







EMPOWERING AUTONOMY THROUGH FEEDBACK: PROPOSALS FOR HYBRID LEARNING IN HIGHER EDUCATION

Ana María Cea Álvarez , Pedro Dono López , M. Dolores Lerma Sanchis ,
Jordi Mogas , Carlos Pazos-Justo  and Xavier Rambla 

MANUAL FOR HIGHER EDUCATION TEACHERS

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Cea Álvarez, Ana María

ORCID: [0000-0002-7383-9646](https://orcid.org/0000-0002-7383-9646)

Dono López, Pedro

ORCID: [0000-0003-0780-6982](https://orcid.org/0000-0003-0780-6982)

Lerma Sanchis, M. Dolores

ORCID: [0000-0001-6704-5199](https://orcid.org/0000-0001-6704-5199)

Mogas, Jordi

ORCID: [0000-0003-3385-5534](https://orcid.org/0000-0003-3385-5534)

Pazos-Justo, Carlos

ORCID: [0000-0001-6172-3059](https://orcid.org/0000-0001-6172-3059)

Rambla, Xavier

ORCID: [0000-0003-1634-4003](https://orcid.org/0000-0003-1634-4003)

This document is the Intellectual Output 1 of the BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>) project, an Erasmus+ Strategic Partnership (Ref. 2020-1-ES01-KA203-082513). It is a translation of the original handbook for teachers written in Spanish:

Cea Álvarez, A. M., Dono López, P., Lerma Sanchis, M. D., Mogas Recalde, J., Pazos-Justo, C., & Rambla, X. (2023). Potenciar la autonomía mediante la retroalimentación: propuestas para el aprendizaje híbrido en la educación superior. Edições Húmus. <https://doi.org/10.21814/1822.82097>

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Co-funded by the
Erasmus+ Programme
of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

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ABSTRACT

This handbook presents some of the results of the collaborative research carried out within the inter-university project BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>). This project focused on analyzing and implementing hybrid learning and/or b-learning pedagogical strategies to promote autonomy in a context of mutation caused by the latest pandemic.

The theoretical framework, integrated by constructivist and connectivist approaches to learning, highlights the transformative change of roles between learners and teachers, whose strategies stress self-regulation through enhanced feedback in a digital context.

The handbook presents the implementation process of the project in the different universities and describes some instruments (questionnaires) and research procedures (focus groups and interviews), especially designed to draw the profile of the target students, to improve the delivery of teacher feedback and to collect the students' metacognitive achievements (rubrics). The detailed analysis of the data, which combines qualitative and quantitative techniques, provides evidence that the delivery of teacher feedback, enhanced by digital tools, increases the students' capacity for self-regulation. Among the various educational tools used, the digital reflective portfolio stands out as it allows longitudinal collection of samples of the development of student autonomy, is useful for planning university teaching and makes it possible to send quality feedback. In addition, this part of the handbook includes an analysis of the feedback reports that the teachers shared with each other in the context of the project and in which not only various types of feedback are identified according to the different activities that the students carry out, but also information on the students' performance and progress.

The manual concludes with a series of recommendations addressed to the teachers so that they can introduce some changes in the methodology and pedagogical design in order to increase the metacognitive awareness of the higher education students, to encourage

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greater self-reflection and to develop their self-criticism, individual engagement and self-organization.

Keywords: autonomy, feedback, hybrid-learning, pedagogical strategies.

RESUMEN

En este manual se recogen algunos de los resultados de la investigación colaborativa llevada a cabo en el seno del proyecto interuniversitario BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>). Este proyecto estaba centrado en analizar e implementar estrategias pedagógicas del aprendizaje híbrido y/o *b-learning* para fomentar la autonomía en un contexto de mutación provocado por la última pandemia.

El marco teórico, integrado por corrientes constructivistas y conectivistas del aprendizaje, pone de manifiesto el transformador cambio de roles entre estudiantes y docentes, cuyas estrategias priorizan la autorregulación a través de una retroalimentación mejorada en contexto digital.

En el manual se presenta el proceso de implementación del proyecto en las diferentes universidades y se describen algunos instrumentos (cuestionarios) y procedimientos de investigación (realización de grupos focales y entrevistas), concebidos especialmente para diseñar el perfil de las alumnas meta, para optimizar el envío de *feedback* docente y recoger los logros metacognitivos de las estudiantes (rúbricas). A través del análisis detallado de los datos, que combina una metodología cualitativa y cuantitativa, se recogen evidencias de que el envío del *feedback* docente, potenciado por las herramientas digitales, aumenta la capacidad de autorregulación de las estudiantes. Entre las diversas herramientas educativas utilizadas destaca el portafolio reflexivo digital que permite recoger de forma longitudinal muestras del desarrollo de la autonomía de las estudiantes, resulta útil para la planificación de la docencia universitaria y posibilita el envío de un *feedback* de calidad. Además, en esta parte del manual se incluye un análisis de los informes de retroalimentación que las docentes compartieron entre sí en el contexto del proyecto y en los cuales se identifican no solo varios tipos de retroalimentación en función de las diferentes actividades que las estudiantes llevan a cabo, sino también información sobre el rendimiento y progreso de las estudiantes.

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El manual concluye con una serie de recomendaciones, dirigidas a las docentes, con el fin de que puedan introducir algunos cambios en la metodología y diseño pedagógico para ampliar la conciencia metacognitiva de las estudiantes de enseñanza superior, propiciar una mayor autorreflexión y desarrollar su capacidad autocrítica, compromiso individual y autoorganización.

Palabras clave: autonomía, retroalimentación, aprendizaje-híbrido, estrategias pedagógicas.

RESUMO

Este manual apresenta alguns dos resultados da investigação colaborativa realizada no âmbito do projeto inter-universitário BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>). Este projeto centrou-se na análise e implementação de estratégias pedagógicas híbridas de aprendizagem e/ou b-learning para promover a autonomia num contexto de mutação causada pela última pandemia.

O quadro teórico, integrado por correntes construtivistas e conetivistas da aprendizagem, destaca a mudança transformadora de papéis entre estudantes e professoras, cujas estratégias dão prioridade à auto-regulação através de um feedback melhorado num contexto digital.

O manual apresenta o processo de implementação do projecto nas diferentes universidades e descreve alguns instrumentos (questionários) e procedimentos de investigação (grupos focais e entrevistas), especialmente concebidos para traçar o perfil das estudantes alvo, para otimizar a entrega de feedback das professoras e para recolher os resultados metacognitivos (grelhas de avaliação). A análise detalhada dos dados, que combina metodologia qualitativa e quantitativa, fornece provas de que a entrega de feedback das professoras, reforçada por ferramentas digitais, aumenta a capacidade de auto-regulação das alunas. Entre as várias ferramentas educativas utilizadas, destaca-se o portfólio digital reflexivo que permite a recolha longitudinal de amostras do desenvolvimento da autonomia das estudantes, é útil para o planeamento do ensino universitário e possibilita o envio de feedback de qualidade. Além disso, esta parte do manual inclui uma análise dos relatórios de feedback que as professoras partilharam entre si no contexto do projecto, que identificam não só vários tipos de feedback sobre as diferentes actividades que as alunas realizam, mas também informações sobre o desempenho e progresso das estudantes.

O manual conclui com uma série de recomendações, dirigidas às docentes, com o intuito de introduzir algumas mudanças na metodologia de ensino e desenho pedagógico que

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procuram alargar a consciência metacognitiva das estudantes do ensino superior, encorajar uma maior auto-reflexão e desenvolver a sua autocrítica, empenho individual e auto-organização.

Palavras-chave: autonomia, feedback, aprendizagem híbrida, estratégias pedagógicas.

RESUM

En aquest manual es recullen alguns dels resultats de la recerca col·laborativa duta a terme al projecte interuniversitari BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>). En aquest projecte s'ha fet un seguiment d'estratègies pedagògiques d'aprenentatge híbrid i/o b-learning per fomentar l'autonomia de l'alumnat en un context de canvis profunds provocats per la pandèmia de Covid-19.

El marc teòric, integrat per corrents constructivistes i connectivistes de l'aprenentatge, palesa el canvi del paper tant de les estudiants com de les docents, i com un seguit d'estratègies pedagògiques prioritzen l'autoregulació a través d'una retroalimentació (*feedback*) millorada en contextos digitals.

Al manual presentem com hem dut a terme el projecte a les diferents universitats i descrivim els qüestionaris, els grups de discussió i les entrevistes aplicades. Hem concebut aquests procediments de tal manera que còpsessin el perfil metacognitiu de les alumnes, moltes de les quals havien seguit rúbriques precises d'avaluació, i totes les quals havien rebut de diverses maneres un seguit de comentaris qualitius de retroalimentació del professorat. A través de l'anàlisi detallada de les dades, que combina una metodologia qualitativa i quantitativa, es recullen evidències que l'enviament de retroalimentació docent, afavorit per les eines digitals, augmenta la capacitat d'autoregulació de les estudiants.

Entre les diverses eines educatives utilitzades destaca el portafolis reflexiu digital, que permet recollir de manera longitudinal mostres del desenvolupament de l'autonomia de les estudiants. Alhora, ajuda a planificar la docència universitària i a aportar una retroalimentació de qualitat. A més, incloem una anàlisi dels informes de retroalimentació que les docents van compartir entre si en el context del projecte, en els quals s'identifiquen no només diversos tipus de retroalimentació en funció de les diferents activitats que les estudiants duen a terme, sinó també informació sobre el seu progrés.

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El manual conclou amb una sèrie de recomanacions, dirigides a les docents, a fi de suggerir alguns canvis en la metodologia i disseny pedagògic per ampliar la consciència metacognitiva de les estudiants d'educació superior, propiciar una autoreflexió més gran i desenvolupar la seva capacitat autocrítica, compromís individual i autoorganització.

Paraules clau: autonomia, retroalimentació, aprenentatge-híbrid, estratègies pedagògiques.

RÉSUMÉ

Ce manuel présente certains des résultats de la recherche collaborative menée dans le cadre du projet interuniversitaire BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>). Ce projet s'est concentré sur l'analyse et la mise en œuvre de stratégies pédagogiques d'apprentissage hybride et/ou de formation en ligne pour promouvoir l'autonomie de l'étudiant dans un contexte de mutation causé par la dernière pandémie.

Le cadre théorique, intégrant des approches *constructivistes* et *connectivistes* de l'apprentissage, met en évidence le changement transformatif des rôles entre les apprenants et les enseignants, dont les stratégies mettent l'accent sur l'autorégulation par le biais d'un feedback amélioré dans un contexte numérique.

Le manuel présente le processus de mise en œuvre du projet dans les différentes universités et décrit certains instruments (questionnaires) et procédés de recherche (groupes de discussion et entretiens), spécialement conçus pour dessiner le profil des étudiants cibles, améliorer la communication du feedback de l'enseignant et recueillir les réalisations métacognitives des étudiants (rubriques). L'analyse détaillée des données, qui combine des techniques qualitatives et quantitatives, démontre que le feedback de l'enseignant, renforcé par des outils numériques, augmente la capacité d'autorégulation des étudiants. Parmi les différents outils pédagogiques utilisés, le portfolio réflexif numérique se détache, car il permet la collecte longitudinale d'échantillons relatifs au développement de l'autonomie des étudiants. Il est également utile pour la planification de l'enseignement universitaire et permet d'envoyer un feedback de qualité. En outre, cette partie du manuel comprend une analyse des rapports de retour d'information que les enseignants se sont échangés dans le cadre du projet et dans lesquels sont identifiés non seulement divers types de retour d'information en fonction des différentes activités réalisées par les étudiants, mais aussi des informations sur les performances et les progrès des étudiants.

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Le manuel se termine par une série de recommandations adressées aux enseignants afin qu'ils puissent introduire des changements dans la méthodologie et la conception pédagogique dans le but d'augmenter la conscience métacognitive des étudiants de l'enseignement supérieur, d'encourager une plus grande autoréflexion et de développer leur autocritique, leur engagement individuel et leur auto-organisation.

Mots clés: autonomie, feedback, apprentissage hybride, stratégies pédagogiques.

SAMMENDRAG

Denne håndboken presenterer noen av resultatene fra samarbeidsforskningen utført i prosjektet BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>), et samarbeidsprosjekt mellom flere universitet. Prosjektet fokuserte på å analysere og implementere hybrid læring og / eller blandet læring i pedagogiske strategier, for å fremme autonomi i en kontekst av forandring forårsaket av den siste pandemien.

Det teoretiske rammeverket, integrert av konstruktivistiske og konnektivistiske tilnærminger til læring, fremhever den transformative rolleendringen mellom elever og lærere, hvis strategier legger vekt på selvregulering gjennom forbedret tilbakemelding i en digital kontekst.

