



**HAL**  
open science

## Enhancing Learners' Autonomy With E-Portfolios And Open Learner Models: A Literature Review

Sacha Kiffer, Eric Bertrand, Jérôme Eneau, Jean-Marie Gilliot, Geneviève  
Lameul

► **To cite this version:**

Sacha Kiffer, Eric Bertrand, Jérôme Eneau, Jean-Marie Gilliot, Geneviève Lameul. Enhancing Learners' Autonomy With E-Portfolios And Open Learner Models: A Literature Review. *Education Thinking*, 2021, 1 (1), pp.1-9. hal-03167146

**HAL Id: hal-03167146**

**<https://hal.science/hal-03167146v1>**

Submitted on 30 Mar 2023

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Enhancing Learners' Autonomy With E-Portfolios And Open Learner Models: A Literature Review

SACHA KIFFER<sup>1</sup>, ÉRIC BERTRAND<sup>1</sup>, JÉRÔME ENEAU<sup>1</sup>, JEAN-MARIE GILLIOT<sup>2</sup>,  
GENEVIÈVE LAMEUL<sup>1</sup>

<sup>1</sup> Université Rennes 2, France

<sup>2</sup> IMT-Atlantique, France

*Declaration of interests:* The authors declare that they have no conflicts of interest.

*Funding information:* This research was supported by the French LabEx Cominlabs, funded by the French National Research Agency (ANR) 10-LABX-07-01.

*Authors' notes:*

Sacha Kiffer is a research fellow in Educational Sciences at Université Rennes 2 (France). Since 2016, Sacha holds a PhD in Education. His focus is on the academic development of novice faculty members, especially how they develop their teaching competencies in their early career years.

Éric Bertrand is an associate professor at Université Rennes 2. He has worked in industry for years in the area of training before getting a PhD in Education in 2006.

Jérôme Eneau is a full professor of Adult Education at Université Rennes 2. Holder of a PhD in Andragogy (Université de Montreal) and an EdD (Université de Strasbourg), he worked for 20 years in industry as a trainer and training manager, before joining the University.

Jean-Marie Gilliot is an associate professor at Telecom Bretagne, Institut Mines-Telecom (IMT). He is a member of the research team 3S (Smart, Social & Semantic), a part of the

IHSEV Team of the Lab-STICC laboratory. His research interests include e-Education, Open learning environments, networked learning including MOOCs and social learning.

Geneviève Lameul is a full professor in Educational Sciences at Université Rennes 2. Her PhD was carried out under the supervision of Prof. Philippe Carré (Université de Paris Ouest La Défense). Her work on “professional posture” and “teachers’ approaches to teaching” contributes to several themes of the SEDELA project.

*Copyright notice:* the authors of this article retain all their rights as protected by copyright laws.

*Journal's area(s) of research addressed by the article:* 2-Adult Learning; 36-Lifelong Learning; 64-Technical & Vocational Education & Training.

### **Abstract**

This article considers how e-portfolios improve learner autonomy in higher education, especially when using open learner models (OLMs). OLMs are artificial-intelligence-built representations of interactions between learners and instructional environments, where learners have access to data about their interaction patterns. The analysis is based on a review of 24 research articles. Results suggest that e-portfolios improve learner autonomy, especially by strengthening self-reflection capabilities. The review also identifies areas of e-portfolio and OLM research that require further investigation.

### **Keywords**

e-portfolio; self-directed learning; learner autonomy; open learner models

The importance of supporting learner autonomy has been widely acknowledged (King, 2011). Learner autonomy is often referred to through self-directed learning (Long, 1989). Knowles (1975, p. 18) initially defined self-directed / self-regulated learning as “a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes”. Similarly, Holec (1981, p. 3) defined autonomy in learning as “determining the objectives; defining the contents and progressions; selecting methods and techniques to be used; monitoring the procedure of acquisition properly speaking (rhythm, time, place, etc.); evaluating what has been acquired”.

Autonomy in learning does not mean isolating the learner. Other people can be a crucial learning resource. Collaboration between learners is considered an important part of autonomy development (Eneau, 2008; Eneau & Develotte, 2012).

