



## From diagrams to self-regulated learning: student teachers' reflections on the construction of their PLE

Gemma Tur, Victoria I. Marín, Juan Moreno, Antonio Gallardo & Santos Urbina

**To cite this article:** Gemma Tur, Victoria I. Marín, Juan Moreno, Antonio Gallardo & Santos Urbina (2016): From diagrams to self-regulated learning: student teachers' reflections on the construction of their PLE, Educational Media International

**To link to this article:** <http://dx.doi.org/10.1080/09523987.2016.1211335>



Published online: 03 Aug 2016.



Submit your article to this journal [↗](#)



View related articles [↗](#)



View Crossmark data [↗](#)

## From diagrams to self-regulated learning: student teachers' reflections on the construction of their PLE

Gemma Tur<sup>a</sup>, Victoria I. Marín<sup>b</sup>, Juan Moreno<sup>b</sup>, Antonio Gallardo<sup>b</sup> and Santos Urbina<sup>b</sup>

<sup>a</sup>Department of Applied Pedagogy and Educational Psychology, University of the Balearic Islands, Ibiza, Spain;

<sup>b</sup>Department of Applied Pedagogy and Educational Psychology, University of the Balearic Islands, Palma, Spain

### ABSTRACT

This paper presents a study on the reflections on their PLEs by student teachers in an ICT subject of the fourth degree course in Teacher Education (Early Childhood Teacher Training) at the University of the Balearic Islands (UIB). There were four student teacher groups ( $n = 117$ ) participating in this project, from the three Balearic Islands' campuses (Mallorca, Menorca and Ibiza). The main research issues focused on in this study are: the topics highlighted from the reflections on the students' PLEs and the reflection level achieved. To explore these issues, a content analysis technique has been used to interpret their final assignment of the students' eportfolios, in which they had to carry out their reflections on their PLEs. For that purpose, two instruments have been designed: a system of categories and a rubric of assessment. Results show that the topics on which students reflect most are the conception of the PLE, its explicitness and its purpose. Although some improvement in students' reflective skills was observed, conclusions lead us to the necessity of working further on the depth of reflections in order to adequately support self-regulated learning.

### ARTICLE HISTORY

Received 16 April 2016

Accepted 4 July 2016

### KEYWORDS

Student-centred learning;  
student teachers;  
educational technology; self-  
directed learning reflection

## Introduction

The research on PLEs is in constant evolution and much has been argued since the first time it was first introduced. The papers presented in the PLE Conference in previous years are an example of its evolution: from the conceptual debate in the early years to the pedagogical approach (Adell & Castañeda, 2013). The PLE approach has had an important impact in the european context, especially in Spain (Hernández, 2016).

The pedagogical approach has particularly focused on introducing students into the virtual environment in order to use tools for learning. Many articles analyse the diagrams made by students representing the tools and the interactions of their PLEs (Castañeda & Soto, 2010; de Benito, Lizana, & Salinas, 2011; Marín, Lizana, & Salinas, 2013) or interpret the progressive number of tools used (Tur, 2011; Tur & Urbina, 2012). However, going one step further, it is also important to observe the cognitive processes carried out by students introduced in PLE practices, and so there is also an important line of research in this way (Dabbagh

& Kitsantas, 2012; Kroop, Berthold, Nussbaumer, & Albert, 2012; Nussbaumer, Sheffel, Niemann, Kravcik, & Albert, 2012; Rahimi, van den Berg, & Veen, 2014).

The current research is included in this last group of studies and shows the pedagogical approach from the perspective of the cognitive activity of learners through their PLEs. Students are asked to draw the tools and the interactions of their PLEs but, also and more importantly, to focus on the reflection process. Thus, students reflect on the activities they have carried out and the impact these have on their learning, among other topics.

## Background

PLEs imply a change in education towards a learner-centred approach overcoming the limitations of the Virtual Learning Environments (Torres-Kompen, Edirisingha, & Mobbs, 2008). It was the development of Web 2.0 tools that led to the appreciation of the PLE concept, which gives more individualisation to the learning processes. In fact, the learning experiences that can be designed with Web 2.0 tools are usually active, process-based, anchored in and driven by learners' interests, and therefore have the potential to cultivate critical thinking skills (Herro, 2014) and self-regulated, independent learning (McLoughlin & Lee, 2010). Likewise, It has been argued that Teacher Education in particular is benefiting from the progressive use of Web 2.0 tools for learning (Cirit, 2015) and there are many learning activities with different social media tools to develop student teacher competences – see for example, recent research by Soomro, Kale, and Yousuf Zai (2014), Lim, Yan, and Xiong (2015) – and in in-service teachers' professional development – see for instance research by Tan and Kou (2014). In this current society, in which the information sources, connections, etc. are so diverse due to technological advances, the PLE could be considered as an environment in which we learn by using technologies in an effective way, learning to learn in a digital era. In short, it would be a metacognitive tool (Castañeda & Adell, 2013).

In this sense, there is a strong idea underlying the PLE concept: the autonomy of the learner and what Zimmerman and Schunk (1989) call self-regulated learning, which has been related to goal setting for learning (Dabbagh & Kitsantas, 2004; Mikroyannidis et al., 2014).