Håndboken presenterer gjennomføringsprosessen av prosjektet ved de ulike universitetene, og beskriver noen instrumenter (spørreskjemaer) og forskningsprosedyrer (fokusgrupper og intervjuer), spesielt utformet for å tegne profilen til målstudentene, for å forbedre leveringingen av tilbakemeldinger fra lærere, og for å samle studentenes metakognitive prestasjoner (rubrikker). Den detaljerte analysen av dataene, som kombinerer kvalitative og kvantitative teknikker, gir bevis for at levering av tilbakemeldinger fra lærere, forbedret med digitale verktøy, øker studentenes evne til selvregulering. Blant de ulike pedagogiske verktøyene som brukes skiller den digitale reflekterende porteføljen seg ut, da den tillater langsgående innsamling av prøver av utviklingen i studentenes autonomi, er nyttig for planlegging av universitetsundervisning, og gjør det mulig å sende tilbakemeldinger av høy kvalitet. I tillegg inneholder denne delen av håndboken en analyse av tilbakemeldingsrapportene som lærerne delte med hverandre i sammenheng med prosjektet, og hvor ikke bare ulike typer tilbakemeldinger identifiseres i henhold til de ulike aktivitetene som elevene utfører, men også informasjon om elevenes prestasjoner og fremgang.

Håndboken avsluttes med en rekke anbefalinger rettet til lærerne, slik at de kan introdusere noen endringer i metodikk og pedagogisk design, for å øke den metakognitive

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bevisstheten til studentene i høyere utdanning, for å oppmuntre til større selvrefleksjon og utvikling av selvkritikk, individuelt engasjement og selvorganisasjon.

Nøkkelord: Autonomi, tilbakemelding, hybrid læring og pedagogiske strategier

INTRODUCTION

Although many higher education teachers are experimenting with hybrid learning (*blended learning or b-learning*), this concept remains unknown to most. In this context, this manual aims to illustrate what *b-learning* is and to what extent hybrid learning¹ enables the implementation of innovative pedagogical strategies. Therefore, throughout this manual some guidelines will be presented that any teacher can follow in a higher education institution to enhance autonomy in learning, use technological resources in the design of their classes in hybrid mode and/or improve the way they offer feedback to their students. In this sense, this manual is the result of an inter-university and international work that has been developed within the framework of a European project and aims to serve as a guide in these and other essential topics to face the necessary changes in higher education of the times we live in.

More specifically, it is the Erasmus+ project (Ref. 2020-1-ES01-KA203-082513) BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>), consisting of a Strategic Alliance that has benefited from the synergies created between different European universities to enhance the development of the autonomy of students and professors of higher education in hybrid mode. The project, which started in November 2020 and will run until February 2023, has been led by the Universitat Autònoma de Barcelona (UAB), with the active collaboration of the following institutions: Universidade do Minho (UMinho), the Universitat de Vic-Universitat Central de Catalunya (UVic-UCC), the University of Stavanger (UiS), the Catholic University of Lyon (UCLy) and the University of Warsaw (UW).

¹ The complexity in the definition of the concept has led us to adopt the term hybrid or combined learning as synonyms in this manual, although the first does not correspond to the literal translation of the term *b-learning*. In [Section 4.1](#) the definition of these concepts shall be completed.

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BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>) has experimented with innovative digital strategies that improve teacher feedback and aims not only to foster collaborative teaching between institutions, but also to develop policies that include hybrid learning. The final products, apart from others that have been generated throughout the project, include a manual for leaders and teachers on institutional policies of hybrid learning (Dikilitas & Rambla, 2022), and the present work, focused on offering guidelines based on analyzing and improving the quality of teacher and student feedback and autonomy in higher education.

In this manual, the theoretical foundation related to the development of self-regulation, the promotion of critical thinking and strategic competence of students in a context of hybrid learning is presented first. Connected with the above, there are allusions to the new methodologies that have been consolidated in the post-pandemic times, and that continue to place at the center of the teaching-learning process the target student and the development of her autonomous competence in digital learning contexts.

Second, and to illustrate the above concepts in an empirical context, the BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>) project and its scope are presented in more detail. The profile of the participants and the general methodological framework are described. Subsequently, an analysis of the different scenarios in which the project has taken place (combining the in-person synchronous classes with online and remote work), and other results of the research, are given.

Finally, some procedures and innovative pedagogical recommendations that promote the autonomy of students are described. The procedures are based on sending quality teacher feedback that helps to reinforce the processes of teaching self-regulation, thus seeking to approach excellence in university teaching.

PART I. Theoretical framework

1. New learning ecologies

In the article “Nothing is new, but everything has changed: a viewpoint on the future school”² Novoa and Alvim (2020)³ allude to the radical transformation of the current learning context caused by the pandemic. In this paper, they state that in a few days, what was considered impossible has become a reality, since both the learning time and the spaces of the class have clearly diversified. The face-to-face/virtual dichotomy has disappeared, and online/innovative learning is taking hold, while ubiquitous learning from digital devices is normalized (Matos, 2014; Monteiro et al., 2012).

In this new pedagogical scenario, the traditional expository model, based on the unidirectional transmission of knowledge, has lost ground against the formative-interactive model (Cánovas, 2020a, 2020b), which focuses on expanding the cognitive process of students. Therefore, the transmission of content, privileged in the traditional educational context, while still relevant, must provide, according to Ruiz de Zarobe (1997-98), a different role to the student:

Institutional education, including university education, has put into play teaching models that essentially correspond to two main ways, in which learning is identified with acquiring answers (behavioral model) or acquiring knowledge. While such models are appropriate for certain acquisitions, they generally require passive behavior and relative participation by the student, who therefore has little motivation.⁴

In this way, the traditional master classes are opened to a more focused training in the competency dimension, which implies a change of roles of teachers and students and

² Kalantzis and Cope, (<http://newlearningonline.com/e-learning>) and Mike Sharples (2019).

³ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7332737/>

⁴ Translated from its original version. Throughout the document, all of the quotes in Spanish have been directly translated to English to ease the reading.

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enhances autonomy (and therefore motivation and responsibility for learning). In addition, this dimension takes place not only at the individual level, but the impact of proposals for collaborative activities in the development of autonomy has been demonstrated (Sánchez Godoy & Casal Madinabeitia, 2016). Likewise, the fact that the student becomes aware of the learning process is relevant. Thus, in the words of León Urquijo et al. (2014)

The student takes control of the learning process, is aware of what he/she does, understands the requirements of the task and responds to it properly; plans and evaluates his/her own assignments, and is able to identify his/her successes and difficulties; uses study strategies pertinent to each situation, values achievements, recognizes and corrects his/her errors. (p. 128)

On the other hand, nowadays, “learning” implies understanding the values of the digital world in which we live: a proactive, connected, contextualized culture, based on learning networks (Ribeiro, 2019). In this sense, the teaching-learning processes related to multiple literacy and creativity have been accelerated, which serve as support for face-to-face and distance teaching at all levels of learning.

In this new pedagogical tendency, approaches are privileged in which the student takes advantage of all the digital resources at her disposal and evolves towards a new way of learning and (self-)evaluating, due to principles such as ubiquity; multimodality; active, differentiated and collaborative learning; and the development of metacognition and self-regulation in virtual or hybrid environments (Cope & Kalantzis, 2016; Sharples, 2019). In other words, adapting to new objectives requires being more autonomous in order to: (a) take better advantage of Virtual Learning Environments (hereinafter VLE); (b) be able to select valid, reliable and secure information from different digital resources, and adapt and interact with flexibly through digital devices. The virtual learning environment, thanks to ubiquity, allows students to participate in learning activities at their own pace and in the place that suits them best. In addition, the more attractive the learning

experience is, through increased motivation and interaction, the more likely students are to continue to participate in the course (FESS, 2020, p. 13).

Additionally, the concept of “connectivity” contemplates the performance of tasks that adapt to different interests and needs of students, promoting differentiated learning. If students investigate their topics of interest, they will be able to take advantage of “informal” learning experiences to continue evolving and relate individual learning with the collective (Sharples, 2019; Torres, 2015, p. 213). In short, the use of technologies enhances an active methodology (as happens, for example, in the inverted class), and contributes to the development of collaborative intelligence. It also allows to design real and immersive interactive situations that explore the power of challenges, projects or gamification strategies to intensify the process. Finally, the use of technologies facilitates the sending of recursive feedback in the context of a formative evaluation.

However, the development of the students' autonomous competence remains essential. Thus, they can not only grow and develop in this new and complex context marked by connectivity, but they can also continue working their self-determination, self-management and critical thinking skills.

2. Putting autonomy and higher education on the map: constructivist and connectivist principles for cybersocial learning

Learner training espouses the belief that everybody has the right to develop the capacity for taking charge of his or her own affairs and that this development is a basic function of education.

Ellis and Sinclair (1989, p. 3)

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Given the importance of the concept of autonomy for the BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>) project, we will start by presenting some definitions of it framed in the pedagogical field. This concept receives contributions from various areas, among which are the constructivist perspectives that defend a dynamic relationship between the student and knowledge through an interpretative vision of education. It is a competency-based approach in which the student will expand her awareness of the learning process, develop her critical thinking, cognitive and metacognitive skills, or the cooperation and communication between the participants in the process (Jiménez & Vieira, 2015, p. 15). In this way, it is intended that the student goes from being a passive consumer of knowledge to a critical consumer, responsible and creative producer of knowledge⁵ (Vieira, 1997, p. 27; Vera, 1997, p. 167). All these statements coincide with the perspective presented by Holec (1981, p. 3) in his founding document, in which he stated that autonomy is “the ability to assume responsibility for one's own learning”. In this sense, it is necessary to emphasize some of the procedures related to self-directed learning: (1) the clear identification of objectives; (2) the proper selection of study methods and techniques; (3) the monitoring and evaluation of the acquisition procedure and, finally, (4) the critical reflection (Wenden, 1987, p. 11-12; Jiménez & Vieira, 2015, p. 26).

Therefore, *autonomous competence* refers us to a broad and cross-cutting concept in learning which, in turn, is intrinsically linked to the *ability to self-regulate* all dimensions of the learning process and implement certain *strategies* that are normally geared towards solving a specific problem. In general, the knowledge derived from the use of strategies covers two dimensions: the mastery of strategies aimed at “doing” something (cognitive strategies) and those aimed at developing a “control and management” over action

⁵ The way we relate to cultural and leisure products also shows a change in teaching-learning procedures, as we often transform the information we consume into a new product (for example, from a newspaper story we can produce an audiovisual story, etc.), which links, in turn, with the concept of “prosumers” (prosumidores) of Scolari (2013).

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(metacognitive strategies). This last dimension includes different micro-strategies, such as the following: (1) being able to direct attention selectively; (2) activating previous knowledge; (3) assessing the level of understanding of learning objectives or learning contents; (4) knowing how to plan and properly identify what the objectives of the task are and what means can be used to concretize it; (5) supervising the development of the activity and the act of learning (time management, collaborative work, etc.); (6) (self) evaluating the results taking into account the evaluation criteria and reformulating or applying changes when necessary based on the feedback received; (7) knowing how to regulate the effectiveness of the strategies used; (8) supervising and evaluating the overall learning process.

Metacognitive knowledge can be completed through the person's knowledge (identifying individual strengths and weaknesses), the learning process (requirements and characteristics of long-term learning), the task to be developed (the nature and requirements of different specific exercises, resources, and phases of realization) and the types of strategies that are most effective in each phase.

Thus, it can be concluded that autonomy is a competence that involves the development of (micro)skills or strategies aimed at regulating or controlling the entire learning process, taking into account different variables such as the difficulty of the task, the time, the situation or support through which learning takes place, the cognitive style, the ability to interact with teachers and other students, the motivation, the aptitude, the previous experience in the area of learning, etc.

In reality, the teacher, to the extent that she provides her students with opportunities to develop their autonomy, contemplates herself as an agent of social change (Jiménez, 2009, p. 188). However, student autonomy is conditioned by the need to analyze pedagogical practices by teachers and “start thinking about myself as a teacher, what I can change about how I work in the classroom to help my learners become more autonomous and responsible”, (Bobb, 2009, p. 107). This author points out several

pedagogical procedures that can be implemented to favor autonomy in learning: a) to follow an action-oriented approach; b) to favor negotiation in the class with the intention of the student regaining pedagogical authority and discursive power; and c) to attend to the diversity of students (Bobb, 2009, pp. 103-104).

In this sense, teacher autonomy can be defined as the ability and willingness to help apprentices take responsibility for their learning. An autonomous teacher reflects on her role and how she can change it. Similarly, Jiménez, Lamb and Vieira (2007: 38) highlight the importance of providing students with spaces for reflection, so that they can identify their *beliefs and knowledge* in relation to personal variables, with the learning tasks and the strategies they put into practice to undertake the learning process.

3. Developing critical thinking skills

Critical thinking has acquired a new pedagogical relevance by becoming explicitly part of the focus of researchers and teachers. It is, for example, one of the cross-cutting dimensions of the eight key learning competences (European Commission, 2017), especially important in terms of digital competence (Sayós & Torras, 2019). Faced with an education focused on the acquisition of knowledge, the new context mentioned, under the premise of *learning to learn*, must promote the development of competences, including critical thinking.

Defining critical thinking is not an easy task because there are numerous and diverse approaches to the concept and its development. It does seem feasible to understand that “all definitions associate critical thinking and rationality. Its main function is not to generate ideas but to review them, evaluate them, and review what is understood, processed and communicated through other types of thought (verbal, mathematical, logical, etc.)” (López, 2012, p. 44). A possible, though rather generic, definition, would be: “Critical thinking is reasonable and reflective thinking focused on deciding what to believe or do” (Ennis, 2011, p. 101). 1). Critical thinking, in this direction, involves the

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management of 15 skills (*see* Table 1). The first skills (1-3) involve basic clarification; 4 and 5, the basis for a decision; 6 to 8, inference; 9 and 10, advanced clarification; and 11 and 12, assumption and integration. Skills 13 to 15 are complementary skills, yet they're very relevant.

