

SUMMARY REPORT

4.4 Results and Report of the Validation of the e-Toolkit



Responsible person for Output 4: Dr Michail Kalogiannakis

Working group at UOC: Dr Michail Kalogiannakis, Dr Stamatis Papadakis, Dr Maria Ampartzaki, Mr Zourmpakis Alkinoos

April 2023

Table of Contents

1.	INTRODUCTION	3
1.1.	Rationale and Aim of the Output	3
1.2.	Aim and Objective of the Review	3
2.	LITERATURE REVIEW	4
2.1.	The Toolkit.....	5
2.2.	The State of Internation Mobility Learning.....	7
3.	DISCUSSION.....	9
4.	CONCLUSION.....	10
5.	REFERENCES	11

1. INTRODUCTION

1.1. Rationale and Aim of the Output

1. The purpose of Output 4 was to achieve the development and testing of an open-access web-based e-learning Toolkit (e-Toolkit) to improve the digital competence of teachers and mobility students. The Toolkit will provide innovation focusing on course creation, quality enhancement, using technology-enhanced teaching (in the way of Online Distance learning), and improving digital competencies. Additionally, it aims to support teachers in digital course development and decreases development time and costs for organizations in course development. This web-based e-learning Toolkit will offer students better open and distance learning courses and enhance their learning success.

Activity 4.4 aims to analyze the research study's results, validate the e-toolkit learning contribution, and make further suggestions for improvement.

1.2. Aim and objectives of the review

The Activity aimed to analyze the previous work of outputs so far, the results of the research study, the validation of the e-toolkit, and make further suggestions for further improvement.

2. Literature review

Due to the rapid globalization of the national economies, labour market workforce mobility across nations has been steadily increasing. The continuous changes in labour markets and industries have put pressure on education, especially universities. Specifically, the number of students travelling to a different country to pursue studies in 2019 was more than double compared to 2007 (OECD, 2021). The amount of international students in higher education has been increasing since 1998 by 5.5% on average (OECD, 2021). As most countries have concluded that international mobility students could benefit their economy and industries, they have put pressure on higher education institutes to internationalize their curriculum and provide the increasing number of international students with the proper teaching and learning approaches and competencies to meet their needs (Huang & Jung, 2020).

Over the last 15 years, many institutions have freely embraced openness and universal access to educational content for the public (McGreal, 2017). The term Open Educational Resources (OER), given during a UNESCO Forum (Johnstone, 2005), refers to teaching, learning, and research resources that can be freely accessed by the users, used in various ways, and re-purposed if need be. The growing adoption of OER has led to many educational materials and resources that everyone can access (McGreal, 2017).

However, the existence of various resources does not necessarily mean finding specific OER for a particular purpose. As such, we gathered OER material for developing digital competencies and developed an e-toolkit to be used by teachers, researchers, and students. This e-toolkit was developed in the context of the European project "Weeks of International Teaching-Inclusive and Digital (WITEA-ID)". This digital e-Toolkit was designed to assist international students and teachers before, during, and after their mobility in growing their digital skills and competencies and acquiring the required knowledge to be competent and confident users of technology in their teaching or international mobility.

According to empirical research, the majority of evidence suggests that international experiences positively influence students' individual development, including their intercultural understanding and foreign language competence, as well as their academic development (Beine et al., 2014; Caveziel et al., 2016; Patelarou et al., 2023). Additionally, participating in mobility programs has consistently been shown to assist students in developing international competence and becoming better prepared regarding future work requirements, particularly within the European economy. Moreover, students gain a significant advantage in securing their first job after graduation and advancing their early careers (Severino et al., 2014; Bryla, 2015).

Mobility programs like Erasmus have positively affected labour market mobility within Europe. Studying abroad can significantly increase the likelihood of a person choosing to work in a

foreign country (Roy et al.,2019). Additionally, students' professional development and higher education can be affected considerably by international experience. This encompasses foreign language competence, which can heavily impact the students' career development and job prospects (Bryla, 2015).