According to these authors, self-regulated learning is “the ability of a learner to prepare for his/her own learning, take the necessary steps to learn, manage and evaluate the learning and provide self feedback and judgment, while simultaneously maintaining a high level of motivation”. Zimmerman (1990, p. 14) argues that students who are self-regulated learners are “distinguished by their systematic use of metacognitive, motivational and behavioural strategies; by their responsiveness to feedback regarding the effectiveness of their learning; and by their self-perceptions of academic accomplishment”.

The self-regulation process is achieved in cycles consisting of forethought (providing choices), performance (scaffolding) and self-reflection phases (assessing) (Rahimi et al., 2014). Zimmerman (2002, pp. 67–69) has detailed the self-regulation process as follows:

- Forethought phase: It refers to the cognitive activities carried out before learning.
- Performance phase: It refers to the processes carried out during the implementation and it involves two main operations: self-control and self-observation.
- Self-reflection phase: It consists of the processes carried out after learning and it involves two main cognitive tasks: self-judgement and self-reaction. In recent research, self-assessment and peer-assessment have been introduced in self-regulation learning activities through the use of rubrics (Ng, 2016).

Furthermore, Rahimi et al. (2014, p. 7), when applying the self-regulated cycle into the construction of PLEs, add a fourth phase:

Feeding back (applying): This mechanism is aimed at improving both student and teacher learning. As for the learner mechanisms, it consists of two parts: firstly, discovering the cognitive, personal and social affordances of the social media; secondly, tracking students' data about their use of technology.

This self-regulation process described can be observed in the construction of the PLE in itself, because it is "something that one builds autonomously to suit one's own needs and fulfill the type of learning one wants to pursue" (Henri, Charlier, & Limpens, 2009). PLEs consist of different systems that help the student to take control and manage their own learning, no matter whether it comes from a formal, non-formal or informal context. These systems support the learners in deciding their own objectives of learning, managing their own learning (the content and the process), communicating with others in the learning process, and all that contributes to the achievement of the objectives (Salinas, 2013).

Therefore, the PLE, as a metacognitive tool, could foster self-regulated learning and reflection, due to its need for goal setting, awareness and control over learning resources and results. According to Henri et al. (2009), it has the potential to support the internalisation/externalisation of learning processes and results. However, the realisation of this potential requires the learner to previously develop metacognition competences (motivation to analyse, control and improve their learning) and reflexive tools should be available to the learner and easily integrated in their PLE.

Also, reflection is a key process for a successful PLE approach (Rahimi et al., 2014). These authors suggest that the reflection process allows learning to go beyond a false constructivism where learning means doing with no other reason than doing. Rogers (2001), after a deep revision of diverse reflection frameworks, is able to define some of its main characteristics: it is a cognitive process or activity; it requires individual engagement; it implies the examination of one's own responses to a situation; it is initiated by an uncommon experience; and, eventually, reflection is aimed at enhancing understanding and improving future actions by the integration of the new learning. Rogers (2001) also observes some commonalities in the different conceptualisations of reflection that he analyses and describes according to the following aspects: antecedents, context, process of reflection, the value of experience, techniques to foster reflection and outcomes of reflection.

For purposes of this study, a framework for using social media to support self-regulated learning in PLEs has been considered (Dabbagh & Kitsantas, 2012). Its aim is to scaffold student self-regulation skills in the creation of PLEs and it is based on the levels of interactivity enabled by social media tools: (1) Creating spaces for personal information management; (2) Social interaction and collaboration; and (3) Information aggregation and management. Also, based on Rogers (2001), reflection is fostered in order to enhance students' effectiveness on their use of the social media for learning and their vision for the integration of technology in their future careers.

## The study

### *Context and participants*

This paper presents a study on student teachers' reflections on their PLEs in an ICT subject in the third degree course of Early Childhood Teacher Education at the University of the Balearic Islands (UIB). During this time, both of them in the first semester of the academic

year 2014/2015, pre-service teachers create different educational resources oriented towards their professional performance (early childhood teacher) and include them on an eportfolio. This is how students are asked to document their evolution, add artefacts and reflect on their learning. There were four groups participating in this experience, studying on three Balearic islands: 70 in Mallorca (two groups), 16 in Menorca and 31 in Ibiza.

For their last eportfolio assignment, at the end of the courses, the students were asked to include the diagram of their PLE, with the tools they most prefer, and reflect on the aspects of their learning that they consider most important. Students were given some specific topics to write about – related to tools and their impact on learning processes – but they were not limited to these and students did not necessarily have to reflect on all of them.

Following Rogers (2001), reflection was worked as follows:

- Antecedents: The unpleasant situation was based on the challenge that every new task and tools, introduced during the lessons, represented for students.
- Context: The educational context was especially concerned with: giving specific instructions about the task assigned; feedback by lecturers during the development of tasks; fostering peer support in face-to-face lessons; careful teaching design by faculty and flexibility to choose among a wide range of tools.
- Process of reflection: Although continuous reflection was demanded and in some cases developed during the course, the reflection process was enhanced in the last assignment, with the representation of student PLEs.
- The value of experience: Students reflected on their own use of tools and the impact these had on their way of accessing information, creating knowledge and sharing with others (Adell & Castañeda, 2010; Castañeda & Adell, 2013).
- Techniques to foster reflection: Mentoring was based on journals or eportfolios, so the reflection process was carried out as a structured activity that facilitated the process of sharing among peers and teachers.
- Outcomes of reflection: The expected outcomes of reflection on PLEs were to see students analysing the affordances of having a PLE for learning, and also its possibilities for transference to their personal and professional future as teachers.