Table 1. Critical Thinking Skills

1. Focus on a question
2. Analyze arguments
3. Ask and answer clarification and/or challenge questions
4. Judge the credibility of a source.
5. Observe, and judge observation reports.
6. Deduce, and judge deduction.
7. Make material inferences (roughly “induction”).
8. Make and judge value judgments.
9. Define terms and judge definitions, using appropriate criteria.
10. Attribute unstated assumptions.
11. Consider and reason from premises, reasons, assumptions, positions, and other propositions with which they disagree or about which they are in doubt, without letting the disagreement or doubt interfere with their thinking ("suppositional thinking").

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12. Integrate the dispositions and other abilities in making and defending a decision.
13. Proceed in an orderly manner appropriate to the situation.
14. Be sensitive to the feelings, level of knowledge, and degree of sophistication of others.
15. Employ appropriate rhetorical strategies in discussion and presentation (oral and written), including employing and reacting to "fallacy" labels in an appropriate manner. Examples of fallacy labels are "circularity," "bandwagon," "post hoc," "equivocation," "non sequitur," and "straw person".

Source: adapted from Ennis (2011, p. 2-4).

For the development of critical thinking, the teacher (López, 2012, p. 51), above all as a mediator rather than a transmitter of knowledge, should promote a favorable environment, of openness to autonomy and (self-)reflection; an enabling environment for female students to participate by expressing (and discovering) their ideas, beliefs, opinions or feelings, for example, with the positive, empathetic encouragement of the teacher. In this direction, students go from being a passive subject to taking an active position in the teaching and learning process.

4. Digital and autonomous competence

The European Commission (2007) identifies digital competence as one of the eight competences essential for the continuity of a person's learning throughout his or her life. This competence involves the critical and safe use of technologies for work, leisure and communication. In addition, the European Commission document identifies basic skills related to digital competence: the use of computers to retrieve, evaluate, store,

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produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet (European Commission, 2007, p. 12).

Although it is recommended that it be the teacher who includes this transversal competence in educational programs, there is some research on the level of digital competence of Spanish teachers (Boumadan Hamed et al., 2022; Martín García, Gutiérrez Pérez & Martín Lucas, 2021) and European teachers in general (Gaebel et al., 2021), which reveals a lack of training and information in the widespread use of technology in classrooms and that, despite a relatively widespread level of support from institutions, the results do not show clear evidence of the usefulness of these trainings. It can be deduced from this that it is necessary to improve training in digital competences and professional development opportunities, identifying approaches that are useful and that can be integrated and accepted by teachers (Gaebel et al., 2021, p. 34).

On this dimension, the *Common framework of teaching digital competence*, developed by the National Institute of Educational Technologies and Teacher Training (INTEF, 2017)⁶ highlights the centrality that the Ministry of Education, Culture and Sport attributes to the digital skills of teachers in the exercise of their activity. This document, similar to the previous one prepared by the European Commission (2007), establishes five areas of competence (INTEFP, 2017, p. 9):

1. *Information and information literacy*: allows to identify, locate, retrieve, store information, etc.
2. *Communication and collaboration*: enables communication in digital environments, sharing resources, connecting, collaborating and participating in communities and networks.

⁶ The acronym MCCDD will be used to refer to this document, which has been edited by the National Institute of Educational Technologies and Teacher Training of the Ministry of Education, Culture and Sport (2017) and which will be referred to respectively with its acronym (INTEFP).

3. *Digital content creation*: promotes the creation and editing of new content (texts, images, videos...), etc.
4. *Security*: ensures personal data protection, digital identity protection, etc.
5. *Troubleshooting*: helps identify needs, select appropriate digital tools, etc.

Twenty-one other competencies emerge from these areas, structured in six progressive levels (A1 to C2), which, thanks to descriptors based on knowledge, skills and attitudes, allow the identification of each person's level of digital mastery. The document adopts the European Parliament and Council's definition of digital competence (2006) and the scales that appear in this document offer the possibility for teachers to diagnose the level of digital competence of their students.

Once identified the level of digital competence of the class, the educational challenge is to favor the expansion of this competence so that students can apply strategies adapted to the new educational context through ICT (Torres Rios, 2015). In particular, the role of strategies that favor the self-regulation of learning through VLE is emphasized. In reality, Torres Rios uses the metacognitive knowledge bases and applies them to connectivist principles, *know how*, *know what*, *know where*, based on three management strategies: selecting information, ordering and evaluating.

4.1 Conceptual review of distance learning/online learning; hybrid (*b-learning*); mixed; face-to-face

One of the objectives of the BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>) project was to experiment with innovative digital strategies to foster collaborative and blended learning in higher education. More specifically, it was intended to promote the autonomous competence of students from a context of hybrid learning (*blended learning* or *b-learning*), taking advantage of the potential of technological tools inside and outside the classroom. In this paper we will consider hybrid learning as the mixture of face-to-

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face training (with teachers in a classroom) and online education (courses on the Internet or through a digital medium).⁷

Authors such as Garrison and Kanuka (2004, as quoted in FESS, 2021, p. 3) understand the hybrid modality as "the integration of classroom experiences of face-to-face learning with online learning experiences". In turn, Driscoll and Carliner (2005) identified four types of pedagogy that could respond to this type of learning, of which we highlight the first three: a) a mixture of web-based technologies; b) a mixture of diverse pedagogical approaches (e.g. constructivism, behaviorism, cognitivism); c) a combination of any form of pedagogical technology with face-to-face conditions and an instructor (FESS, 2021, p. 10).

Face-to-face training allows teachers to be in direct contact with the students, facilitates interaction in the physical world among the students, and is an effective tool to transmit knowledge. Its use can make the organization of tasks more efficient, promote teamwork, and allow personalized attention according to the needs of each student. In turn, online training gives students more flexibility to take courses anytime, anywhere, and makes it easier to send all kinds of documents (text, videos, slides, audio, infographics, etc.). It is also possible to collect a large amount of information about the learning process carried out by each student. Additionally, this methodology can be applied to many students at a low cost and allows content updates to be made much faster.

⁷ In Spanish, *b-learning* is also known as *aprendizaje semipresencial*, *aprendizaje mixto*, *aprendizaje combinado* or *aprendizaje híbrido*.

4.2 The new role of teachers and students in *b-learning* environments

The (post-)pandemic context has led to the improvement of learning management systems (*Learning Management System*, hereinafter LMS or *Learning Content Management System*, hereinafter LCMS) or Virtual Learning Environments (VLE) and has increased the presence of hybrid learning in higher education, which combines virtual and face-to-face modalities (Martín, Sánchez & Costa, 2019).

The rise of this teaching modality has shown that educational institutions must undertake several changes to minimize the challenges that the new educational reality causes: on the one hand, it is necessary to renew pedagogical approaches that proved unfeasible in hybrid or distance learning contexts, and, on the other, it must systematically and comprehensively offer the possibility of strengthening the development of digital competence of both teachers and students (Leite, Lencastre, Silva, & Borges Neto, 2020).

It is about favoring a learning process adapted to the creation of new spaces and times, but at the same time more strategic, that allows students to learn to operate in a different model than the traditional class. In other words, pedagogy must remain at the forefront of the structure of the hybrid learning modality. As Lencastre and Coutinho (2015) point out, although the digital aspect is the one that most visibly awakens change, it is consensual that the use of technologies *per se* does not necessarily mean an improvement in the quality of education (Padilla-Hernández, Gámiz Sánchez & Romero López, 2018).

For all this, it is necessary to adapt curricula, methodologies, programs, objectives, materials and even implement evaluations in hybrid mode (as recommended by Baloh et al., 2019 and quoted in FESS, 2020, p. 12) to the new educational contexts (Monteiro, Moreira & Lencastre, 2015), taking into account the demands of *b-learning*: the creation

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of new learning spaces (away from the traditional classroom), time management, and the alternation of synchronous and asynchronous sessions in a logic of flexible, autonomous and adjustable learning strategies. Despite the rise of *b-learning* and the use of various technological devices to work, there is still no theoretical body that guides the different groups involved (teachers, educational leaders and students) on how to organize this emerging teaching modality effectively to improve results (Salinas Ibáñez, de Benito Crosetti, Pérez Garcies & Gisbert Cervera, 2018).

In short, the idea is to take advantage of the current context, in which a multiscreen society predominates, the use of innovative VLEs so that the student continues to be the main focus. In addition, innovations in curricula and methodological approaches aim to expand the autonomy and critical capacity of students (Monteiro, Moreira & Lencastre, 2015, p. 8), as well as promote the active search for learning, knowledge and education, giving rise to the new roles of students and teachers (Cope & Kalantzis, 2016). Consistent with the above, some of the characteristics that should be present in the role of the current student are listed below (Salinas Ibáñez, de Benito Crosetti, Pérez Garcies & Gisbert Cervera, 2018):

- She actively participates in her learning, which results in more effective learning, individually or collectively (in pairs or groups).
- She assumes responsibility for her learning through the acquisition of autonomy and self-regulation.
- She brings her experience, interests and voice to the learning task.
- She draws on knowledge available autonomously and on her own initiative.
- She works individually and collectively, sharing knowledge: collaborative pedagogy/learning.
- She adapts to new learning contexts, combining face-to-face and hybrid moments.

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- She puts into practice the ubiquity principle of learning and assumes that it will take place throughout life, even outside the traditional educational setting and beyond the classroom space.
- She is open to new technologies and participates in multimodal digital projects, becoming “producers of knowledge”.
- She evaluates herself and her peers critically, reflecting on their learning.
- She uses and gives feedback on "social media" interactions, learning in recursive loops involving peers, experts and friends, as well as teachers.

In turn, the role of the teacher will be marked by the following characteristics:

- She designs learning projects for her students based on learning objectives.
- She motivates students to take more responsibility for their own learning.
- She adapts to new methodologies, pedagogies and learning contexts, designing strategies for face-to-face and virtual work, synchronous and asynchronous moments of contact.
- She feels comfortable working on online platforms and other multimodal spaces.
- She diversifies the types of evaluation throughout the process.
- She manages a multifaceted pedagogical space.
- She takes the different learning styles and rhythms of students into account.

As for the advantages of *b-learning* teaching, we could say that it enhances different learning rhythms, adapted to each student. In addition, sending feedback can result in an increase in the autonomy, motivation and responsibility of the students. On the other hand, it presents some disadvantages, since the use of this type of support requires a greater dedication to provide individual feedback, which overloads the work of teachers. We can also mention the increased possibility of fraud or impersonation of identity and, when the pedagogies are not adapted to this hybrid model, there can be evidenced deficiencies at the level of student self-regulation (management and organization of

learning in general, or of time, work and contents in particular), demotivation or a reduced communication flow between teachers and students.

In this manual we are interested in emphasizing that blended learning favors a feedback that establishes significant relationships between the evaluation criteria and the tasks delivered by the students. Previous research has observed that in the vast majority of learning designs, teachers point out the successes and failures of their students in four aspects: homework, content processing, the regulation of their own learning, and identity. Feedback is particularly effective when it resolves misinterpretations of homework instructions and encourages students to review hypotheses in such a way that students better understand the material. Although it affects self-regulation and identity by indirect means, it is more difficult to give concrete indications on these aspects (Hattie & Timperley, 2007). Thus, if the learning of students improves noticeably as they receive feedback while they are performing certain tasks and contrasting the content of a subject with their previous assumptions, it is reasonable to expect that digital tools facilitate such feedback, as they open simultaneous or synchronous communication spaces, but also asynchronous spaces, or spaces that are activated at different times.

4.3 Ways to develop autonomy in a hybrid learning context

As we have already anticipated, today hybrid learning contexts are part, with greater or less weight, of the face-to-face and virtual dimensions of university education, usually complementing traditional teaching activities with the use of LMS or VLE.

In fact, in this modality it is possible to alternate different teaching methods to cater for the diverse learning styles of the students: to facilitate a clear exchange of all the areas included in the course, and to promote a change of roles between teachers and students. This, in turn, enhances autonomy often through VLEs.

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In addition to guiding the definition of objectives, contents, techniques and planning of learning (Ruiz de Zarobe, 1997, p. 187), another of the teaching functions in these learning contexts is to enhance the autonomy and awareness of students about their learning, for which it is advisable to provide adequate resources and strategies. In higher education teaching, many methods are used that combine pedagogy with technology. Examples include open source materials, MOOCs, virtual games, online quizzes, collaborative content development on wikis, video calls, and e-portfolios. In this manual we highlight the usefulness and versatility of reflective digital portfolios. In this area, the latter item plays a role of emphasis, since it also serves as an instrument of formative evaluation, focused not only on the final product, but also on the way the student has to go to reach a satisfactory result. In the words of Sayós & Torras (2019):

The portfolio, and more specifically the electronic portfolio, is a tool of great potential to carry out such a favorable formative assessment of learning. [...] consists of a selection of evidences that the student must collect over a period of time and that respond to a specific objective: to demonstrate the efforts made to advance in their learning process and reflect on that process. (p. 29)

The use of portfolios in the context of university education is not new, although it has already been the subject of research. The digital portfolio is a space of work and learning where the student collects, creates, shares and reflects on her work and competences. At the same time, it allows to store the *feedback* and the evaluation received, since it is open and shared with the different agents involved in the learning process. At the same time, the teaching methodology based on the development of competences finds in the portfolio a useful tool to demonstrate the capacity for learning and development of creativity; reflective and critical thinking and communicative competence (Pujolà, 2019), the latter in the case of language learning.