2.1 The Toolkit

The Toolkit was developed to reform technical cooperation and project implementation. The Toolkit is directed towards decision-making and planning of science mobilities and is designed to ensure attention to questions such as the following (EU, 2011):

- What are the more major current problems and their symptoms that could explain the present capacity situation when it comes to the planning and execution of scientific collaboration mobilities by staff and students?
- What is the effective demand for support and competence development among students and staff?
- What is the current level of mobility experience available to students and staff with their current perceived levels of competence in planning and executing a scientific collaboration mobility?
- How can WITEA-ID design an output-focused capacity development process to provide active toolkit decision-making support to students and staff embarking on scientific collaboration mobilities?

With these questions in mind, we moved forward to developing a mind map of the approaches in planning and populating the e-Toolkit. The decision to use the flow chart approach was informed by information derived from the work of Miyazaki et al. (2017).

The realization of learning opportunities for explorative proving so that students can plan proofs together with constructing them, examine their proof construction processes/product, improve them if necessary, and/or advance them to further proving. Under this principle, focusing on planning proofs as the essential part of explorative proving, the system's design adopts the open-problem situation of proving to amplify the planning proofs, as shown in the second subsection below. This usage can enhance students' capacity to think backwards and forward to connect conclusions with assumptions. Additionally, the principles of feedback (see final subsection below) are carefully considered so that learners can modify and improve their proving activities, which we consider to realize the interaction between 'Producing proof' and 'Looking back' as the critical parts of explorative proving in school mathematics.

In this same line, inspiration was also derived from another project where the development of an e-Toolkit for educational purposes was also developed (Mazohl et al., 2018a; Mazohl et al., 2018b; Ossiannilsson et al., 2019). The concept of interactive engagement with the Toolkit and the possibility of open-ended problem-solving inspired the structure and the functioning of the WITEA-ID Toolkit.

A framework illustration was used to structure and develop the e-Toolkit on the WordPress platform. Based on the mentioned literature support, it was decided to develop the e-Toolkit to offer a more spherical (holistic) growth experience than a linear, single-outcome process. An essential requirement is that the flow of mind is attractive and easy for the students and staff.

The internal structuring must therefore allow for multiple road mapping experiences to allow for different angles to possible solutions. It is also important to note that most client journeys only sometimes happen linearly. Instead, clients often take a back-and-forth, cyclical, multi-channel journey.

We used this reference to lead us in the thinking to develop the functionality of the Toolkit. Especially the section on quality assurance testing was essential to consider in the development and functionality of the Toolkit. To implement these aspects, it was decided to use the following rubric evaluation framework to design the Toolkit. To ensure that the Toolkit meets the basic requirements for functionality in Higher Education, we followed a rubric of suggestions for functional effectiveness developed by Anstey & Watson (2018).

The Rubric for E-Learning Tool Evaluation offers a framework, with criteria and levels of achievement, to assess the suitability of an e-learning tool for their learners' needs and their own learning outcomes and classroom context. This rubric articulates the appropriate assessment criteria for e-learning tools using the standard design components of other analytical rubrics: categories, criteria, standards, and descriptors.

The rubric's evaluation criteria are into eight categories. Each category has specific characteristics or criteria against which e-learning tools are evaluated. Each criterion is assessed against three standards: works well, minor concerns, or serious concerns. Finally, the rubric offers individual descriptions of the qualities an e-learning tool must have to achieve a standard.

Although our rubric integrates a broad range of functional, technical, and pedagogical criteria, it is not intended to be overly prescriptive. We aim for the framework to respond to a client's needs and be adapted appropriately. For example, when a rubric criterion is not relevant to the assessment of a particular tool, it can be excluded without impacting the overall quality of the toolkit experience.

Given the diversity of outcomes across learning experiences, this e-toolkit provides the basis for intended learning outcomes and planned instructional activities to develop the necessary competencies and capacities to support the planning and execution of high-quality collaborative scientific internationalization experiences. We designed the rubric with this intention in mind.