### **Research questions**

The main research questions of this study are:

- What topics do student teachers highlight from the reflection on their PLEs?
- How deeply do students carry out their reflection process?

After collecting the data, we represent it graphically in order to compare different results and answer the research questions initially posed. In this way, the data obtained will allow us to observe the main topics commented on by students and see if their impressions cover a wide range of topics.

### **Methodology**

From an interpretative perspective, the current study is aimed at understanding students' reflection on their PLEs. A mixed methodology is employed, since qualitative and quantitative methods may be necessary in different stages.

As mentioned previously, a content analysis technique is used to explore the research questions posed through the last assignments of the students in their eportfolios related with the reflection of their PLEs.

### ***Instruments***

Two instruments were used for the analysis of data obtained: a system of categories to analyse students' reflections on the topics suggested and a rubric to assess the depth of the reflection process carried out by students.

#### ***System of categories***

A system of categories for the analysis of content – the written texts by students in their eportfolios – is designed ad hoc based on the research questions in previous research stages. This initial system was first validated with its experimental application for the assessment five pieces of writing by two of the researchers in an independent way. After this step, several convergences and divergences were found in the results and some adjustments were made. However, some minor corrections had been introduced during the process of analysis in order to optimise the system. Furthermore, one more family in relation to emotional references has been added in the final design of the instrument.

The resulting instrument with the relation of families and its description, categories and assigned codes is shown below (Table 1):

#### ***Rubric on reflection***

The reflection rubric used is an adaptation of a previous work to analyse students' reflection on their eportfolio evidence (Tur, 2013; Tur & Urbina, 2016). The item "reflection" of the original work is based on diverse theoretical reflection frameworks, especially Dewey's cycle of reflection (1998) and the theory of transformational learning by Mezirow (1997, 1998). Also, it includes the scale formulated by other authors who have observed some patterns in the way students address the reflection process on eportfolios (Cambridge, 2010; Jenson, 2011; Oner & Adadan, 2011). The four levels of the final design of the rubric give a wide and comprehensive perspective about the different levels of depth in which student teachers carry out their reflection process.

Thus, the rubric used includes four steps:

- (1) Non-reflection level: Students include in their eportfolio evidence a diagram of their PLE without reflection.
- (2) Descriptive level: It is based on the description of the activity carried out such as the use of new tools and the difficulties encountered at a technical level. It also includes the description of feelings towards the process and the results achieved.
- (3) Analysis of learning: It is based on the description of the impact that the use of tools may have at a personal level.
- (4) Analysis of learning in relation to past and future stages: It includes the level in which students value the transformational learning they have experienced and how the new learning may change their educational perspective and future learning. But it also includes their vision of the use of technology and the impact of their PLE in their professional careers.

**Table 1.** System of categories for the analysis of content.

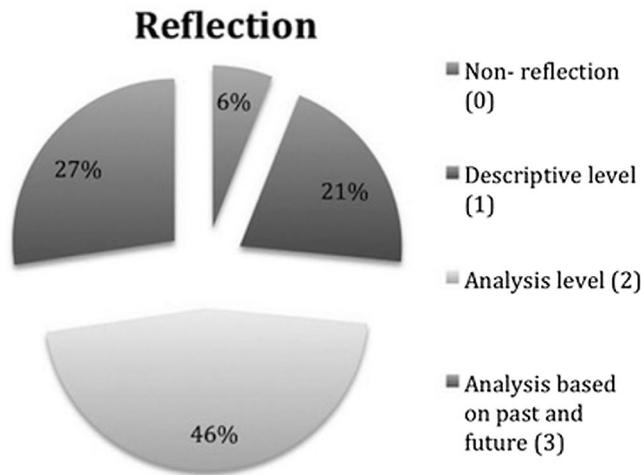
Family	Description	Categories	Assigned codes
Concept	It refers to the mention by students of the concept of the PLE, whether with its definition or description. From this concept, a technological or pedagogical conception of the PLE was inferred by the researchers	Definition	C-definition
		Description	C-description
Structure	It refers to the mention of the type of structure by students of their PLE	Personal/academic Virtual/physical Reading/writing/sharing	S-personal/academic S-virtual/physical S-reading/writing/sharing
Explicitness	It refers to the explanation or explicitation by students of their PLE	Process of explanation of the PLE	E-explicitation
Learning	It refers to student reflection on the learning related to the PLE	Awareness of the PLE	E-awareness
		Awareness of learning	L-awareness
		Learning connection	L-connection
		Formal learning	L-formal
		Informal learning	L-informal
		Non-formal learning	L-nonformal
Network	It refers to student reflection on networked learning related to the PLE	Lifelong learning	L-LLL
		Learning community	N-learning_community
		Personal learning network	N-PLN
		Sharing resources	N-sharing_resources
		Connection with others	N_connection
Purpose	It refers to student reflection on the aims related to the PLE	Social networks	N-social_networks
		Projection to professional work	P-projection
		Professional practice	P-professional
		Academic use	P-academic
		Professional teacher development	P-PTD
Tools	It refers to the students' tools considered in their PLE	Information tools	T-consult
		Content creation tools	T-creation
		Communication and relations tools	T-communication
		Multimedia	T-multimedia
		Organisation tools	T-organisation
Feelings	It refers to students' feelings	Satisfaction	F-feeling
		Overwhelmed	