The characteristic of being a digital portfolio allows interaction, communication, discussion or evaluation directly and immediately, and simultaneously makes the learning process transparent (Pujolà, 2019) and evident. Sayós & Torras (2019, p. 38), in their

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review of the literature, in addition to recognizing the positive impact on the enhancement of the self-esteem of the student and in the construction of her identity as a learner and, later, as a professional, have found that these tools:

- Promote meaningful and functional learning, based on inquiry and search, interaction with people and with the context.
- Make the students clearly aware of the learning objectives of the subject in general, and at the same time can consider their own objectives, in particular.
- Create situations for reflection and enhance oral and written verbalization of reflective processes.
- Force students to continuously use metacognitive strategies of planning, monitoring and evaluation; to make decisions and assume responsibilities.

According to authors such as Fullana & Bordons (2019, p. 130-131), the students themselves value this instrument as an enhancer of reflective learning and autonomy, a value that has been demonstrated at an individual level but also at a group level. As Aguaded et al. (2013, p. 22) have seen in their experience with the digital portfolio, it “allows to know the progress of the learning of the group and helps the structural planning of the subject under study, stimulates shared responsibility, decision-making and conflict resolution.” In the same way, for the teacher, it is also a valuable instrument to obtain, from her students, “qualitative assessments (opinions, reflections, feelings...), especially to improve the planning of our teaching, but also to feel supported as teachers in the work we do; who better than the students to tell us if we are wrong or not when we impart our teaching” (Alfageme, 2007, p. 213).

To this end, teacher intervention will provide the guidelines that allow the student to advance in her learning, instead of constituting an (almost) unique source of knowledge and enhancing the interaction between learners and teacher-student. To this end, teachers must equip themselves with instruments and resources that allow them to provide effective and timely feedback on the activities available in the digital portfolio. In addition

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to the value added, there is no doubt about the relevance and positive impact of peer feedback, highlighting, according to Sánchez-Quintana & Mateo (2019), the following aspects: “improving personal autonomy, the learning process itself and the capacity for self-assessment; developing strategies for interpersonal relationship; developing reflective and critical thinking skills, as well as, ultimately, the co-construction of shared knowledge” (p. 106). It is important to emphasize that the main intention is to increase awareness of learning and the acquisition of competences, avoiding focusing on reflection (understood as an instrument and not an end in itself): it is thus of great importance to select the aspects of training that will be subject to reflection or (self-)criticism by the student to avoid automated responses.

Regarding the design and implementation of the portfolios, there are studies that warn about the level of digital competence of the students and their technological difficulty to build them properly. As a result, teachers will select the most appropriate work platforms for their students and work with them in writing for the network and creating multimodal and hypertextual texts (González Argüello & Montmany, 2019).

The integration of different activities that allow to broaden the level of awareness and reflection on the learning process from digital portfolios (Donato & McCormick, 1994, p. 457, as quoted in Oxford, 2011, p. 152), it will also allow for the promotion of autonomy in hybrid environments as follows:

- Drawing a longitudinal portrait of what the student is able to do or not do in a specific area.
- Gathering tangible evidence (recordings, creative writing, homework, activity reports, etc.) that documents the students' development.
- Empowering students with opportunities to create and reflect on personally meaningful learning strategies and activities.
- Raising students' awareness of the learning process.

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- Developing metacognitive competence from an initial descriptive model to a more interpretive and proactive way that allows identifying obstacles, analyzing needs and levels of motivation, enhancing decision-making and problem solving.

It is recommended to integrate this digital tool in the evaluation methodology with a weight proportional to the type and amount of work that both students and teachers will have to carry out. In this sense, the use of rubrics that clearly describe the metacognitive and autonomous characteristics of students will allow to provide clear and illustrative feedback on their progression and will ensure that the task of continuous evaluation is implemented more effectively and with a shorter response time. In the next section we will show some examples of this type that have been conceived within this project.

It is important to bear in mind that in digital portfolios multimodal competition allows to communicate, through the screen, a discourse constructed in a hybrid way, through different interrelated semiotic modes: the image (fixed and in motion) and the sound (word, music and noise); while hypertextuality facilitates navigation through the text, providing the possibility of building a non-sequential portfolio, in which the reader chooses her itinerary from the hyperlinks introduced in the document.

This digital, multimodal and hypertextual nature of the digital portfolio makes evident the need to work, in the classroom, on content creation strategies for the network, which is presented as a transversal competence of higher education studies. Learning about the construction of screens covers different tasks (such as inserting images, videos and audio; managing and organizing templates, or working with aspects such as color, orthotypography, etc.), since among all these elements possible modes of communication are identified (González Argüello & Montmany, 2019).

The digital potential of the digital portfolio increases when thinking about the diversity of possibilities that it offers. In addition to photographs, texts, audios or videos, instruments such as infographics, concept maps, timelines or PowerPoints can be added.

Thus, in addition to developing the competences of autonomous learning, reflection, analysis and criticism, the construction of the digital portfolio helps to develop digital competence.

Screens and multimodality are representative ways of communicating in contemporary society, to which teaching-learning in a university context are not foreign. Therefore, the construction of digital learning portfolios will allow students to improve their digital and multimodal literacy in a natural way and simultaneously with other academic learning. And, although initially working with tools that are unknown may present difficulties and some resistance, the students are satisfied with the results obtained (Costa, Alfonso & Toquero, 2019).

Finally, it is necessary to mention that on the Bloom scale (1956), creativity is one of the most valued aspects because it requires more proactivity and cognitive effort. Creative competence is reflected in the design and execution of the portfolio, from the expression of knowledge and content to the configuration of its aesthetic structure. Since the student has freedom of invention and execution, this is something that should be encouraged.

5. Autonomous learning and rubrics to give feedback and evaluate students' productions: examples at UMinho

As we have already said, working with digital portfolios allows us to collect evidence of processes that favor the development of teaching autonomy at the level of general competences (specifically problem solving, self-regulation or the development of critical thinking). All of which can be transferred to other learning contexts, and even prepare the student to incorporate successfully into situations of daily and work life. By making room for students to develop their identity, creativity and autonomy in the context of formal

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learning, we are promoting higher quality, more democratic teaching, in which participants are more motivated, feel more secure and are more proactive.

Progressively, and because of the formative feedback, it is intended that students move from a descriptive phase to an interpretative one, in which the analysis predominates. This involves a greater monitoring and evaluation of certain parameters of the learning process. Affirmations related to decision-making, resource-seeking and self-evaluation from a critical and objective perspective often appear in the students' discourse.

The importance of teacher-student interaction, and constructive and kind teacher feedback, can be part of the formative or summative evaluation. In a hybrid learning context, feedback can be sent from multiple tools and in multiple formats (written, audio or video), depending on the context and the number of students in the target group. It is important to send it on time and, in this respect, the teacher can be assisted by the figure of a mentor who speeds up the process. In turn, it is also possible for the students themselves to provide feedback to each other (known as peer feedback), assuming the role of teachers or mentors. Some of the digital tools that enable this function are virtual walls that allow both students and teachers to have access to the comments displayed on the virtual wall, in which a diversified sending mode is possible (text, audio, video, etc.).

It is also possible to send feedback that provides not only an assessment of past study/learning phases, but also comments aimed at guiding the students' next steps (achievement of goals or objectives), *feed forward* or *flipped feedback*. The latter tries to anticipate concrete steps in achieving a specific task or a sequence of tasks.

Within the framework of the project and to monitor autonomous learning, a rubric was developed (Sánchez-Quintana & Ruiz, 2019), with the aim of: (i) providing feedback to students and (ii) qualitatively evaluating the development of digital portfolios. The rubric⁸

⁸ This instrument, as indicated by its authors (Cea Álvarez, A. M., Dono, P., Lerma Sanchis, M. D., Pazos-Justo, C., 2023) was conceived in the Universidade do Minho within this project, and underwent different modifications after being first piloted and then validated.

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designed (*see* Table 2) was intended to convey clear information to students and be a complete, useful, flexible and simple instrument; in addition, the rubric should be cross-sectional to all subjects involved in the project, and it should have a formative approach.

Table 2. Rubric to send feedback on reflective portfolios

CRITERIA FOR MONITORING THE LEARNING PROCESS OF PUPILS
<ol style="list-style-type: none">1. Unsatisfactory2. Satisfactory3. Very good4. Excellent
1. Description or presentation of information:
The student: <ol style="list-style-type: none">4. Describes the relevant information (activities, procedures or theoretical content) in a clear, correct and well-supported way.3. Describes relevant information (activities, procedures or theoretical content) in a clear and correct way, but not always in a well-supported way.2. Does not always describe the relevant information (activities, procedures or theoretical content) in a fairly clear and correct way, although there may be gaps or minor inaccuracies; the information is sufficiently well-supported, although it could be more complete.1. The information submitted (activities, procedures or theoretical content) is often irrelevant, unclear or formally incorrect; it is insufficiently supported.
COMMENTS:
2. Understanding objectives, identifying needs and implementing strategies.

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The student:

4. Demonstrates a full understanding of the objectives of the requested activities, clearly and comprehensively identifies their learning needs, and implements a number of strategies to successfully accomplish the tasks.
3. Demonstrates an understanding of the objectives of the requested activities, identifies their learning needs and implements sufficient strategies to successfully perform the tasks.
2. Demonstrates a general understanding of the objectives of the requested activities, identifies some of their learning needs and implements few strategies to accomplish the tasks.
1. Demonstrates that she has not fully understood the objectives of the requested activities, does not always identify their learning needs, nor does she implement strategies to accomplish the tasks.

COMMENTS:

3. Analysis and self-evaluation of procedures and results.

The student:

4. Critically analyzes and self-evaluates with precision her performance and the results obtained after the completion of the task.
3. Analyzes with some critical perspective and evaluates in a general way her performance and the results obtained after the completion of the task.
2. Performs, too generically, an analysis and self-evaluation of her performance and the results obtained after the task has been carried out.
1. There is no analysis and self-evaluation of the student's performance or of the results obtained after the completion of the task.

COMMENTS:

4. Combine theoretical and practical knowledge and monitor your learning.

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<p>The student:</p> <ol style="list-style-type: none">4. Combines theoretical and practical knowledge in a completely autonomous way and demonstrates a clear process of self-regulation in a comprehensive way.3. Combines theoretical and practical knowledge quite autonomously and demonstrates, in general, certain processes of self-regulation.2. There are indications that the student attempts to combine theoretical and practical knowledge autonomously and demonstrates some processes of self-regulation.1. There is no evidence that the student attempts to combine theoretical and practical knowledge autonomously and does not demonstrate self-regulatory processes.
COMMENTS:
5. Impact of the assessment of the teacher on the student's performance.
<p>The student:</p> <ol style="list-style-type: none">4. Clearly takes into account the comments sent by the teacher or other students and modifies or reformulates the whole procedure in a comprehensive way according to the analysis or feedback received.3. Takes into account some of the comments sent by the teacher or other students and modifies or reformulates the procedure in many aspects according to the analysis or information received.2. Takes slight account of the comments sent by the teacher or other students and modifies or reformulates part of the procedure according to the analysis or information received.1. Does not respond to the comments sent by the teacher or other students and does not modify or reformulate the procedure according to the analysis or information received.<ul style="list-style-type: none">● This item will be applied after the student has received the first feedback.
COMMENTS:
FINAL COMMENTS:

Source: own production

For this purpose, five aspects related to cognitive activities during learning were selected and organized from lowest to highest complexity, according to Bloom's taxonomy (1956)

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(see Figure 1), a theoretical framework that was later updated by several authors (Anderson & Krathwol, 2001; Churches, 2009).