Portfolios are a way to foster learner autonomy (Beckers et al., 2016). The portfolio is a digital or paper-based file used to collect, store and manage data (Bélair & Van Nieuwenhoven, 2010). Portfolios are designed to support learning, assessment and

employability (Wolf & Dietz, 1998; Zeichner & Wray, 2001; Butler, 2006; Barrett 2010; Matthews-DeNatale 2014) and are respectively referred to as learning portfolios, credential portfolios and showcase portfolios (Zeichner and Wray, 2001). Portfolios are used in general education, vocational training and professional development (Eneau, Lameul & Bertrand, 2014). They enhance students' reflexive practice (Le Boucher et al., 2018).

Portfolios may be combined with Open Learner Models (OLMs), which is an important class of learner awareness tool. OLMs stem from research into artificial intelligence in education, specifically, intelligent tutoring systems (ITS). ITSs are artificial intelligence settings designed to tutor learners by defining learning problems and solutions and by identifying the learner's learning process. Data collected can be used to map the Learner Model, i.e. the interactions between the learner and the instructional environment (Holt et al., 1991), as well as the learner's knowledge, difficulties and misconceptions (Bull, 2004; Guo, 2007). OLMs open up sharing information with the learner to support their learning processes (Bull, 2004). Learners can thus access data to consider, apply and use in their portfolios. The OLM thus strengthens self-reflection, metacognition and motivation (Guo & Greer, 2007; Raybourn & Regan, 2011) and reinforces the learner's aptitude to self-regulate the learning process, a component of learner autonomy.

This article is part of the SEDELA ("SElf-Data for Enhancing Lifelong learning Autonomy") research project. The project aims to enhance learner autonomy skills in lifelong learning through the design and implementation of an innovative self-data management approach based on an electronic portfolio in higher education (El Mawas et al. 2017; Kiffer et al., 2018). The research question addressed in this paper is: how can an e-portfolio approach using open learner models enhance learner autonomy in higher education?

Several authors have reviewed the literature on e-portfolios. Some focus on specific areas such as medical or nursing education (Green et al., 2014); secondary education (Romero, 2014); and formative assessment in foreign language learning (Burner, 2014). Alan and Sunbul (2015) reviewed 17 experiences of implementing and using e-portfolios in the Turkish education system. However, these reviews have not fully addressed higher education or the issue of developing autonomy skills.

Although Butler's review of the literature on implementation and impact of e-portfolios (2006) did not consider their role in developing autonomy in higher education students, it showed that implementing e-portfolios is a long-term process that "need(s) to be an integral part of a program of study, not an 'added-on' assessment, which may necessitate the review and restructuring of courses" (Butler, 2006, p.19). This research also underlined that the type of portfolio, its purpose and its audience must be clear for successful implementation.

Bryant and Chittum (2013) highlighted the lack of strong empirical evidence that could help implement e-portfolio approaches. As noted by Scully et al. (2018, p. 8), they found that only 18 out of a set of 118 articles presented "data on learning outcomes, or outcomes associated with learning, such as motivation and reflective practice".

Panke (2014) identified instructional scaffolding and peer feedback as the two main factors to support learning and reflection in an e-portfolio approach. The author emphasized the need for a "careful reflection of pedagogical motives, organizational context and instructional setting to successfully orchestrate an e-portfolio process to trigger reflection and learning" (Panke, 2014, p. 1536).

Beckers et al. (2016) pointed out that portfolios may help develop self-directed learning skills. They argue that development of self-directed learning skills can be supported when “faculty development aimed at supervising self-directed learning skills development is provided; the portfolio is integrated into the educational routine (e.g., it is implemented school-wide, it is aligned with course outcomes); teachers coach their students regularly; scaffolding is applied to increase student motivation; the portfolio is designed to at least facilitate basic elements common to most SDL theories: goal-setting, task-analysis, plan implementation, and self-evaluation” (Beckers et al., 2016, p. 44).

These reviews reveal factors and conditions which may support self-directed learning using an e-portfolio approach. However, they tell us little of the links between autonomy, e-portfolios and OLMs; hence the need for the present review.

### **Method**

From the Education Resources Information Center database, Google Scholar and the Web of Science databases, a primary list of 1243 references containing the keywords “portfolio” or “e-portfolio” was drawn up. The keywords “autonomy”, “self-directed learning” and “learner model” were then used as filters to select references relevant to the research question. This left 24 peer-reviewed articles issued from 2007 to 2018, which constitute the corpus analysed for the present literature review. These articles address the research question – how can an e-portfolio approach using open learner models enhance learner autonomy in higher education? – from two different yet complementary angles. The first explores the material, human, technical (including OLMs) and pedagogical conditions that may encourage autonomy. The second questions the effects of the e-portfolio approach. The results outlined below shed light on both aspects.