## Results and discussion

Before the content analysis of the students' reflections, it is noteworthy to show, first of all, how students graphically represent their PLE. Students diagrammed their PLEs as a mind map. Students could use any mind map service to represent their PLE and could also classify the tools in three groups regarding usage. The students were asked to place special emphasis on the relationship among the tools diagrammed.<sup>1</sup>

### Results of the rubric on reflection

From the global results of the rubric on reflection (see Figure 1 and Table 2), we can observe that most of the reflections by students are within the analysis step (level 2). Likewise, the second most important percentage is in level 3 (27% of students at the impact of learning at a personal level), followed by a more reduced group in level 1 (descriptive skill) and a very small percentage in level 0 (6%). There are some challenging facts in these findings. First of all, there is one group (Palma-G1) in which the highest percentage of students is in level 3



**Figure 1.** Graphic representation of the results of rubric on reflection (%).

**Table 2.** Results of rubric on reflection (%).

	Level 0	Level 1	Level 2	Level 3
Palma-G1 ( $n = 35$ )	14.2	25.71	28.57	31.42
Palma-G2 ( $n = 35$ )	0	11.43	48.57	40
Menorca ( $n = 16$ )	12.5	68.75	18.75	0
Ibiza ( $n = 31$ )	0	0	77.42	22.58
Total ( $n = 117$ )	5.99	20.51	46.15	27.35

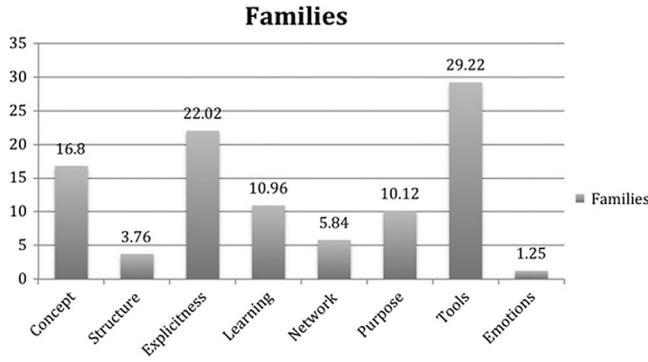
and there are two others in which it is the second most frequent level reached (Palma-G2 and Ibiza). Secondly, all students in Ibiza were able to reach the two highest levels of the rubric (level 2 and 3). Thirdly, only one group repeats low-level reflective patterns with most students reflecting at the descriptive stage.

Results of the application of the rubric are shown in the following table (Table 2):

### **Results of content analysis**

Results of content analysis of written texts are presented in the following figures where the diverse categories of each family are presented to distinguish the diverse arguments given by students (Figure 2).

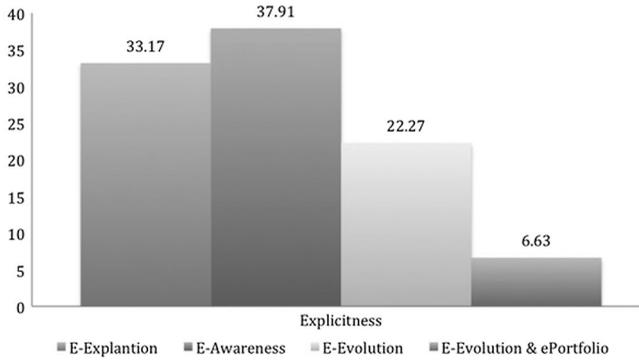
From data obtained, some patterns can be seen in the way students reflect on their PLE. Firstly, the most frequent families are those related to lower reflection levels such as concept, explicitness and tools whereas families related to higher reflective skills such as learning, network and purpose present less frequency. Secondly, many students introduce their PLE analysis at a descriptive level, addressing the theoretical framework studied such as the concept; and, moreover, expliciting their PLE and naming the tools used. However, these participants do not highlight at all their PLE structure, which is quite contradictory since it is a topic very much connected to the theoretical analysis they mostly start with. Thirdly, it is relevant to observe that feelings have a very reduced presence in students' discourse, which is coherent with the fact that level 1 of the rubric has also a low frequency.



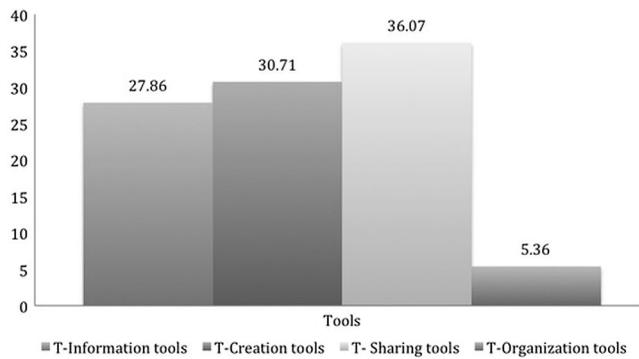
**Figure 2.** Families of categories mentioned by students (%).