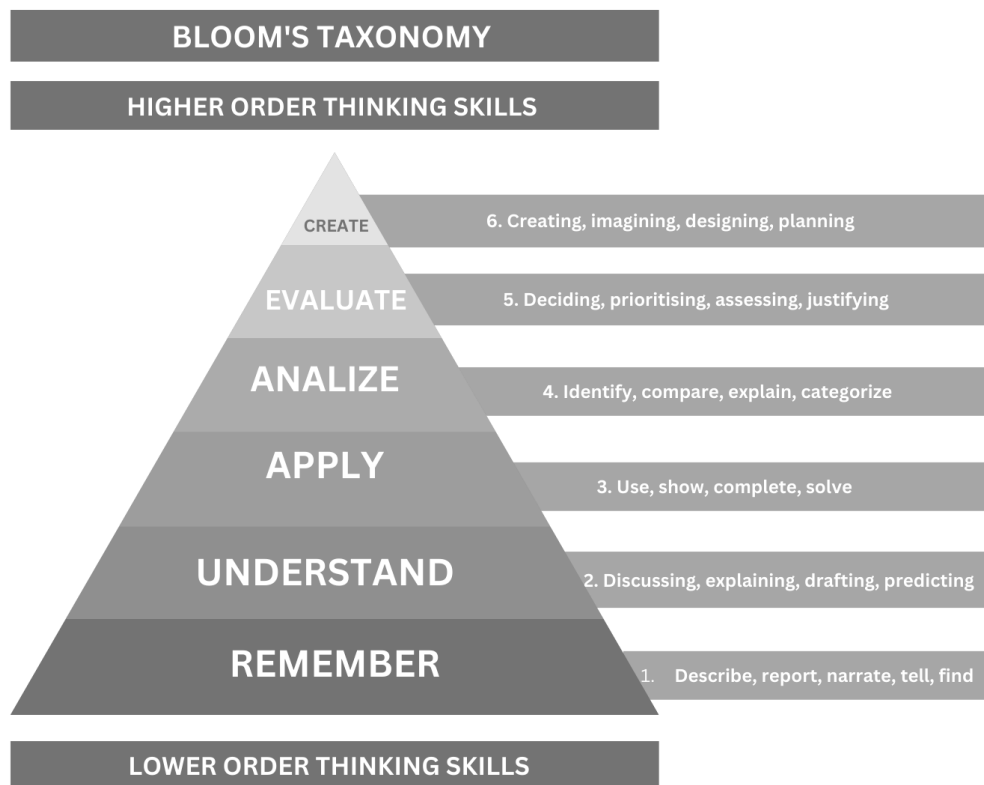


Figure 1. Adaptation of Bloom's Taxonomy (1956)

The latest version of this taxonomy focuses on the knowledge and competencies of the digital age. The discriminated aspects are oriented towards a reflection on the factual, conceptual, procedural and metacognitive knowledge. In the rubric designed within this project, each item would receive a quantitative assessment on a scale of between 1 and 4 points, with 1 corresponding to Unsatisfactory, 2 to Satisfactory, 3 to Very good and 4 to Excellent. In addition, these data are supplemented with qualitative information derived from the analysis of the learning process.

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The analysis of the output generated by students through reflective portfolios in digital support allows to identify cognitive processes of different order: thinking skills of lower order (such as the description of activities or learning sequences, application of content, analysis), until reaching the (self)evaluation or interpretation of the learning process autonomously (needs analysis, planning, implementation of resources and strategies, etc.) (Torres Ríos, 2015; Bloom, 1956; Churches, 2009).

The use of digital portfolios shall be conditioned on a ratio between the work that will be required of teachers and students, and the learning objectives. The use of rubrics can speed up the process of sending feedback, improve its quality (focused on structuring aspects of learning) and contribute to the development of self-regulation, metacognition and autonomous competence of students, since they will identify both the evaluation and learning objectives.

PART II. Empirical dimension of the BLEARN AUTONOMY project

6. Project description, design of tools and analysis of collected results

The data collected throughout the project allowed us not only to perform a characterization of the target audience from a socio-biographical perspective, but also to delineate their level of digital and autonomous competence. For this purpose, different research tools were designed, such as a questionnaire (Annex 1), interviews (script in Annex 2) and focus groups (script in Annex 3). The following sections will describe and analyze the data collected.

6.1 Profile of the participants and tools used

The following is an overview of the profile of participants in the BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>) project in relation to the data collection tools that support the empirical foundation of this manual. On the one hand, the self-perception of students in certain subjects of the six universities involved in the project was collected in quantitative terms through the use of a questionnaire. This questionnaire consisted of four distinct parts:

Part 1 - Socio-biographical information of the respondents.

Part 2 - Experience of students in methodologies for the development of autonomy.

Part 3 (I) - Experience with teacher feedback.

Part 3 (II) - Reflective Portfolios.

Part 4 - Digital Competence.

The third part was divided into two sections. Only if the participant had confirmed that she had used digital portfolios, was she requested to reply to the second section.

In addition, data was collected for qualitative analysis of interviews and focus groups with students, as well as systematized contributions from teachers to inform about technical aspects of their subjects and how to offer feedback to students.

6.1.1 Socio-biographical characteristics of the participants in the questionnaire

A total of 364 people participated in the questionnaire designed to be answered by the students. Of these, 51 also answered the questionnaire in post-test format at the end of the subject from which they were invited to participate in the project. Thus, the set of responses recorded was 415. Pretest-post-test answers allow us to inquire about whether there is an evolution after the use of the portfolio.

Of the 364 respondents in the pre-test phase, 259 identified with the female gender (71%), 101 identified with the male gender (28%), while 4 preferred not to respond (1%). In relation to the maximum level of completed studies, 124 reported having passed secondary school (34%); 44, a higher education cycle (12%); 156 are already graduated at degree level (43%); 39, at a master level (11%); and 1 participant already has a doctorate.

The sources of the answers are also diverse (Figure 2): 16.2% (n=59) of the Universitat Autònoma de Barcelona (UAB), 20.6% (n=75) of the Universidade do Minho (UMinho), 5.5% (n=20) of the Universitetet i Stavanger (UiS), 9.6% (n=35) of the Uniwersytet Warszawski (UW), 15.9% (n=58) of the Université Catholique de Lyon (UCLy), 11% (n=40) of the Universitat de Vic - Universitat Central de Catalunya (UVic- UCC), and

21.2% (n=77) of a joint program between the Universitat de Vic - Universitat Central de Catalunya (UVic- UCC) and Universitat Oberta de Catalunya (UOC).

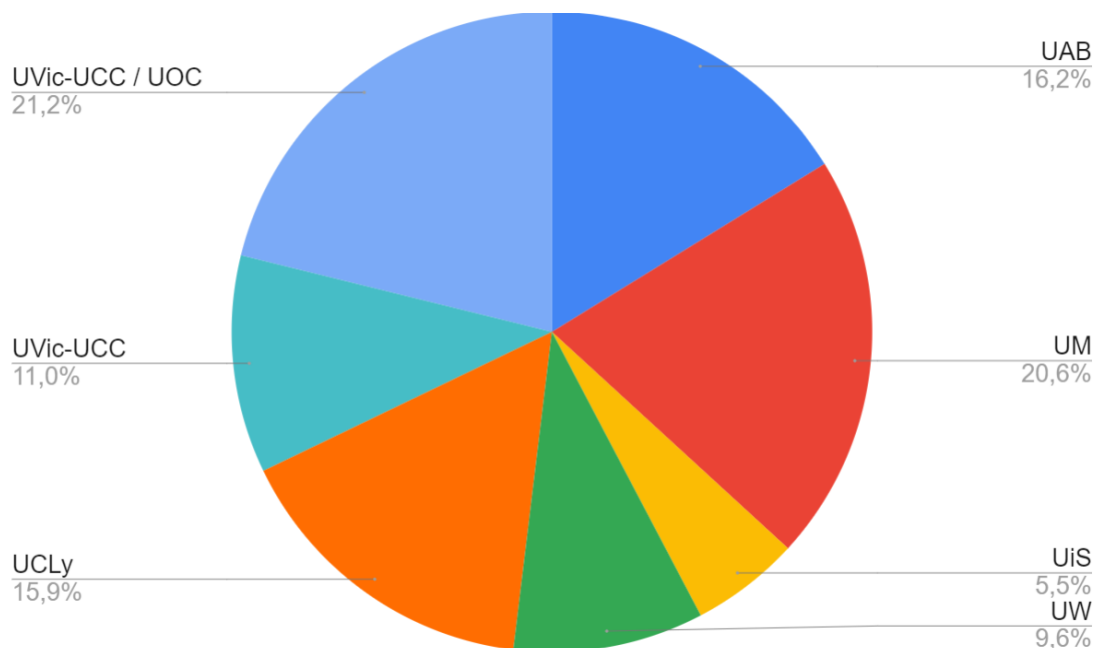


Figure 2. Participation by universities

The students who participated in the questionnaire are mostly from the country in which the university where they are studying is located (n=301). The rest of the participants are from other nationalities such as Venezuela, Ukraine, Mexico, Spain, Colombia, Brazil and up to a total of thirty countries.

The mother tongue of the participants is Spanish (n=94), Portuguese (n=69), Catalan (n=64), French (n=55), Polish (n=30) and Norwegian (n=15). The number of other mother tongues is lower: 4 students report that their mother tongue is Italian, Galician or English; 3 have Russian, German or Basque as their mother tongue; 2 speak Turkish, Thai, Romanian, Ukrainian or Bulgarian as their mother tongue; while there are isolated participants from Arabic, Belarusian, Chinese, Czech, Tagalog and Twi. It should be noted that although the questionnaire could be answered in English, only four of the

participants have this language as their mother tongue. In addition, many students responded to the questionnaire and interviews in Spanish because they were learning this language.

Asked about which electronic devices they use to study online (multiple choice with drop-down list), 193 confirm using a smartphone, while 171 do not use it; 357 use a personal computer, while 7 do not have it; only 11 use shared computers; and 13 use public computers. In addition, in open response, 12 report that they work from their iPad and 10 from a digital tablet.

When asked whether they can easily participate in online courses, 384 (pretest-posttest) confirm that they can, while 16 respond negatively by providing different justifications: not having a computer and having to work from a smartphone, availability (due to work causes that do not allow to follow synchronous teaching), technical difficulties with the computer equipment or with the connection to the internet, or lack of an adequate concentration space. Some of the negative responses, moreover, are due to the fact that their way of learning is completely face-to-face, and they have not used any online add-ons.

6.1.2 Profile of participants in interviews

Interviews and qualitative data collection have involved a total of 34 students. Of these, 21 have presented their vision as a student through an interview (12 live interviews, 2 oral reflections provided by recording and 7 written answers to the interview questions). Additionally, two focus groups have been held, with a total of 13 students.

These contributions are in many cases made by participants of the questionnaire as well. Specifically, there are 29 girls and 5 boys, studying in all the universities belonging to the project: UVic-UCC and UOC joint degree (n=3), UAB (n=7), UMinho (n=7), UW (n=13), UiS (n=3), and UCLy (n=1).

6.2 Experience of students in the use of the portfolio for the development of autonomy

Having asked in the questionnaire if they have used learning portfolios in their higher studies, we find that 39.6% answered affirmatively (n=144), while 60.4% have not used them (n=220). Comparing these two groups, the answers related to autonomy (second part of the questionnaire) by Mann-Whitney U test, a statistically significant difference appears in all items.

To the general question of “In my experience as a student I have participated in subjects in which...” four options were complemented by agreement-scale response:

- Decision-making is shared between teachers and students. ($p < .001$)
- Students are invited to raise awareness about the learning process. For example, reflecting on how to learn more effectively or what the stages of the learning process may be. ($p < .001$)
- Learning strategies are implicitly taken into account: identification of learning difficulties, identification of learning needs, learning planning, identification of learning resources, implementation of reflection tools (e.g. learning portfolios). ($p < .05$)
- Learning strategies are explicitly mentioned. For example, certain strategies are presented and practiced in a controlled manner. ($p < .05$)

As we can see, these results indicate that the use of the portfolio has an impact on the way of teaching and preparing students. Those teachers who have used portfolios proceed differently, in the sense that they promote propitious dynamics to encourage the students' autonomy.

The interviews allow us to better understand that the teaching action is essential to get the students to develop this autonomous capacity. Portfolio support is crucial to contribute to this process:

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I have worked on a reflective portfolio that allowed me to increase my awareness of the learning process and reflect on how to learn more effectively or what the stages of the learning process can be. This portfolio allowed me to take a critical attitude towards problem solving and look for strategies, evidence decision making, increase awareness about the learning process and also self-assess my results. (WR - M1008)⁹

I had to make a portfolio explaining step by step what I did, and I think that's improved my autonomy a bit and it was really important, and I think experiences like that should have been given to everybody to improve their outstanding means. (FG1 - P2)

In my case, at first, when they asked us to do that in this process of learning to learn, when they asked us to reflect on what we had learned, it's been very strange for me, because never in my life has anyone asked me to reflect, that is, never has any teacher asked me my opinion. So, to me it was, "Wow. I am giving my opinion and this will be evaluated, but what I say is important. How do you tell me this is important?" And at first it's kind of weird for me to give my opinion. Because when I was in high school, what they told us was, "You don't have to give your opinion, you have to say what's in the text; you reflect on the text, but I don't even want to know what you've thought." They didn't ask us for our critical thinking, and here they are asking for it, and to me it's been a very good surprise, I must say. So now it's not weird for me to share my experience anymore, and we see that, yes, there are different things, things that are the same, and that they lead us to something, which I think is important. (FG3 - P2)

⁹ The coding of the participants corresponds to the following parameters:

- a) OR = Oral Reflection, EV = Interview, WR = Written Response, FG = Focus Group.
- b) P = Participant // A = Universitat Autònoma de Barcelona (UAB), C = Université Catholique de Lyon (UCLy), M = Universidade do Minho (UMinho), S = Universitetet i Stavanger (UiS), V = Universitat de Vic - Universitat Central de Catalunya (UVic- UCC) as well as UVic-UCC interuniversitaire with Universitat Oberta de Catalunya (UOC), & W = Uniwersytet Warszawski (UW).
- c) Unique sequential or random number for each participant (note: the same participant can be quoted from different sources, e.g. EV and FG).