### **Results**

Four major conditions for the successful use of portfolios emerge from the literature. First, collaboration between students appears crucial for helping learners develop autonomy (Jimoyiannis & Tsiotakis, 2016, p.127): “meaningful reflection is best facilitated by peer collaboration and mentoring within a learning community evolving in the e-portfolio spaces”. More specifically, a pedagogic strategy based on the principles of social constructivism supporting learners’ collaboration is to be set up. In this context, activities promoting collaboration and critical thinking should be favoured or privileged. These authors suggest that the e-portfolio design should make room for self-reflection and active learning as well as “communication, collaboration and critical thinking within a supportive community of learning”. These results are in line with research showing the importance of collaboration for developing autonomy in adult education (Eneau, 2008; Eneau & Develotte, 2012). Autonomous learning implies that other people are required as a resource by the learner when necessary. This makes collaboration a key skill of autonomy development. Collaboration also involves teachers, whose role is to accompany the learners by providing them with scaffolding.

Second is the learner model. Guo (2007) and Guo & Greer (2007) emphasized that information provided by the learner model must be as clear and accessible as possible. This

is essential to enable teachers to put in place teaching activities that best help the learner. It is also essential to provide the learner with more food for thought when carrying out reflexive practice.

Third is taking into consideration the students' views about how the e-portfolio should be structured. Alexiou and Paraskeva (2013) show that student participation in structuring the e-portfolio can help to enhance self-regulated learning.

Fourth is setting the e-portfolio approach in a long-term perspective. Lopez and Rodriguez-Illera (2009) show that, although some positive effects of e-portfolios on users' self-efficacy can be seen from the second month of use, students need more time to identify how the platform, the methodology and the activities are working. This result is consistent with the findings of Butler (2006) according to which e-portfolio implementation is more efficient in a long-term perspective.

On the effects side, a range of papers conclude that e-portfolios have an overall positive effect on learner autonomy and self-directed learning (Alexiou & Paraskeva, 2010; Büyükduman & Şirin, 2010; Gonzalez, 2009; Ivanova, 2017; Khoosf & Khosravani, 2014; Nguyen & Ikeda, 2015; Šliogerienė, 2016; and Yildirim, 2013). Büyükduman & Şirin (2010) showed that the e-portfolio enables students to take the ownership of their learning, raises their awareness of their strengths and weaknesses and allows them to adapt the learning process to their own pace. Some authors highlight the benefits of e-portfolios for developing specific autonomy skills in relation to metacognition (Dominguez-Garcia et al., 2015; Gonzalez, 2009; Ivanova, 2017; Meeus et al., 2008); self-reflection (Slepcevic-Zach & Stock, 2018); and self-regulation (Ciesielkiewicz et al., 2014; Nguyen & Ikeda, 2015). Students become more active and responsible learners (Imafuku et al., 2018) and more engaged into knowledge acquisition (Gorbunovs et al., 2013).

This literature also shows that the e-portfolio approach has other positive effects indirectly or partially related to autonomy development. Using e-portfolios increases learners' ability to mobilize their creativity (Jimoyiannis & Tsiotakis, 2016; Terkowsky et al., 2012). E-portfolios also seem to have a beneficial impact on the development of professional identities (Imafuku et al., 2018) and competences (Rezgui et al., 2017; Slepcevic-Zach & Stock, 2018; van der Schaaf et al., 2017).

## Discussion

The reviewed literature indicates that using e-portfolios improves learner autonomy. However, as pointed out by Bryant & Chittum (2013), these results should be considered with care. The effectiveness of e-portfolio implementation remains insufficiently documented. More empirical evidence is needed as most studies are based on stakeholders' opinions rather than empirical data.

With respect specifically to the relationship between learning autonomy, e-portfolios and learner models, the literature remains scarce as few authors have addressed the topic (mainly Bull, 2004; Guo, 2007; Guo & Greer, 2007; and van der Schaaf et al., 2017). More research is needed; many challenges remain. More attention will have to be paid to standardizing methods and metrics in developing and using learner models (Bodily et al., 2018). Learner access to data needs to be reinforced (Bull & Kay, 2016), while the sharing of data between learners, supervisors and researchers remains problematic and requires sound

procedures (van der Schaaf et al., 2017). Design-based research could be helpful in this respect.