The functional mind map (Figure 2) was developed for the e-Toolkit implementing the approaches in the planning and populating the e-Toolkit as conceptualized above. This illustration only illustrates the functional modelling concept in the Toolkit. The structuring and linkages in the Toolkit allow for different variations and permutations of interactive Activity to meet the client's demands.

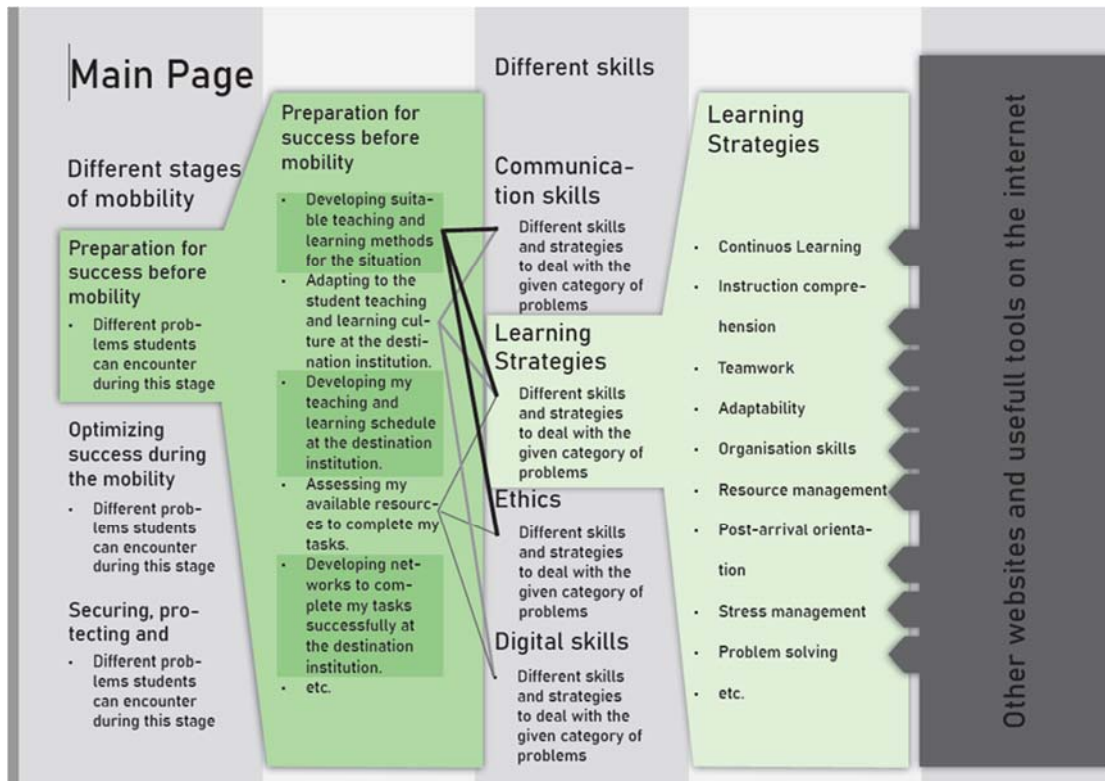


Figure 2. Developed Mind Map for the e-Toolkit

2.2 The State of Internation Mobility Learning

Despite the growing scientific interest in the importance of learning and teaching in the IM field, only a few studies focus on interventional studies and their effectiveness (Aguayo et al., 2022; Mohammed, 2022). In particular, studies that use quantitative data or evaluate the impact of educative interventions on students' learning and IM competencies are rare, and teachers need to be more noticed.

Teaching and learning in the field of IM is a complex and newly researched topic with limited knowledge about effective learning interventions. Therefore, it is reasonable for researchers to use various learning strategies to explore their impact. What is more, based on studies in IM have shown promising results; however, it is also essential to identify the obstacles and aspects that hinder their learning in IM.