It is also evident that the predisposition of the students is located in the first step of the Bloom pyramid (1956). Some students admitted that they were only aiming to pass the exams, while others explained the importance of metacognition.

6.3 Experience with teacher feedback

Students generally praise timely feedback. In particular, the quick answers and feedback provided by the virtual interaction stand out as an added value that helps them improve their learning process. This feedback, however, is not always sufficiently developed or customized, and this fact is highlighted as limiting.

The internet monitoring has been very positive because the academic tutor followed us a lot. I, for example, if I had a problem, I would tell him and we would have a meeting on the spot, on the same day. For example, one day I found a problem and after half an hour I was already having a meeting with him. The tutor is very adaptable, very flexible; other teachers would not do it. The virtual interaction has benefited us because in the face of the unexpected it was much easier to change days, than if it was in person. (EV - A0003)

When I did my written assignments, he very, very soon, maybe the next day or a couple of days I received feedback. [...] that was not only good, it was deep. (EV - S1003)

Teachers are always available to help, which is amazing and is how a real teacher should be. (WR - M1035)

The teacher was always there to answer all my doubts and questions both during the classes and outside; also, her explanations helped me a lot to understand the material of the classes. (WR - W9203)

To me, what really bothers me is that a lot of times they ask you for things super pom-pom, you know?, such a date, if it's delivered late because I can't, because you're doing another assignment or whatever, you can't turn it in... and then it takes them three months to correct an assignment. You say, listen, you rush me so much, I can't deliver something a day late, but you can deliver the result whenever you can, you know? (EV - A9900)

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I am quite bothered by the fact that you do the assignments and then they correct them and give them to you two days before the exam because they are obliged to give the grades. (EV - A9900)

In the same vein, interviews and focus groups show unanimity regarding the need for the university professor to be a close figure and with availability. Proximity is perceived as a positive aspect, although there can be delicate situations: some interviewees report that some teachers treat students as if they were in school, and they also justify it by arguing that some students prefer this type of teaching (FG1 - P3 and P4).

My teachers mostly give you a lot of feedback and they really want you to improve what you did wrong and improve your skills. And I think that I see some improvements nowadays in that educational part. (FG1 - P2)

From the part of the teacher, he has to focus on a particular student to give him the feedback that he really needs. So I think that proximity is a really important factor for university teachers. (FG1 - P2)

I think there was a lack of more direct student-teacher interaction. I mean, it was something by email. I think it could be something more real. That they could be there in my, in my Canva and put comments as if it were a Word, we would say, like in a document, you know? (EV - M0002)

Yeah, and they're very available for us always. (FG3 - P2)

The truth is that everywhere there is a possibility to get in contact, and they are available. I remember yesterday I contacted a teacher who wasn't even in the university, who was in Granada, and he answered me 3 or 4 minutes later, so okay, what do you want more? (FG3 - P1)

The teachers guide you a lot with what they tell you and suggest. Everyone is free to expand by asking the teacher everything they want to expand on. The path of knowledge for the one who wants it is endless. (WR - A9901)

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The teacher has reached as far as I have asked him, and in some cases, if it has not been so, it has been because I have not asked him. (WR - A9901)

(...) there will be people who have said that dealing with the teacher does not interest them and that they “like to go pinion¹⁰”, and that they are a single super good person and that they explain their life to them. But I get bored if they explain a whole lot of things to me. I really like that there is interaction, that many questions are asked, [...] Yes, I like that there is a very close/intimate treatment, but it is also because of my personality, in general I like to have close interactions with people. (EV - A9911)

I think that the students should be much more active because there are students in my class who want to be given everything “already chewed”, you know? I think that one of the great things about uni is that makes you “get it together” and it allows you move forward, see your limits, see even how to go beyond what you thought you could do. (EV - A9911)

This means that the role of the university teacher requires a commitment that can be demanding in terms of attention to the students, as well as with organization. On the one hand, there must be a strategy of formative evaluation and dedication in the proportion of feedback, since one of the main complaints is the lack of specificity in the indications for improvement. On the other hand, disagreements with the teaching function have also been mentioned on several occasions, in the sense that a poorly organized course may even determine the student's mood, interest and involvement.

It is very frustrating to have such short feedback in writing without being able to discuss them. You know? The problem is this, when the answer is positive, then that's it, you don't go any further, but when it's not, or it's not what you expected, you'd like to find out more, if not, you have the impression that it didn't help you too much, having dedicated some hours. (EV - A9912)

¹⁰ That they explain everything they have to without too much detail, as to cover all the planned topics, instead of being interested in that others understand the matters explained.

As a consequence [of poor teacher organization] I have sometimes had to run/hurry, and this is what I didn't like at all. (EV - V0062)

Before last semester's exam session, I think until a month earlier we didn't know what was going to be on the exam, nor in what form. That surprises me a lot because I come from another system and that... compared to Essex. Because I like to know what I have to do because I also do other things and I'm not here to wait until someone makes the decision of their program, or form of exam until ...

6.4 Digital Competence

For most students, the pedagogical purpose of their experiences with hybrid and mixed learning remains unclear. Their opinions do not converge in favor or against face-to-face or blended learning. In interviews and focus groups, the majority of students expressed nuanced views on both modes of teaching and learning in higher education.

Focusing on the use of digital resources, most of the students score positively (4 or 5 on a scale of agreement) the questions related to digital competence. This view is reaffirmed in interviews, and even some interviewees point out that it is some of the teachers who have difficulty adapting new resources of the virtual environment, a fact that was pointed out during the confinements for the Covid-19 pandemic.

I'd like the technology to be used. This is said a lot in my career, it is like the digitization of companies that wasn't simply changing from a normal sheet to an excel sheet, you know? In other words, if you want to change and make it more digital, you have to start from scratch and how would you do it digitally to improve it. And I think that's what happens in universities too. We use technology as a substitute for pen and paper, for example. And I don't know, I would like it to be a little rebuilt, to really integrate this technology in the classrooms to make it useful. Not that you have to look for yourself... well, see if you have to look for a substitute, I don't know... For example, I bring an iPad to class with a pen and I have the keyboard, and if I want to make a graph or whatever the teacher has done, I take the pen and do it, you know? But it's no different than what I

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would do with pencil and paper, you know? Rethink a little this model of monologue and notes. Transform and look at it from scratch, but digital. (EV - A9900)

Sometimes we didn't even have classes because the teachers didn't know how to do the classes, how to organize them, and in the end we only had a synchronous class. (FG2 - P2)

It was like spending five hours in front of the computer as if it were a typical class, and many teachers knew how to use these tools a little, but they still gave a lot of material and they just kind of did the typical class, just as if we were in the university, but with cameras. Or for example, give readings and spend an hour and a half from 18:30 to 20:00 all listening and with the cameras turned off because that didn't work. (FG2 - P2)

Turning to portfolios, let us remember that 39.6% of the participants in the questionnaire have used learning portfolios, while 60.4% have not. Comparing the answers related to the digital competence (part four of the questionnaire) by means of a Mann-Whitney U test, a statistically significant difference appears between these two groups in several items ($p < .05$), including one of them that presents a $p < .001$. This indicates that those who use the portfolio have a more positive self-perception of certain aspects of their digital competence:

- In terms of communication and collaboration, I am able to: Manage my digital identity.
- Regarding digital content creation, I am able to: Integrate and re-elaborate digital content.
- As for the application of technologies in education, I believe that the development of digital competence contributes to:
 - Develop creativity in learning.
 - Manage feedback ($p < .001$).
 - Improve communication with other students.
 - Improve collaborative learning.
 - Track learning.

When analyzing the interviews in more depth, these show that one of the most effective mechanisms to enhance the autonomy of students is to require the development of digital learning portfolios.

7. Contribution of teacher feedback to student autonomy

This section analyzes the feedback reports that the teachers shared with each other in the context of the project. Feedback reports described how female teachers informed students about their performance and progress. A general look at all the reports distinguishes three types of feedback according to the scope of student activity that teachers focus on: projects, task sequences and individual tasks. In addition, this section discusses some digital tools that help facilitate this type of qualitative assessment for higher education students.

In our view, teaching teams in a wide range of subjects can use these tools to provide highly effective feedback to students in higher education. The projects and sequences contribute greatly to structuring the interactions between teachers and students, so that the latter can review their work according to the observations of the teachers. Even though it does not structure a process as such, digital feedback can also be informative and stimulating if it only focuses on concrete student exercises (Hattie & Timperley, 2007).

While most of the reports were written by the teachers who participated in BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>), some other colleagues also responded positively to their invitation to share a report. The total number of reports represented twenty subjects in the six universities. The research team drafted an initial classification of the types of feedback, which it shared with all participating teachers. The final version is based on both that draft and the teachers' comments.

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Projects are well-crafted learning designs that articulate all the tasks of a course, and have a decisive weight in the final qualification. A variety of software packages is very useful for organizing projects through digital portfolios (Donato & McCormick, 1994, as cited in Oxford, 2011, p. 152). Digital portfolios provide longitudinal portraits of students' potential in a given area based on pieces of concrete evidence, such as oral recordings and written texts. Digital portfolios enable students to create their own documents and reflect on meaningful learning strategies and activities. Thus, each student develops their own metacognitive competence from an initial descriptive perspective that, when publishing and discussing entries in a digital portfolio, usually becomes a more interpretive and proactive account of individual learning. In doing so, each student becomes aware of specific obstacles, analyzes their personal needs and motivation, and improves individual problem-solving skills.

But teachers can also use digital tools to boost students' autonomy through less articulated activities, such as sequencing and homework. Sequences articulate specific tasks in broader but coherent chains that, however, only account for about one-fifth to one-fourth of a course's final grade. Homework includes activities that students do at a particular time. Examples of the three types of feedback are described in Table 3.

The evaluation system of a course should give digital portfolios, sequences and tasks a weight proportional to the work of both students and teachers. In this line, clear rubrics describing the metacognitive operations required to complete a task correctly promote the individual autonomy of each student as she carries out certain activities. If this feedback is timely and agile, students have very useful guidelines to reinforce their metacognitive awareness through greater self-reflection and self-criticism of their own learning. In this way, they strengthen their individual commitment, make specific decisions about their own learning, and discover ways to improve the organization of their work.

The analysis of students' work in portfolios and reflective sequences helps teachers to identify a variety of cognitive processes. In early rounds of analysis, portfolios typically

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include processes of low cognitive complexity, such as descriptions of learning activities, but often encourage students to analyze content and procedures. Eventually, projects require high-order processes such as interpretation of needs, planning and implementation of learning strategies (Torres Ríos, 2015; Bloom, 1956; Churches, 2009). Teachers can promote the evolution of students from the first to the second round following an appropriate feedback pattern, which should always comply with the basic rules of courtesy and consolidate a friendly relationship. Similarly, sequences are fundamental to changing the students' strategy from simple description to incipient analysis exercises. Finally, the organized feedback on individual tasks seems to lay the groundwork for undergraduate and master students to practice how to prepare exams, write academic texts, and conduct research. Significantly, one-task feedback helps higher education teachers review their practices, thus opening opportunities for innovation and improvement.

While in this section we have outlined a simple scheme of constructive feedback facilitated by digital tools, it is important to note that more sophisticated learning designs may also include summative feedback at the end of an activity. Assistant teachers or mentors can be very helpful in improving the quality of feedback. The review of work among the students themselves is also a good way to promote autonomous learning. Finally, feedback can bring to mind the extra steps of learning by anticipating the challenges of a task.

Thus, students become more autonomous in solving problems, regulating their own learning, and practicing critical thinking with digital portfolios. Later, they can easily transfer these competencies to other learning contexts, such as common challenges in everyday life and work environments. Furthermore, by making it easier for students to foster their autonomy and creativity, and to build their identity in the context of formal education, this type of teaching also cultivates a democratic and high-quality learning in which students are more motivated, and act with greater security and perspective.