### References

- Alan, S. & Sunbul, A.M. (2015). Experimental studies on electronic portfolios in Turkey: A literature review. *International Journal of Research in Education and Science*, 1(1), 89-94.
- Alexiou, A., & Paraskeva, F. (2010). Enhancing self-regulated learning skills through the implementation of an e-portfolio tool. *Procedia - Social and Behavioral Sciences*, 2(2), 3048-3054.
- Barrett, H. (2010). Balancing the two faces of ePortfolios. *Educação, Formação, & Tecnologias*. 3(1), 189-198.
- Beckers, J., Dolmans, D., & van Merriënboer, J. (2016). E-portfolios enhancing students' self-directed learning: A systematic review of influencing factors. *Australasian Journal of Educational Technology*, 32(2), 32-46.
- Bélaïr, L. & Van Nieuwenhoven, C. (2010). Le portfolio, un outil de consignation ou d'évaluation authentique ? In Paquay L., Van Nieuwenhoven C. & Wouters P. (Eds.), *L'évaluation, levier du développement professionnel ?* (pp. 161-175). Bruxelles : De Boeck université.
- Bodily, R., Kay, J., Aleven, V., Jivet, I., Davis, D., Xhakaj, F., & Verbert, K. (2018). Open learner models and learning analytics dashboards: a systematic review. In *LAK '18: Proceedings of the 8th international conference on learning analytics and knowledge*. Sydney, New South Wales, Australia (pp. 41-50). ACM.
- Bryant, L. H., & Chittum, J. R. (2013). ePortfolio effectiveness: A(n ill-fated) search for empirical support. *International Journal of ePortfolio*, 3(2), 189-198.
- Bull, S. (2004). Supporting learning with open learner models. Keynote speech at the 4th Hellenic Conference with International Participation: Information and Communication Technologies in Education, Athens, Greece.
- Bull, S., & Kay, J. (2016). SMILI<sup>©</sup>: A framework for interfaces to learning data in open learner models, learning analytics and related fields. *International Journal of Artificial Intelligence in Education*, 26(1), 293-331.
- Burner, T. (2014). The potential formative benefits of portfolio assessment in second and foreign language writing contexts: A review of the literature. *Studies in Educational Evaluation*, 43, 139-149.
- Butler, P. (2006). *A Review of the Literature on Portfolios and Electronic Portfolios*. Working Paper, Massey University College of Education, Palmerstone.
- Büyükduman, I., & Şirin, S. (2010). Learning portfolio (LP) to enhance constructivism and student autonomy. *Procedia – Social and Behavioral Sciences*, 3, 55-61.
- Ciesielkiewicz, M., Munoz, G. N., & Priego, C. M. (2014). E-portfolio as a tool for the development of self-regulated learning skills. In L. G. Chova, A. L. Martinez, & I. C. Torres (Eds.), *Edulearn14 Proceedings*. 6th International Conference on Education and New Learning Technologies, Barcelona, Spain (pp. 2350-2354). IATED.