All families present a complex discourse compound of diverse categories (see Table 1). The following figures show the frequency of diverse categories argued by students in the families selected for their complexity.

Among the most superficial ones, figures are given for “explicitness” (Figure 3) and “tool” families (Figure 4). It is noteworthy that the category “awareness” is one of the most frequently repeated (37.91%) since most students realise their PLE when they are introduced to the



**Figure 3.** Categories of the family explicitness (%).



**Figure 4.** Categories of the family tools (%).

topic. It is relevant to observe that there is little reference to the relationship between eportfolios and PLEs (6.63%). Among the tools family, it is of special significance that the “network tools” ones are those most often cited by students.

Among those categories related to higher cognitive skills, it can be observed that although they have less frequency, they present greater nuances due to the diverse categories analysed. Figure 5 presents categories for the learning family, in which the most repeated one is “awareness”, which means that students realise their ability to learn thanks to their PLE. The family network presented in Figure 6 is the one presenting a more balanced discourse with diverse categories similarly argued. Finally, the network topic presents a noteworthy frequency. Thus, this fact allows us to think that the impact on learning highlighted by students is related to networks, which is an important variable in fostering sharing and collaboration. This result has important implications for the teaching practice and innovative methodologies as suggests that PLE may support student learning in the network, which is a key issue to enhance learning by sharing and collaborating. The purpose family (Figure 7) presents four categories from which the most repeated one is projection (37%). It seems clear that going beyond description and reflecting on learning would also mean addressing the purpose of PLE, which has not been very much addressed by students.

The fact that the majority of students base their answers on the PLE definition and the description of their activity and tools but not so many of them reflect on learning allows us to observe difficulties for reflection. This means that students start by describing their

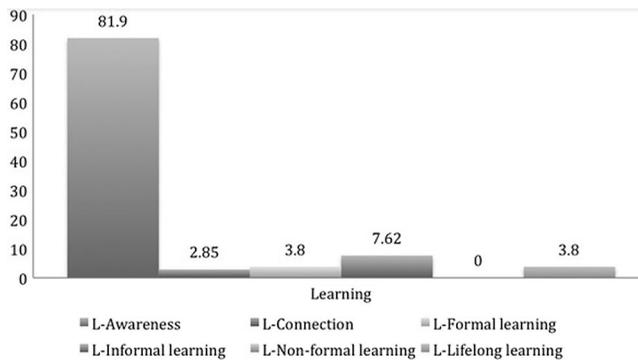


Figure 5. Categories of the family learning (%).

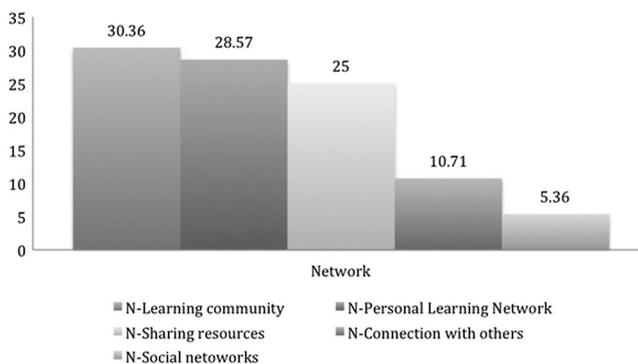
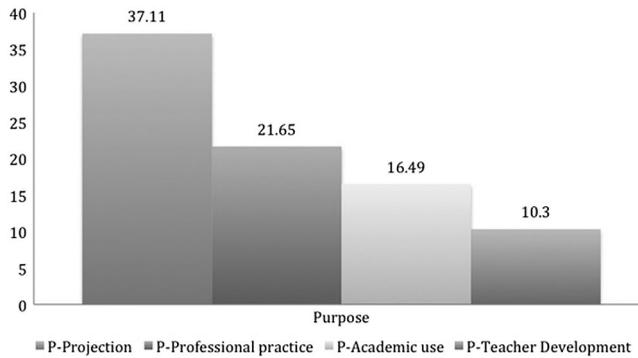


Figure 6. Categories of the family network (%).



**Figure 7.** Categories of the family purpose (%).

experience, which is the most elemental level of the learning process defined by Rogers (2001), but they do not reflect further, for example, on the impact on learning. Likewise, these results are mostly coherent with the data obtained from the rubric application. So future implementations of this activity should address student difficulties in going beyond the conceptual and description level.

These results are partially in line with previous research (Tur & Marín, 2013; Tur & Urbina, 2012) which allowed us to observe that student teachers have better perceptions of their technical learning than of their reflection or collaboration processes. In fact, previous research on the reflection process by student teachers revealed great difficulties in achieving the highest level of reflection (Castañeda & Soto, 2010; Tur, 2013). Thus, reflective learning is considered difficult by learners since it demands a high degree of effort and commitment (Banks, 2004). However, we cannot conclude that our students are self-regulated learners according to the characteristics described by Zimmerman (1990, p. 14): “systematic use of metacognitive, motivational and behavioural strategies; responsiveness to feedback regarding the effectiveness of their learning; and self-perceptions of academic accomplishment”.