There is currently an unprecedented selection of electronic educational tools that can be utilized to improve learning in education. The COVID-19 pandemic has emphasized automating specific routine tasks related to course development, competency building, and enhancing time management. Educators' main obstacle is gaining the necessary knowledge and skills to utilize these electronic tools effectively.

The primary focus of this e-toolkit is to utilize the different stages of mobility, learning strategies, and various skills, including the extensive use of ICT, to enhance the digital competencies of both students and teachers. The main goal is to improve the learning capabilities of these individuals, which can be accomplished by prioritizing high-quality educational material. The learning process is designed to minimize the instructor's involvement, as Poulakakis et al. (2017) emphasized. The project also

employs the flipped learning pedagogical approach and Open Educational Resources (OER) to provide a contemporary approach to digital teaching, reinforced by multimedia-based teaching material.

This study aimed to educate teachers and students about the options available and the common challenges associated with adopting them. The e-toolkit was developed in a web-based format, which allows learners to access course materials at their convenience, from any location with an internet connection (preferably high-speed), and as frequently as desired. Adopting one or more of these tools with careful consideration can be effective and may lead to the unintended consequence of frustrating educators by increasing the time spent on designing and delivering instruction. If teachers and students perceive that integrating these tools into their activities requires excessive effort, it is unlikely that they will make the necessary changes.

E-tools involved in validation processes come in various types and offer various functions (Hao et al., 2005). These tools are characterized by the software used and the built-in competencies that they possess. This study incorporates different types of e-tools, from those that facilitate documentation and clarification to databases. This tool has multiple functions, and there is a considerable variation in the comprehension of competencies that this tool is based on, as showcased above.

International student mobility is becoming more critical to improving students' multicultural effectiveness and future professional educational potential. Alongside the growth of international education and mobility, there is increasing recognition of the need to develop intercultural competence (Unesco, 2013; Deardorff & Arasaratnam-Smith, 2017). However, there needs to be more knowledge about effective learning strategies and e-toolkits that can positively impact students in international student mobility, as only a few studies have focused on this topic.

3. Discussion

International student mobility is an increasingly crucial educational means to enhance students' various competencies that will assist them in the future in their line of work. Due to the Covid-19 pandemic, the development of competencies digital competencies has become even more critical than ever. Effectively teaching and working online is a fundamental skill nowadays.

WITEA-ID aims to bring an innovative approach to internationalization in higher education in the digital environment. The project focuses on the development of a Web-based e-learning Toolkit (e-Toolkit), an open-access online resource to improve international mobility competencies in higher education, helping to assess competence growth, that would assist in the development of competencies of students and staff in communication, intercultural, learning and digital and the building of self-confidence in an international environment.

Competencies are the knowledge, skills, abilities, and behaviours contributing to individual and organizational performance necessary for successful mobilities. As shown from IO3, a mind mapping was developed regarding the Utility Functions of the Toolkit. The main idea was to build of conceptual problem perspective based on quick links and offers of easy guidelines on the eToolkit website, collect information to build alternative options, solutions, and action maps on the digital competencies and lastly, evaluate and select relevant and applicable information, and actions for successful mobilities as such efforts were made to incorporate features that accommodate different cultural pedagogy and learning styles to prevent learners from feeling lost or feeling dissatisfied with the online learning experience. The Toolkit incorporates a variety of modules in one e-Toolkit with the use of online digital platforms so that the educational material will be available in open access to groups. Each level is accompanied by a description of its relevance and examples of digital tools that connect with this taxonomy framework.

However, since there was a need to test the effectiveness of such a toolkit and since the use of the Toolkit itself is associated with the aspect of digital competencies, it was decided to test the effectiveness of the Toolkit in developing digital competencies. Additionally, using the e-toolkit should not be arbitrary but should follow a specific learning strategy. This way, we could determine its full capabilities in education in a specific way. However, according to the findings of IO1, only a few studies assess the impact of learning strategies on students learning and international mobility competence and utilize quantitative methods. Also, even among those few studies, they all followed different learning strategies. However, given the nature of the technological tool, the workshops' format that would be utilized within the International Weeks, and the study of Walsh et al. (2020), it was decided to utilize the flipped learning approach.