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Table 3. Interaction between higher education students and teachers through digital tools

Degree	University	Type	Student actions	Teacher actions
Translation and multilingual communication (M)	UMinho	Project	Submission of online translation exercises, and subsequent review taking into account teachers' comments	Discuss student exercises
Specialized translation (M)	UVic-UCC	Project		
Translation, interpretation and applied languages (G)	UVic-UCC	Project	Prepare lesson plans for teaching Spanish as a foreign language	Configuration instructions. Evaluate the work of the students according to a very detailed rubric
Management of Geriatric Centers (DP)	UAB	Project	Realization of a small research project	Monitor student progress and give advice on next steps
Social Policy, Employment and Welfare (M)	UAB	Project	Write a journal on the experience of a professional internship	Encourage students to reflect on their own apprenticeship

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Early Childhood and Primary Education (G)	UAB	Sequence	Report on practical activities by recording a video and writing a short essay	Discuss their own performance with the students themselves
Engineering (G)	UiS	Sequence	Try to solve math problems several times	Use learning analytics to detect and resolve key questions
Software Engineering (G)	UAB	Sequence	Solving network management problems based on the scientific method. Additionally answer conceptual questionnaires online.	Give students hints while they are working on the problems.
Translation, interpretation and applied languages (G)	UVic-UCC	Sequence	Doing translation tasks and giving feedback to peers	Design a series of tasks and monitor the process
European languages and literatures (G)	U. Minho	Sequence	Develop an individual portfolio of tasks and reflections on learning, which is	Evaluate students' assignments and encourage them to improve their work

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			equivalent to 25% of your final grade.	
Sociology (G)	UAB	Sequence	Answer theoretical questions in a forum. Then, consider the teacher's comments to write a short essay.	Share interim evaluations of forum posts with the students. Discuss the challenges of the essay with the students
Iberian Philology (G)	UW	Sequence	Take into account virtual conferences and expert opinions to design lesson plans collectively with peers	Addressing key challenges of lesson plans in virtual conferences
Common subject for all degrees(G)	UCLy	Task	Answer questionnaires. Reflect on academic skills (e.g., taking notes, preparing exams)	

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Training for higher education teachers (DP)	UiS	Task	Do online review exercises on teaching practices	Design of tasks. Discuss the main challenges with female students in online or face-to-face encounters
Doctorate in Sociology (Doct)	UAB	Task	Provide a video summary of the work in progress to an examination board.	
Iberian Philology (M)	UW	Task	Practice academic writing online	

Note: G= Degree; DP= Professional Diploma; M= Master's Degree; Doct= Doctoral Program.

Table 3 illustrates different interactions between teachers and students who exchanged assignments and comments in the BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>) sample. To begin with, it includes four examples of projects in five subjects. The projects are very useful in language and translation degrees because structured patterns of homework and interactions eventually put the students' communication and grammatical skills at the forefront. The projects are also useful to discuss the strengths and weaknesses of the simulations of didactic units in teacher training, since the two-way exchanges of work and comments emulate the teaching process, evaluation of students and review of curriculum design in real life. In courses related to management and the delivery of social services, students may seek to review their professional judgements with the regular support of teachers.

The sequences seem to be very versatile. Similar to the projects, the sequences help college students who will be teachers and translators. Several engineering courses use test, error, and FAQ sequences that greatly help students participate in high-level math

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problem solving. A sequence has also proven to be a good teaching practice to encourage students to derive research questions from social science theories.

According to the examples compiled in Table 3, university professors make use of digital procedures to provide feedback on individual assignments that students will later need to carry out more complex academic activities. As mentioned above, students can learn to prepare for exams, write academic texts and improve their work if they submit their exercises online and receive detailed comments from teachers and evaluators. These examples suggest that higher education institutions can ensure that all female students build their own structure of academic skills by developing plans for an entire degree or master's degree that strengthen these skills along with normal academic activity in a variety of subjects.

The information in Table 3 suggests three more general conclusions about academic feedback through digital tools in higher education. First, digitally enhanced feedback can contribute to both cognitive and metacognitive learning. Second, such feedback not only increases teachers' ability to evaluate tasks, but also to design learning with more accuracy. Thirdly, the sample of courses reflected in the table indicates that digitally enhanced feedback is useful in undergraduate, master's, doctoral and continuing professional training programs.

It should be noted that the evidence collected by BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>) does not reflect all the disciplines in which the digital portfolio is commonly used for university teaching. Based on an international sample of institutions, we have compared how hybrid learning promotes students' autonomy by providing orderly feedback on academic specialties such as foreign languages, translation, social sciences, and engineering. In one of the participating universities, students also develop their transversal academic skills with this tool. In many institutions, the evaluation of teaching practices requires that academic staff present a portfolio of their teaching practice. However, specialized literature has also studied uses of the digital

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portfolio in many other areas, such as health sciences (Sidebotham et al., 2018), physics (Espinel-Rubio, Hernández-Suárez & Paz-Montes, 2021) and law (Ribas et al., 2021), which we have not managed to involve in this research. Thus, more studies and comparative reflections are still needed to consider how it can be used in all branches of knowledge.

Table 4. The pedagogical potential of digital tools: some illustrations

Teaching activity	Digital tools
<i>Task</i>	
Share the rubric of an exercise with a group of students	Upload a file Text sections (VLE)
Propose exercises to promote students' basic academic skills (e.g., taking notes, preparing exams)	Surveys and tests (VLE) Deliveries (VLE)
Discuss and track changes in student work	Share documents in word processors E-mail Task (VLE)
Evaluation of videos made by the students	Youtube channels Video recording tools

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Circulate questions in a video, lecture, or math exercise	One-time questionnaires
<i>Task or project sequences</i>	
Show the implications of a rubric to all students	Text sections (VLE) Forum (VLE)
Write field diaries about work in progress (for example, after participant observation, during a practice, after conducting a research interview, during laboratory work)	Mahara (VLE) Teams Notebook (VLE) Moodle (VLE) Individual Wiki (e.g., Moodle, VLE) Wix Webnode (...)
Answer students' questions after trying to solve math problems online	Multiple opportunity questionnaires (VLE)
Share feedback on work in progress with colleagues	Moodle Workshop (VLE) Discord

Note: LMS = Learning Management Systems (e.g. Blackboard, Canvas, Moodle)

Table 4 complements Table 3 in that it reflects different digital tools that teachers in higher education often use to promote their students' learning. The first part illustrates the variety of tasks that students can perform with digital tools. The second part brings together a series of digital tools that are useful for designing sequences and projects, and thus become feedback vehicles between students and teachers.

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Table 4 suggests four conclusions from the analysis of the BLEARN_AUTONOMY (<https://blearn-autonomy.eu/>) feedback reports. First of all, it is important to note that not only Virtual Learning Environments (VLEs) serve to build digital portfolios, but also that programs like *Discord* can be useful even though their original function is the game, and that many tools of the most common learning management systems are also suitable for designing sequences and projects.

Secondly, digital tools do not impose a pedagogical approach. Indeed, some of them have been inspired by constructivist pedagogies, such as the Mahara and Moodle VLEs. However, neither can these tools only be used in this way, nor is it inappropriate for a subject to share the same inspiration but to still use other technological tools in it.

Third, some tools produce data that can later guide other teaching practices, for example, questionnaires, forums, portfolios, and workshops. Teaching teams can thus take full advantage of the synergies between pedagogy and technology.

Finally, tables 3 and 4 indicate that different universities have generated their own heritage of pedagogical experiences in digitally improved teaching and learning processes. In fact, the sample includes universities of varying size and seniority located in different European countries such as France, Norway, Poland, Portugal and Spain. Therefore, professional development and organizational learning are possible to the extent that some teachers simply help their colleagues to adopt blended learning strategies for their classes. Given that such technical expertise exists, a forward-looking strategy is precisely to share ideas and combine them in a common effort.

PART III. Final recommendations

European university education reflects today's multi-screen society, for hybrid learning contexts coexist as a continuum between classroom face-to-face training and online education through various digital media. However, both in the literature specialized in the subject, and in the results from the empirical study that we have presented previously, it is found that the use of technologies *per se* does not necessarily mean an improvement in the quality of education; it will be their use what may contribute to develop an innovative methodological approach. To do this, it will be necessary to generate learning processes that allow the opening of spaces for reflection and self-regulation in the classes, using technologies to make the most of the concepts of ubiquity and flexibility in learning. Thus, as a result of the previous study, a series of guidelines will be presented below that aim to make the best use of a hybrid learning context, and, above all, that ensure the development of the autonomous and digital competence of today's students.

First, it is recommended to analyze the general framework of the subject and all those aspects that shape its methodological approach: the program, the definition of learning objectives or the type of teaching materials proposed. Derived from the above, it is also useful to analyze what is the role proposed for both the teacher and the student, and to check if all the elements are aligned so that the student is the center of learning. To this end, the unidirectional transmission of knowledge will be discarded, and a reversal of roles in which the student gains autonomy will be promoted. In turn, the role of the evaluation methodology is crucial, since it must be diversified and combine moments of formative and summative evaluation. To this end, it will be necessary to design and integrate in the evaluation (sequences of) tasks (individual or collaborative) or projects and provide spaces for student reflection in digital support on those elaboration processes that enhance self-regulation, creativity, collaborative learning and digital literacy of students. In this way, these alterations allow:

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- 1) Meaningful and proactive learning on the part of the students that allows to increase their motivation and that enables the reception of informative, stimulating and friendly digital feedback focused on specific exercises of the students.
- 2) To promote time management, with the alternation of synchronous and asynchronous sessions in a logic of flexible, autonomous and adjustable learning strategies.
- 3) To attribute to tasks, task sequences or projects a weight proportional to the work done by both students and teachers (sending formative feedback).
- 4) To structure the interactions between teachers and students by creating spaces for reflection, so that the latter can monitor their progression according to the observations of the teachers, and so that the students develop their general competences (know how to learn, know how to do or know how to be) and specific on a subject (knowledge).
- 5) To design activities that contribute to the development of the digital competence of students, which allows them to manage their digital identity, the creation of digital content and collaborative learning.
- 6) To manage a multifaceted pedagogical space and become familiar with the functioning of different Virtual Learning Institutional Spaces (*Mahara, Moodle, Blackboard*), virtual walls (*padlet, etc.*), digital media (*Wiki, Wix, Webnode, etc.*) or tools initially intended for games (programs such as *Discord* or *Kahoot*) that allow to accompany the development of such tasks and projects individually or collaboratively, and at the same time to send effective feedback, subsequently selecting the most appropriate work platforms.
- 7) To work in the classroom on content creation strategies for the network (transversal competence of higher education studies), improving digital and multimodal literacy in a natural way, simultaneously with other academic learning.

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- 8) To develop the digital competence of the students regarding writing for the network and the characteristics of multimodal and hypertextual texts. The multimodal dimension allows to build a discourse through the screen by means of different interrelated semiotic modes: the image (still and moving) and the sound (word, music and noise), while the hyper-textuality offers different possibilities of navigation throughout the text, providing the possibility to choose the reading itinerary from the hyperlinks introduced in the document.

Regarding the adoption of specific procedures, the results of the empirical research carried out during the project indicate that the organized introduction of digital learning portfolios into the program achieved the empowerment of students in an effective way. Let's recall that a substantial part of the students who participated in the project (about 40% of a universe of over 300 students) have used learning portfolios. The analysis of quantitative results (questionnaire) and qualitative results (interviews and focus groups) allows us to affirm that those students who have made the portfolio show a more positive self-perception of certain aspects of their digital competence. We are aware, however, that despite the variety of subjects and universities in which the project has been implemented, this sample is still too small to illustrate this potential in all academic specialties in which most universities work. However, with the information gathered so far, it is possible to enumerate some of the conditions that allow for the effective integration of this resource in the programming of higher education courses. We will list some of them:

1. Since digital portfolios provide longitudinal and versatile portraits of the potential of female students in a given area of knowledge, based on pieces of concrete evidence, such as oral recordings and written texts, it is important, first of all, to identify those computer programs or software packages most suitable for their implementation. In relation to this aspect, before the implementation it is also important to self-assess the level of digital competence of each teacher and try to

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train in this dimension to overcome the challenges that the use of virtual resources can cause, since evidence has also been collected in this study that it is sometimes the teachers themselves who have difficulties in this field.

2. On the other hand, the specialized literature also reveals that, although our students are considered digital natives, their level of digital competence in terms of learning (autonomy, critical thinking) and the construction of digital portfolios may present deficiencies. It is therefore appropriate to accompany the process of building digital portfolios in synchronous sessions and provide clear guidance on the type of platforms they can select, how these should be structured and the design of navigability of the pages, or what the characteristics of the construction of multimodal and hypertextual discourses are.
3. After the construction and design phase of the digital portfolio, it is important that the students understand what the objectives of this activity—which will be developed longitudinally throughout the course—are. To this end, it will be necessary to provide indications of what they are expected to do and how they should do so, indicating specific deadlines for the phase of information production, review, and receiving feedback.
4. As for the evaluation, the use of such activities promotes a formative evaluation that takes place throughout the process. It will be necessary to specify from the beginning what type of information should be introduced on the page, and how often and how the observations or comments of the teacher will be sent. In this sense, it is important to make sure that the students are able to make an estimate of the time and work they will have to devote to this activity, with the intention that they understand that the weight of this activity in the evaluation is proportional to the effort made, both by students and by teachers. In this way, this digital tool makes the learning process transparent, helps the structural planning of the subject under study, stimulates shared responsibility, decision making and conflict resolution.