In general, these results recommend that further implementations and research may be needed to explore self-regulated strategies in students’ PLEs along with Dabbagh and Kitsantas (2012), Kroop et al. (2012), Nussbaumer et al. (2012) and, Rahimi et al. (2014). Students were asked to reflect on the transformational learning that PLEs may have introduced into their learning process, but going further would mean empowering students to truly self-regulate their learning taking into account their reflection process.

This is an interesting issue that could be a subject for further research in order to discover if this is due to the instructional design (since the lecturers shared the same conception of the PLE), which is a relevant variable, or if the personal characteristics of student teachers might have influenced the results. Therefore, this is in line with previous research by Buchem, Tur, and Hölterhof (2014) who observe that factors related to context, didactic design and knowledge background may influence students’ perception of PLEs.

## Conclusions

Having analysed participants’ reflection on their PLEs, conclusions point out the following answers to our research questions and what needs to be done in further research:

- Although, it cannot be confirmed that students have totally developed high-level reflective skills, the rubric results point out their improvement in relation to previous research in which difficulties for deep reflection were detected. Therefore, new research should be necessary to observe the reasons for this improvement: is it a result of the learning design?; are the lecturers involved better trained to lead students towards self-regulated learning?; are the lecturers involved better trained in the use of the rubric?
- After having drawn and observed the tools that students use for learning, they have highlighted with more frequency some aspects on their reflection that range from the conceptual and descriptive level (conception, structure and tools) to a deeper analysis (learning, purpose and network). Also, this fact highlights that students' perspective of PLEs is more technical than pedagogical.
- However, some inconsistencies can be highlighted. It seems contradictory that rubric results have improved whereas the frequency of families connected with high-level cognitive skills (learning, purpose and network) is reduced. This fact could suggest that students have only been initiated and more work is needed to make this improvement more generalised. Thus, high-level cognitive skills could be defined as liminal, one of the five characteristics of threshold concepts (Cousin, 2006, 2010). This fact suggest a challenging new line of research that could have an important impact for teaching aims: the relationship of the PLE with the threshold concept. Some questions for further research could be the following: what is the threshold concept in the context of PLE? Where is the point at which the new perspective brought by the pedagogical concept becomes irreversible?
- Students use a wide range of tools that cover the three main activities of learning on the virtual world on which this study is based, such as reading and accessing information, reflecting and creating knowledge, and sharing and collaborating with others. They were also asked to highlight interactions among them. Thus, further research should also try to analyse the interaction of tools and how this interaction can impact learning and if there is any kind of relation among the number of tools, their interaction and level reached in their reflective skills.
- The system of categories developed has been applied in the context of the UIB, so further research could also test its validity in other national and international contexts. Also, it could be interesting to complete the content analysis of students' perceptions by including the topics derived from the Activity theory, which was first applied to analyse research on PLE (Buchem, Attwell, & Torres, 2011).

A set of limitations is related to methodology, the process of content analysis in the application of the rubric to assess student reflection. Thus, certain perceptions have been considered to correspond to the different levels of depth. However, triangulation with other research techniques should also be carried out in order to see if the written texts are their authentic perceptions or simply a strategy in saying what students think that teachers want to read.

This new study, in line with previous work carried out in relation to PLE in Teacher Education confirms that more work needs to be done in order to move students to deeper levels of reflection, so that they are able to observe not only the tools but also their cognitive processes (Castañeda & Soto, 2010). As Castañeda and Adell (2011, p. 7) state, "PLEs are not only technology, but also attitudes and values".

## Note

1. Two examples of students in Ibiza: <http://4tgedialouf.blogspot.com.es/2014/10/el-meu-ple.html> and <http://quartcursgedigozalbo.blogspot.com.es/2014/10/el-meu-ple-2014.html> The former highlighted the access to information through peer-to-peer social networks; and the latter, coloured in purple the tools she used when writing reflective texts on her eportfolio.

## Funding

This work was supported by the Ministry of Science and Innovation of Spain, within the National Programme for Fundamental Research under [grant number EDU2011-25499].