- Dominguez-Garcia, S., Garcia-Planas, M. I., Palau, R., & Taberna, J. (2015). Modelling E-portfolio for a Linear Algebra undergraduate course. *International Journal of Education and Information Technologies*, 9, 115-121.
- El Mawas, N., Gilliot, J.-M., Garlatti, S., Serrano Alvarado, P., Skaf-Molli, H., Eneau, J., Lameul, G., Marchandise, J.-F. & Pentecouteau, H. (2017). Towards a Self-Regulated Learning in a Lifelong Learning Perspective. CSEDU 2017: 9th International Conference on Computer Supported Education - Special Session Lifelong Learning, Apr 2017, Porto, Portugal. pp.661 - 670.  
<https://hal.archives-ouvertes.fr/hal-01574104/document>
- Eneau, J. (2008). From Autonomy to Reciprocity, or Vice Versa? French Personalism's Contribution to a New Perspective on Self-Directed Learning. *Adult Education Quarterly*, 58(3), 229-248.
- Eneau, J. & Develotte, C. (2012). Working online together to enhance learner autonomy. *ReCALL*, 24(1), 3-19.
- Eneau, J., Lameul, G. & Bertrand, E. (2014). Le stage en formation alternée dans l'enseignement supérieur : pour quel développement professionnel ? *Education et socialisation*, 35. Retrieved from <http://edso.revues.org/689>
- Gonzalez, J. A. (2009). Promoting student autonomy through the use of the European Language Portfolio. *Elt Journal*, 63(4), 373-382.
- Gorbunovs, A., Kapenieks, A., & Kudina, I. (2013). Competence development in a combined assessment and collaborative e-portfolio information system. In E. Ginters & E. Bluemel (Eds.), *Icte in Regional Development*, Valmiera, Latvia (Vol. 26, pp. 79-100). Elsevier.
- Green, J., Wyllie, A., & Jackson, D. (2014). Electronic portfolios in nursing education: a review of literature. *Nurse Education in Practice*, 14, 4-8.
- Guo, Z. (2007). *Connecting electronic portfolios and learner models*. Master's Degree thesis, Department of Computer Science, University of Saskatchewan, Canada.
- Guo, Z. N., & Greer, J. (2007). Bootstrapping Accurate Learner Models from Electronic Portfolios. In R. Luckin, K. R. Koedinger, & J. Greer (Eds.), *Artificial Intelligence in Education, Building Technology Rich Learning Contexts That Work*, Proceedings of the 13th International Conference on Artificial Intelligence in Education, AIED 2007, July 9-13, 2007, Los Angeles, California, USA. *Frontiers in Artificial Intelligence and Applications* (Vol. 158, pp. 297-304).
- Holec, H. (1981). *Autonomy and foreign language learning*. Oxford: Pergamon.
- Holt, P., Dubs, S., Jones, M., & Greer, J., (1991). The State of Student Modelling. In *Student Modelling: The Key to Individualized Knowledge-Based Instruction*, NATO ASI Series, London, UK: Springer Verlag.
- Imafuku, R., Kataoka, R., Ogura, H., Suzuki, H., Enokida, M., & Osakabe, K. (2018). What did first-year students experience during their interprofessional education? A qualitative analysis of e-portfolios. *Journal of Interprofessional Care*, 32(3), 358-366.
- Ivanova, O. V. (2017). The use of e-portfolio to develop English language learners' autonomy and independence. *Information Technologies and Learning Tools*, 60(4), 155-165.
- Jimoyiannis, A., & Tsiotakis, P. (2016). Self-directed Learning in e-Portfolios: Design Issues and Investigation of Students' Performance. In G. Vincenti, A. Bucciero, & C. V. de Carvalho (Eds.), *E-Learning, E-Education, and Online Training*, Second International Conference, eLEOT 2015, Novedrate, Italy (pp. 126-134). Springer.



