielkiewicz, 2019; Contreras-Higuera et al., 2016; Klamper & Köhler, 2015; Mobarhan, 2015; Meyer & Latham 2008; Wakimoto & Lewis, 2014; Wetzel & Strudler 2005).

Understanding how aspiring teachers perceive their e-portfolios is important for informing how faculty can promote students' motivation, as well as their learning and professional growth through this medium. This research can contribute to the line of inquiry on the topic.

One of the limitations of this study is the size of students' class, and the number of participants as a whole. The limited number of participants is due to the university in which this study was carried out having a low teacher to student ratio, and the course that implemented the e-portfolio was an elective, not a compulsory course. It would be of interest to perform a longitudinal study at a larger scale in order to determine their long-term use. Another limitation is the gender of the participants. The majority of students were female as preschool and primary education is a very popular degree among young women. The comparison of perspectives of male and female students in a larger sample could provide a valuable insight in future studies. There are other factors, such as age or previous knowledge and exposure to ICTs, that may also affect how the e-portfolio is perceived and used. This should be explored, and addressed if appropriate, so that this valuable tool is made more accessible to a wider population.

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Appendix A: Pattern matrix

	Component		
	VU	PC	EI
PC1. I think I did pretty well on the e-portfolio activities.	-0.204	0.770	0.173
PC 2. I think I did pretty well on the e-portfolio compared to other students.	-0.044	0.734	0.046
PC 3. After working on the e-portfolio for a while, I felt pretty competent.	0.155	0.789	-0.211
PC 4. I am satisfied with my performance on the e-portfolio.	0.085	0.753	0.209
EI 1. I put a lot of effort into the e-portfolio.	-0.038	0.344	0.649
EI 2. It was important to me to do well on the e-portfolio.	0.266	-0.050	0.786
VU 1. I think that learning the e-portfolio could be of some value for me.	0.829	0.176	-0.438
VU 2. I think that the e-portfolio is important because it can serve as a tool for evaluation and learning and job search as well.	0.844	-0.021	0.059
VU 3. I would be willing to create and use new portfolios in the future if they were useful for me.	0.814	0.084	0.072
VU 4. I believe that by doing this, it could help me in my career and help me do a better job.	0.816	-0.116	0.213
VU 5. I believe doing this activity could be beneficial to me.	0.888	-0.065	0.097
VU 6. I believe that the creation of the e-portfolio is an important activity.	0.790	-0.054	0.166
Extraction method: Principal component analysis. Rotation method: Promax with Kaiser normalisation. Rotation converged in 5 iterations. PC = Perceived competence; EI = Effort/importance; VU = Value/usefulness			

Appendix B: Structure matrix

	Component		
	VU	PC	EI
PC1. I think I did pretty well on the e-portfolio activities.	0.049	0.771	0.356
PC 2. I think I did pretty well on the e-portfolio compared to other students.	0.162	0.737	0.265
PC 3. After working on the e-portfolio for a while, I felt pretty competent.	0.299	0.762	0.083
PC 4. I am satisfied with my performance on the e-portfolio.	0.344	0.841	0.472
EI 1. I put a lot of effort into the e-portfolio.	0.242	0.539	0.746
EI 2. It was important to me to do well on the e-portfolio.	0.483	0.267	0.848
VU 1. I think that learning the e-portfolio could be of some value for me.	0.746	0.255	-0.139
VU 2. I think that the e-portfolio is important because it can serve as a tool for evaluation and learning and job search as well.	0.855	0.219	0.300
VU 3. I would be willing to create and use new portfolios in the future if they were useful for me.	0.858	0.320	0.338
VU 4. I believe that by doing this, it could help me in my career and help me do a better job.	0.848	0.165	0.416
VU 5. I believe doing this activity could be beneficial to me.	0.900	0.198	0.337
VU 6. I believe that the creation of the e-portfolio is an important activity.	0.825	0.205	0.380
Extraction method: Principal component analysis. Rotation method: Promax with Kaiser normalisation. PC = Perceived competence; EI = Effort/importance; VU = Value/usefulness			

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