## References

- Adell, J., & Castañeda, L. (2010). Los Entornos Personales de Aprendizaje (PLEs): una nueva manera de entender el aprendizaje. In R. Roig Vila & M. Fiorucci (Eds.), *Claves para la investigación en innovación y calidad educativas. La integración de las Tecnologías de la Información y la Comunicación y la Interculturalidad en las aulas*. Alcoy: Marfil-Roma TRE Università degli studi.
- Adell, J., & Castañeda, L. (2013). El ecosistema pedagógico de los PLEs. In L. Castañeda & J. Adell (Eds.), *Entornos Personales de Aprendizaje: Claves para el ecosistema educativo en red* (pp. 29–51). Alcoy: Marfil.
- Banks, B. (2004). *e-portfolios: Their use and benefits. A white paper*. Retrieved from <http://www.eife-l.org/publications/eportfolio/documentation/doc/fd>
- Buchem, I., Attwell, G., & Torres, R. (2011, July 10–12). *Understanding personal learning environments: Literature review and synthesis through the activity theory lens*. Proceedings of The PLE conference 2011, Southampton. Retrieved from <http://journal.webscience.org/548/>
- Buchem, I., Tur, G., & Hölterhof, T. (2014). Learner control in personal learning environments: A cross-cultural study. *Journal of Literacy and Technology, Special Edition: Personal Learning Environments: Current Research and Emerging Practice*, 5, 14–53. Retrieved from <http://www.literacyandtechnology.org/uploads/1/3/6/8/136889/ib1.pdf>
- Cambridge, D. (2010). *E-portfolios for lifelong learning and assessment*. San Francisco, CA: Jossey-Bass.
- Castañeda, L., & Adell, J. (2011). El desarrollo profesional de los docentes en entornos personales de aprendizaje (PLE). In R. Roig Vila & C. Laneve (Eds.), *La práctica educativa en la Sociedad de la Información: Innovación a través de la investigación* (pp. 83–95). Alcoy: Marfil.
- Castañeda, L., & Adell, J. (2013). La anatomía de los PLEs. In L. Castañeda & J. Adell (Eds.), *Entornos personales de aprendizaje: claves para el ecosistema educativo en red* (pp. 11–27). Alcoy: Marfil.
- Castañeda, L., & Soto, J. (2010). Building personal learning environments by using and mixing ICT tools in a professional way. *Digital Education Review*, 18, 9–25.
- Cirit, N. C. (2015). Assessing ELT pre-service teachers via Web 2.0 tools: Perceptions toward traditional, online and alternative assessment. *TOJET: The Turkish Online Journal of Educational Technology*, 14, 9–19. Retrieved from <http://www.tojet.net/articles/v14i3/1432.pdf>
- Cousin, G. (2006). An introduction to threshold concepts. *Planet Special Issue on Threshold Concepts and Troublesome Knowledge*, 17, 4–5. Retrieved from [www.gees.ac.uk/planet/p17/gc.pdf](http://www.gees.ac.uk/planet/p17/gc.pdf)
- Cousin, G. (2010). Neither teacher-centred nor student-centred: Threshold concepts and research partnerships. *Journal of Learning Development in Higher Education*, 2. Retrieved from [http://www.aldinhe.ac.uk/ojs/index.php?journal=jldhe&page=article&op=view&path\[\]=64](http://www.aldinhe.ac.uk/ojs/index.php?journal=jldhe&page=article&op=view&path[]=64)
- Dabbagh, N., & Kitsantas, A. (2004). Supporting self-regulation in student-centred web-based learning environments. *International Journal of eLearning*, 3, 40–47. Norfolk, VA: Association for the Advancement of Computing in Education (AACE).
- Dabbagh, N., & Kitsantas, A. (2012). Personal learning environments, social media, and self regulated learning: A natural formula for connecting formal and informal learning. *The Internet and Higher Education*, 15, 3–8. doi:10.1016/j.iheduc.2011.06.002