- Khoosf, S. G., & Khosravani, M. (2014). Introducing Email Portfolio as a Means of Developing EFL Learner's Autonomy. In K. Sadeghi, S. Modirkhameneh, P. Alavinia, & Z. A. Khonbi (Eds.), *Proceedings of the International Conference on Current Trends in ELT*, Urmia University, Iran. Procedia - Social and Behavioral Sciences (Vol. 98, pp. 504-512). Elsevier.
- Kiffer, S., Eneau, J., Lameul, G., Pentecouteau, H., Desmontils, E., Garlatti, S., Gilliot, J.-M., Niang, M., Serrano-Alvarado, P. & Skaf-Molli, H. (2018). *Implementing a Lifelong Learning Approach to Enhance Learner's Autonomy Skills within an Apprenticeship Programme in Higher Education*. EARLI SIG 14 "Interaction, learning and professional development", Geneva, Switzerland.
- King, C. (2011). Fostering self-directed learning through guided tasks and learner reflection. *Studies in Self-Access Learning Journal*, 2(4), 257-267.
- Knowles, M. S. (1975). *Self-directed learning: A guide for learners and teachers*. Englewood Cliffs: Prentice Hall/Cambridge.
- Le Boucher, C., Lameul, G., & Pentecouteau, H. (2018). L'expérimentation du eportfolio à l'université : questionnements autour de la réflexivité. *The Canadian Journal for the Scholarship of Teaching and Learning*, 9(3). Retrieved from [https://ir.lib.uwo.ca/cjsotl\\_rcacea/vol9/iss3/7](https://ir.lib.uwo.ca/cjsotl_rcacea/vol9/iss3/7)
- Long, H. B. (1989). Self-directed learning: Merging theory and practice. In Long, H. B., (Ed.), *Self-directed learning: Emerging theory and practice* (pp. 1-12). Norman, Oklahoma: Research Center for Continuing Professional and Higher Education of the University of Oklahoma.
- Lopez-Fernandez, O., & Rodriguez-Illera, J. L. (2009). Investigating university students' adaptation to a digital learner course portfolio. *Computers & Education*, 52(3), 608-616.
- Matthews-DeNatale, G. (2014). Are we who we think we are? E-portfolios as a tool for curriculum redesign. *Journal of Asynchronous Learning Networks*, 17(4), 41-55.
- Meeus, W., Van Petegem, P., & Meijer, J. (2008). Stimulating independent learning: a quasi-experimental study on portfolio. *Educational Studies*, 34(5), 469-481.
- Nguyen, L. T., & Ikeda, M. (2015). The effects of ePortfolio-based learning model on student self-regulated learning. *Active Learning in Higher Education*, 16(3), 1-16.
- Panke, S. (2014). E-Portfolios in Higher Education Settings: A Literature Review. In T. Bastiaens (Ed.), *Proceedings of World Conference on E-Learning*, New Orleans, USA (pp. 1530-1539). Association for the Advancement of Computing in Education (AACE).
- Raybourn, E. & Regan, D. (2011). *Exploring E-portfolios and Independent Open Learner Models*. Interservice/Industry Training, Simulation and Education Conference, Orlando, Florida, USA.
- Rezgui, K., Mhiri, H., & Ghedira, K. (2017). Ontology-based e-Portfolio modeling for supporting lifelong competency assessment and development. In C. ZanniMerk, C. Frydman, C. Toro, Y. Hicks, R. J. Howlett, & L. C. Jain (Eds.), *21st International Conference on Knowledge Based an Intelligent Information and Engineering Systems, KES2017*, Marseille, France. Procedia Computer Science (Vol. 112, pp. 397-406). Elsevier.
- Romero, R. T. (2014). E-portfolio in secondary school: literature review. In L. G. Chova, A. L. Martinez, & I. C. Torres (Eds.), *Edulearn14 Proceedings*. 6th International

- Conference on Education and New Learning Technologies, Barcelona, Spain (pp. 5453-5462). IATED.
- Scully, D., O'Leary, M. & Brown, M. (2018). *The Learning Portfolio in Higher Education: A Game of Snakes and Ladders*. Dublin: Dublin City University, Centre for Assessment Research, Policy & Practice in Education (CARPE) and National Institute for Digital Learning (NIDL).
- Slepcevic-Zach, P. & Stock, M. (2018). ePortfolio as a tool for reflection and self-reflection. *Reflective Practice*, 19(3), 291-307.
- Šliogerienė, J. (2016). Using portfolios to enhance self-regulated learning. *Sustainable Multilingualism*, 9  
<http://uki.vdu.lt/sm/index.php/sm/article/view/149>
- Terkowsky, C., May, D., Haertel, T., & Pleul, C. (2012). *Experiential Remote Lab Learning with E-Portfolios Integrating tele-operated experiments into environments for reflective learning*. 15th International Conference on Interactive Collaborative Learning and 41st International Conference on Engineering Pedagogy, Villach, Austria.
- van der Schaaf, M., Donkers, J., Slof, B., Moonen-van Loon, J., van Tartwijk, J., Driessen, E., & Ten Cate, O. (2017). Improving workplace-based assessment and feedback by an E-portfolio enhanced with learning analytics. *ETR&D-Educational Technology Research and Development*, 65(2), 359-380.
- Wolf, K. & Dietz, M. (1998). Teaching portfolios; purposes and possibilities. *Teacher Educational Quarterly*, 25(1), 9-22.
- Yildirim, R. (2013). The Portfolio Effect: Enhancing Turkish ELT Student-Teachers' Autonomy. *Australian Journal of Teacher Education*, 38(8).
- Zeichner, K., & Wray, S. (2001). The teaching portfolio in US teacher education programs: What we know and what we need to know. *Teaching and Teacher Education*, 17(5), 613-621.