Based on the findings of the 4.2 and 4.3 activities, it was shown that teachers and students managed to improve their digital competencies. Additionally, they displayed positive views regarding the usability learning experience and acceptability of the e-toolkit. The perceived usefulness is a crucial determinant of the users' attitudes towards using a technological tool (Park & del Pobil, 2013). was particularly high. Since the design of the digital competencies section follows the same as all other areas, it can be assumed that the format of the e-toolkit, along with the use of a learning strategy, like the flipped learning approach, can assist students and teachers in developing international mobility competencies.

4. Conclusion

The education system still faces the challenge of developing digital competencies effectively, especially in utilizing digital means in education where teachers need more adequate skills. It is, therefore, essential to prioritize both initial and continuous educational interventions in this scope, which is a requirement that applies to all levels of education.

Although the partners of the WITEA Erasmus program that took part in this project and research study considered the completion of the event satisfactory, improvements could certainly be made. The one-week course duration was tight for the amount of information exchanged, making the work tedious for both the teaching team and learners. To enhance the experience, it would be beneficial to generalize it on a larger scale and conduct a more in-depth assessment of the competencies acquired using qualitative methods. Furthermore, incorporating this learning into a more remote and digital format could improve the results and give the curricula access to technical and pedagogical support from universities, improve the results, and remove obstacles such as those raised concerning coherence and practical use.

Based on the results of the IO4, all partners of the WITEA-ID project have agreed upon the potential of the e-toolkit in developing International Mobility competences. On the other hand, improvements could be made concerning the e-toolkit itself. Introducing the concept of a journey map would lead the client from his/her identified point of departure (identified competence need) to the logical conclusion of the journey (solutions and decision-making support outcomes). Also, additional decision-making support apps could be included to complete the customer journey to reach full support for addressing the competence needs. A second experience, based on Massive open online courses (MOOCs) for a larger audience, could provide more flexibility and connectivity and alleviate the economic problems while providing students with international experiences and opportunities.

In addition, potential plans include expanding the e-toolkit to be used in other projects. The logical next steps are to use it as a tool to develop a database for the improvement of mobility skills of students and staff or introduce online assistances, such as chatbots, to guide further and assist students in entirely making use of the e toolkit.

References

Aguayo, J. M., Valdes, J., Cordoba, V. H., Nájera, M., Vázquez, F. R., Muñoz, E., & García Lirios, C. (2022). Digital activism in students of a university in central Mexico in the COVID-19 era. *Advances in Mobile Learning Educational Research*, 2(1), 297-307. <https://doi.org/10.25082/AMLER.2022.01.014>

Anstey L.M. & Watson G. P. L. (2018). Rubric for eLearning Tool Evaluation. Available at: <https://teaching.uwo.ca/pdf/elearning/Rubric-for-eLearning-Tool-Evaluation.pdf>

Beine, M., Noël, R., & Ragot, L. (2014). Determinants of the international mobility of students. *Economics of Education Review*, 41, 40-54.

Bryła, P. (2015). The impact of international student mobility on subsequent employment and professional career: A large-scale survey among Polish former Erasmus students. *Procedia-Social and behavioral sciences*, pp. 176, 633–641.

Caviezel, V., Falzoni, A.M., Vitali, S. (2016). Esperienza erasmus: motivazioni e timori prima della partenza. *Stat. Soc.* <http://www.rivista.sis-statistica.org/cms/?p=74>

Deardorff, D. K., & Arasaratnam-Smith, L. A. (2017). Intercultural competence: An emerging focus in international higher education. In *Intercultural competence in higher education* (pp. 294-302). Routledge. <https://doi.org/10.4135/9781452218397.n16>

Hao, X., Qu, J. J., Bhoi, S., Dasgupta, S., Wang, W., Xie, Y., ... & Wang, C. (2005, July). Development and enhancement of calibration/validation toolkit for supporting NPOESS/NPP missions. In *Proceedings. 2005 IEEE International Geoscience and Remote Sensing Symposium, 2005. IGARSS'05.* (Vol. 1, pp. 113-116). IEEE

Huang, Q., & Jung, J. (2020). DEVELOPMENT OF STRATEGIES FOR INTERNATIONALISING CHINESE HIGHER VOCATIONAL EDUCATION. *Journal of Institutional Research South East Asia*, 18(1).