- de Benito, B., Lizana, A., & Salinas, J. (2011, July 10–12). *Evolution of the construction of personal learning environments for students of pedagogy*. Proceedings of The PLE Conference 2011, Southampton. Retrieved from <http://journal.webscience.org/649/>
- Dewey, J. (1998). *How we think: A restatement of the relation of reflective thinking to the educative process*. Boston: Houghton Mifflin.
- Henri, F., Charlier, B., & Limpens, F. (2009, May 21–23). Understanding and supporting the creation of more effective PLE. *Proceedings of the International Conference on Information Resources Management (CONF-IRM) 2009*, Dubai. Retrieved from <http://aisel.aisnet.org/confirm2009/23>
- Hernández, M. A. (2016). Gestión del conocimiento, actividad científica y entornos personales de aprendizaje (ples): una bibliometría de la ple conference. *EDUTEC, Revista Electrónica de Tecnología Educativa*, 55, doi:10.21556/edutec.2016.55.653
- Herro, D. (2014). Techno savvy: A Web 2.0 curriculum encouraging critical thinking. *Educational Media International*, 51, 259–277. doi:10.1080/09523987.2014.977069
- Jenson, J. (2011). Promoting self-regulation and critical reflection through writing students use of electronic portfolio. *International Journal of EPortfolio*, 1, 49–60. Retrieved from [www.theijep.com/pdf/IJEP19.pdf](http://www.theijep.com/pdf/IJEP19.pdf)
- Kroop, S., Berthold, M., Nussbaumer, A., & Albert, D. (2012, November 15–16). *Supporting self-regulated learning in personalised learning environments*. 1st International Workshop on Cloud Education Environments (WLOUD 2012), Antigua. Retrieved from <http://ceur-ws.org/Vol-945/paper10.pdf>
- Lim, C. P., Yan, H., & Xiong, X. (2015). Development of pre-service teachers' information and communication technology (ICT) in education competencies in a Mainland Chinese university. *Educational Media International*, 52, 15–32. doi:10.1080/09523987.2015.1005425
- Marín, V. I., Lizana, A., & Salinas, J. (2013). *Estudio inicial sobre la percepción del propio PLE por alumnos de grado en Pedagogía*. XVI Congreso EDUTEC 2013 "Educación y tecnología: una oportunidad para impulsar el desarrollo." San José. Retrieved from [http://edutec2013.ac.cr/memoria/ponencias/marin\\_lizana\\_56.pdf](http://edutec2013.ac.cr/memoria/ponencias/marin_lizana_56.pdf)
- McLoughlin, C., & Lee, M. J. W. (2010). Personalised and self regulated learning in the Web 2.0 era: International exemplars of innovative pedagogy using social software. *Australasian Journal of Educational Technology*, 26, 28–43. Retrieved from <http://www.ascilite.org.au/ajet/ajet26/mcloughlin.html>
- Mezirow, J. (1997). Transformative learning: Theory to practice. *New Directions for Adult and Continuing Education*, 74, 5–12. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1002/ace.7401/abstract>
- Mezirow, J. (1998). On critical reflection. *Adult Education Quarterly*, 48, 185–198. doi:10.1177/074171369804800305
- Mikroyannidis, A., Connolly, T., Law, E. L.-C., Schmitz, H.-C., Vieritz, H., Nussbaumer, A., ... Dhir, A. (2014). Self-regulated learning in formal education: Perceptions, challenges and opportunities. *International Journal of Technology Enhanced Learning*, 6, 145–163. doi:10.1504/IJTEL.2014.066860
- Ng, E. M. W. (2016). Fostering pre-service teachers' self-regulated learning through self- and peer assessment of wiki projects. *Computers & Education*, 98, 180–191. doi:10.1016/j.compedu.2016.03.015
- Nussbaumer, A., Sheffel, M., Niemann, K., Kravcik, M., & Albert, D. (2012). *Detecting and reflecting learning activities in personal learning environments*. Proceedings of the 2nd Workshop on Awareness and Reflection in Technology-Enhanced Learning, Saarbrücken. Retrieved from [http://dbis.rwth-aachen.de/cms/publications/paper.2012-09-24.5781480577?set\\_language=de&cl=de](http://dbis.rwth-aachen.de/cms/publications/paper.2012-09-24.5781480577?set_language=de&cl=de)
- Oner, D., & Adadan, E. (2011). Use of web-based portfolios as tools for reflection in preservice teacher education. *Journal of Teacher Education*, 62, 477–492. doi:10.1177/0022487111416123
- Rahimi, E., van den Berg, J., & Veen, W. (2014). A learning model for enhancing the student's control in educational process using Web 2.0 personal learning environments. *British Journal of Educational Technology*, 46, 780–792. doi:10.1111/bjet.12170
- Rogers, R. (2001). Reflection in higher education: A concept analysis. *Innovative Higher Education*, 26, 37–57. doi:10.1023/A:1010986404527
- Salinas, J. (2013). Enseñanza flexible y aprendizaje abierto, fundamentos clave de los PLEs. In L. Castañeda & J. Adell (Eds.), *Entornos personales de aprendizaje: claves para el ecosistema educativo en red* (pp. 53–70). Alcoy: Marfil.

- Soomro, K. A., Kale, U., & Yousuf Zai, S. Y. (2014). Pre-service teachers' and teacher-educators' experiences and attitudes toward using social networking sites for collaborative learning. *Educational Media International*, 51, 278–294. doi:10.1080/09523987.2014.977003
- Tan, V., & Kou, X. (2014). Case-based reasoning to help educators design with Web 2.0. *Educational Media International*, 51, 91–108. doi:10.1080/09523987.2014.924662
- Torres-Kompen, R., Edirisingha, P., & Mobbs, R. (2008). *Building Web 2.0-based personal learning environments – A conceptual framework*. Fifth EDEN Research Workshop, Paris. Retrieved from <http://hdl.handle.net/2381/4398>
- Tur, G. (2011). *ePortfolios and PLEs in teacher education. First results*. Proceedings of the The PLE Conference 2011, Southampton. Retrieved July 26, 2013, from [http://journal.webscience.org/578/1/EPORTFOLIOS\\_AND\\_PLES\\_IN\\_TEACHER\\_EDUCATION\\_FIRST\\_RESULTS.doc](http://journal.webscience.org/578/1/EPORTFOLIOS_AND_PLES_IN_TEACHER_EDUCATION_FIRST_RESULTS.doc)
- Tur, G. (2013). *Projecte de portafoli electrònic amb eines de la Web 2.0 als estudis de Grau d'Educació Infantil de la UIB a la Seu d'Eivissa. Estudi de cas* (thesis). University of the Balearic Islands. Retrieved from <http://www.tdx.cat/handle/10803/111339>
- Tur, G., & Marín V. I. (2013). *Student teachers' attitude towards ePortfolios and technology in education*. Proceedings of the First International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'13), 435–438, Salamanca.
- Tur, G., & Urbina, S. (2012). *PLE-based ePortfolios: Towards empowering student teachers' PLEs through ePortfolio processes*. Proceedings of the The PLE Conference 2012, Aveiro.
- Tur, G., & Urbina, S. (2016). Rúbrica para la evaluación de portafolios electrónicos en el entorno de la web social. *Pixel-Bit. Revista de Medios y Educación*, 48, 83–96. doi:10.12795/pixelbit.2016.i48.06
- Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An overview. *Educational Psychologist*, 25, 3–17. doi:10.1207/s15326985ep2501\_2
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice*, 41, 64–70. doi:10.1207/s15430421tip4102\_2
- Zimmerman, B. J., & Schunk, D. H. (Eds.). (1989). *Self-regulated learning and academic achievement: Theory, research and practice*. New York, NY: Springer-Verlag.