Johnstone, S. M. (2005). Open educational resources serve the world. *Educause Quarterly*, 28(3), 15–18.

Mazohl, P., Ossiannilsson, E., Makl, H., Ampartzaki, M., & Kalogiannakis, M. (2018a). Virtual Teachers' Toolbox - An Innovative Tool to Assist the Creation of High-Quality Open Distance Learning Courses. In B. McLaren, R. Reilly, S. Zvacek, & J. Uhomibhi (Eds), *Proceedings of the 10th International Conference on Computer Supported Education (CSEDU 2018)*, Vol 2, 555-560, Funchal, Madeira, Portugal, 15-17 March, 2018.

Mazohl, P., Ossiannilsson, E., Makl, H., Ampartzaki, M., & Kalogiannakis, M. (2018b). An innovative tool to assist the creation of high quality open and distance learning courses - The Virtual Teachers Toolbox (VTT-Box.eu) In *Exploring the Micro, Meso and Macro: Navigating between dimensions in the digital learning landscape Proceedings*

of the European Distance and E-Learning Network, EDEN 2018 Annual Conference, Genova, 550-556, 17-20 June, 2018.

McGreal, R. (2017). Special report on the role of open educational resources in supporting the sustainable development goal 4: Quality education challenges and opportunities. *The International Review of Research in Open and Distributed Learning*, 18(7).

Mohammed, D. Y. (2022). The web-based behavior of online learning: An evaluation of different countries during the COVID-19 pandemic. *Advances in Mobile Learning Educational Research*, 2(1), 263-267. <https://doi.org/10.25082/AMLER.2022.01.010>

OECD. Education at a Glance: OECD Indicators; OECD Publishing: Paris, France, 2021.

Ossiannilsson, E., Ampartzaki, M., Kalogiannakis, M., & Mazohl, P. (2019). The VTT-BOX, Pedagogical and Quality Considerations. In B. McLaren, R. Reilly, S. Zvacek, & J. Uhomuibhi (Eds), *Proceedings of the 11th International Conference on Computer Supported Education (CSEDU 2019), Vol 1*, 654-659, Heraklion, Crete, Greece, 2-4 May, 2019.

Park, E., & del Pobil, A. P. (2013). Technology acceptance model for the use of tablet PCs. *Wireless personal communications*, 73, 1561-1572.

Patelarou, E., Trivli, A., Đorđević, V., Papadakis, S.E, Papadourakis, G.M, Zourmpakis, A.I., Ampartzaki, M., Menšíková, M., Ljubišić, N.B, Kalogiannakis, M,, & Patelarou, A. (2023). Core Competencies for International Mobility for Teachers and Students in Higher Education. *Population Medicine 2023* (in press).

Poulakakis, Y., Vassilakis, K., Kalogiannakis, M., & Panagiotakis, S. (2017). Ontological modeling of educational resources: a proposed implementation for Greek schools. *Education and Information Technologies*, 22, 1737-1755.

Roy, A., Newman, A., Ellenberger, T., & Pyman, A. (2019). Outcomes of international student mobility programs: A systematic review and agenda for future research. *Studies in Higher Education*, 44(9), 1630–1644.

Severino, S., Messina, R., & Llorent, V.J. (2014). International student mobility: an identity development task? *International Journal of Humanities and Social Science*, 4(3), 89–103.

UNESCO (2013). *Intercultural competences: Conceptual and operational framework*. Paris: UNESCO. <http://unesdoc.unesco.org/images/0021/002197/219768e.pdf>