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5. From the teaching point of view, the reflective portfolio allows to improve the planning of teaching. It's essential to select the aspects of training that will be subject to reflection or (self-)criticism by the students, enhancing the oral and written verbalization of the reflective processes, and avoiding automated responses. In this sense, the types of activities under study promote learning based on inquiry and search, through which the student promotes their freedom of creation and execution and develops skills such as problem solving, self-regulation, active pursuit of learning, knowledge and education or the development of critical thinking, all related to general competences and autonomy. This leads to a change in the roles of students and teachers.
6. The results of the empirical study confirm that combined learning favors feedback that establishes significant relationships between the evaluation criteria and the tasks turned in by the students. Digital reflective portfolios collect tangible evidence (recordings, images, academic or creative writing, activity reports, etc.) that documents the students' development and draw a longitudinal portrait of what the student is capable of or not in a specific area.
7. In turn, it has been proven that, to send teacher feedback, the use of rubrics allows to establish a balance between the time spent sending individual feedback and the weight that the task has in the evaluation methodology of each subject. In fact, this manual for teachers has presented a rubric model, designed specifically for this project, which has focused on structuring aspects of learning. This tool has a series of scales that allow not only to evaluate the result of the tasks submitted, but also to clearly and accurately describe the (lack of) progression of students in the competences being evaluated (level of self-regulation), with the combination of qualitative and quantitative information. In this way, it would respond to some deficiencies identified by the students and included in the empirical study related to the more detailed reception of the evaluation.
8. Finally, we can affirm that in this study the use of the portfolio has had a positive impact on the way of teaching and preparing students, since those teachers who

have used portfolios promote dynamics that are essential for the development of the autonomous competence of their students.

Analysis of teacher feedback

To develop teacher autonomy, in the framework of the project we found it relevant to analyze the type and quality of feedback that has been sent to students in the different subjects. Thanks to the empirical study, it has been possible to triangulate information from different sources (questionnaire, interviews or focus groups) and verify the following:

- Following an appropriate feedback pattern, which complies with the basic rules of courtesy, kindness and a friendly relationship, digitally enhanced feedback increases the ability of students to assess the outcome of assignments at various levels of learning (at the bachelor, master or doctoral level, as well as continued-professional-training diplomas).
- Sending effective and useful feedback in virtual mode (an aspect praised by the students in the data collected through the questionnaire), can contribute to the development of both cognitive and metacognitive learning strategies, since reflection tasks in portfolios oblige students to continuously use metacognitive strategies of planning, monitoring, evaluation, decision-making and assumption of responsibilities.
- In general, formative tutoring allows students to move from an initial or *descriptive* phase (characterized by the presence of processes of low cognitive complexity, such as descriptions or summaries of activities, collected at the base of the Bloom pyramid, 1956 and following adaptations), towards an *interpretive phase* (in which reflections are transformed into processes of greater cognitive complexity). In this last phase, a greater awareness of the students about the use of different learning strategies (such as the interpretation of needs, planning, self-evaluation or search for resources from

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a critical and objective perspective) becomes evident, as well as a greater monitoring and evaluation of certain parameters of the learning process. However, it is common for some students to remain in the initial or descriptive phase of learning due to different factors. One of them is shown in the present study, in the answers to the questionnaire: the lack of extrinsic motivation to improve in the grades of the subject.

- Peer feedback is equally effective in learning.
- Tutoring can take two directions: a) to influence the assessment of the evidence of learning corresponding to the phases of study already passed (feedback); b) to guide or anticipate the next steps for the achievement of goals or objectives of a sequence of tasks or specific tasks (known as *feed forward* or *flipped feedback*).
- It has been shown that this type of more personalized teaching not only enhances self-esteem, but also has an empowering effect on students, favoring their self-image and the construction of their identity as a learner.

Finally, the results of the research instruments implemented during the project show that:

- The sample of institutions includes universities of different sizes and seniority in different European countries such as France, Norway, Poland, Portugal and Spain. One conclusion of this analysis is that it has identified interesting examples of mixed practices in all institutions. Therefore, professional development and organizational learning are possible to the extent that some teachers simply help their colleagues to adopt blended learning strategies for their classes.
- Given that such expertise exists, a future strategy is precisely to share ideas and pool them, analyze the kind of feedback sent to students from each task with

the intention of reviewing their practices and opening up opportunities for innovation and improvement.

Table 1. Main aspects to consider

General

- Analyze the general framework of the subject: program, objectives, methodology, teaching materials, evaluation, etc.
- Organize the subject around the figure of the student as a center of learning.
- When possible, switch between synchronous and asynchronous sessions.
- Establish flexible and autonomous learning strategies.
- Request realistic tasks or projects that are in line with the time available to both students and teachers.
- Structure the interactions between teachers and students in such a way that it is possible to monitor the work and progression of the students.
- Propose activities that promote the development of digital and multimodal competence through collaborative work.

Digital Portfolio Design

- Identify software, applications and platforms suitable for the implementation of digital portfolios.
- Explain the objectives of the activity of building the digital portfolio, as well as other practical indications considered relevant (deadlines, evaluations...).

- Select the moments and activities in which the reflection will focus, so that students can develop competences of critical thinking and autonomy.

- Use feedback rubrics to optimize the time spent on feedback, as well as effective communication between teachers and students.

Analysis and feedback quality

- Send effective and useful feedback in virtual mode that contributes to both the development of cognitive and metacognitive learning strategies.

- Promote a formative mentoring that allows to evolve from an initial descriptive phase to an interpretative one.

- Influence on the assessment of the evidence of learning from past study phases (feedback).

- Anticipate the steps needed to be able to achieve the goals of a sequence of tasks (*feed forward* or *flipped feedback*).

- Enhance feedback between peers, *peer feedback*, as long as it is constructive and friendly.

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Annexes

Annex 1.- Questionnaire to students

STUDENTS' REFLECTIVE QUESTIONNAIRE

Within the framework of the BLEARN_AUTONOMY project, this questionnaire seeks to collect information on the impact of digital portfolios on the learning process of

students in higher education. It is divided into four parts and can be answered in about 12 minutes.

Link to original questionnaire (pretest): <https://blearn-autonomy.eu/cuestionario/>

INFORMED CONSENT

<https://blearn-autonomy.eu/informed-consent/>

Type of scales appearing in the questionnaire:

(Select as many options as needed)

- *Multiple choice*

(Agreement scale)

1. Completely disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Completely agree

(Frequency scale)

1. Never
2. Sometimes
3. Frequently
4. Very often

5. Always

1st part: Socio-biographical data

- a) Name and surname
- b) E-mail
- c) Were you born in the country where you are currently studying? If not, write what country you were born in.
 - Yes
 - No _____
- d) Gender
 - Female
 - Male
 - Others
 - I prefer not to say
- e) Year of birth
- f) Mother tongue
 - Catalan
 - Spanish
 - French
 - English
 - Polish
 - Portuguese
 - Other _____

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COMPLETED STUDIES

- g) What is the highest level of education you have completed?
- Secondary
 - Tertiary level VET
 - Bachelor's degree
 - Master's degree
 - PhD

ONGOING STUDIES

- h) University of current studies
- Universitat Autònoma de Barcelona (UAB)
 - Universidade do Minho (UMinho)
 - Universitetet i Stavanger (UiS)
 - Uniwersytet Warszawski (UW)
 - Université Catholique de Lyon (UCLy)
 - Universitat de Vic - Universitat Central de Catalunya (UVic- UCC)
 - Universitat de Vic - Universitat Central de Catalunya (UVic- UCC) /
Universitat Oberta de Catalunya (UOC)
- i) Degree or master's degree in which you are enrolled:
- j) From which subject have you been invited to participate in this research?

TOOLS AND CONNECTION

- k) What electronic devices do you use to work online? (Select as many options as needed)
- Smartphone
 - Personal Computer
 - Shared Computer
 - Public Computer
 - Other _____

- 1) Can you comfortably participate in online courses? In case you can't, explain why.
- Yes
 - No _____

2nd part - Experience of students in methodologies for the development of autonomy

Please respond according to your experience as a student.

- a) In my experience as a student, most subjects use the same teaching methods.
(Agreement scale)
- b) In my experience as a student, I have participated in subjects in which... (Agreed scale)
- i. Decision-making is shared between teachers and students.
 - ii. Students are invited to increase awareness of the learning process. For example, to reflect on how to learn more effectively or what the stages of the learning process may be.
 - iii. Learning strategies are implicitly taken into account: identification of learning difficulties, identification of learning needs, learning planning, identification of learning resources, implementation of reflection tools (e.g. learning portfolios).
 - iv. Learning strategies are explicitly mentioned. For example, certain

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strategies are presented and practiced in a controlled manner.

c) In my experience as a student I have had to do some kind of work outside of class.

(Select as many options as needed)

- i. Exercises of systematization of contents treated in class
- ii. Collaborative work
- iii. Individual work
- iv. Preparation of theoretical content
- v. Research papers on study topics
- vi. Other _____

d) The following teaching practices develop critical thinking skills. In my experience as a student, I have participated in subjects in which... (Select as many options as necessary)

- i. Students are encouraged to ask relevant questions
- ii. The search for problem-solving is promoted
- iii. Evaluation of statements and arguments is encouraged
- iv. Students are encouraged to say when don't understand a concept
- v. Problem analysis is proposed in detail
- vi. Time is devoted to critical reflection on contexts, especially on variables that affect learning
- vii. Negotiation and discovery of positive strategies is encouraged, as to make the students' voices heard

e) In my experience as a student, I have participated in subjects that promote the development of students' digital competence.

- i. Yes
- ii. No

- f) In my experience as a student, I have participated in subjects in which the interaction between teachers and students takes place...
- i. Online
 - ii. In a physical classroom
 - iii. Both online and in a physical classroom (hybrid)

3rd part (I): Student experience with teacher feedback

*Please respond according to your overall experience as a student in relation to teacher feedback. **(PRETEST)***

*Please respond according to your experience in the subject from which you were invited to participate in this questionnaire. **(POST-TEST)***

- a) On the kinds of feedback I have received in my experience as a student...
(Frequency scale)
- i. Teachers give feedback at the end of the course
 - ii. Teacher feedback significantly affects learning
 - iii. Teacher feedback is useful for learning
 - iv. The time period in which I receive feedback is useful for my learning
 - v. Teacher feedback is focused on scoring evaluation activities with a grade
 - vi. Teacher feedback is focused on reformulating activities
 - vii. Teacher feedback focuses on learning as a result
 - viii. Teacher feedback focuses on learning as a process
 - ix. Teacher feedback helps me identify learning resources

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- x. Teacher feedback helps me plan my learning
 - xi. Teacher feedback helps me control my learning
 - xii. Teacher feedback is provided on an individual basis
 - xiii. Teacher feedback is given collectively
- b) The feedback purposes I have received from teachers in my experience as a student were... (Select as many options as needed)
- i. Clarify learning objectives and outcomes
 - ii. Increase motivation and commitment to the learning process
 - iii. Monitor and help develop different learning outcomes (tasks, projects, presentations, etc.)
 - iv. Expand my development of critical thinking
 - v. Encourage the use of co-evaluation or peer review
 - vi. Follow the development of tasks related to complex cognitive processes
 - vii. Monitor and assist with problem-oriented tasks
 - viii. Increase awareness of my learning process
 - ix. Increase awareness of my cognitive style
 - x. Interpret the meaning of certain errors to increase my awareness of the stage of the learning process in which I am at
- c) Teachers have interacted online with me through... (Select as many options as needed)
- i. E-mail
 - ii. Discussion forums
 - iii. Videoconferencing
 - iv. Other _____
- d) I've written thoughtful diaries or portfolios.
- i. Yes **[If YES, the questionnaire is addressed to PART 3 (II)]**

- ii. No **[If they say NO, the questionnaire goes to PART 4]**

3rd part (II): Learning portfolios

*Please respond according to your general student experience in relation to the use of learning portfolios. **(PRETEST)***

*Please respond according to your experience in the subject from which you were invited to participate in this questionnaire. **(POST-TEST)***

- a) According to my experience as a student, the making of reflection portfolios or learning diaries was a productive experience and had a positive impact on my learning. (Agreement scale)
- b) I used the following digital media to produce my digital portfolio: (Please select as many options as necessary)
- i. Mahara
 - ii. Learning Management Systems (LMS): Blackboard, Moodle
 - iii. Websites
 - iv. Blogs
 - v. Genially
 - vi. Canva
 - vii. Discord Server
 - viii. Other _____
- c) How much weight did the portfolios have in the assessment? Enter the percentage (if not used for evaluation, enter 0).
- i. _____ %

d) What relevance do you attribute to the portfolio in your university education?

Indicate your degree according to the following statements. (Agreement scale)

- i. It helps me reinforce the learning derived from the subject contents
- ii. It contributes to achieve the course's learning objectives
- iii. It improves my ability to be aware of my progress in the subject
- iv. It doesn't make a significant contribution to my learning process
- v. It takes time from other activities that contribute more effectively to my education
- vi. It's not relevant at all
- vii. It contributes only in some specific aspects

e) Participation in the portfolio has contributed to... (Agreement scale)

- i. Reinforce subject-specific knowledge
- ii. Develop critical thinking skills
- iii. Solve problems individually and collaboratively
- iv. Self-evaluate my learning
- v. Improve my planning
- vi. Realize the importance of learning strategies

4th part: Digital competence

Please respond based on your overall student experience in relation to your digital competence.

(PRETEST)

*Please respond according to your experience in the subject from which you were invited to participate in this questionnaire. **(POST-TEST)***

a) In terms of information and data literacy, I am able to: (Agreement scale)

- i. Browse, search and filter data, information and digital content
- ii. Evaluate data, information, and digital content
- iii. Manage data, information and digital content

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- b) In terms of communication and collaboration, I am able to: (Agreement scale)
- i. Interact through digital technologies
 - ii. Share through digital technologies
 - iii. Exercise citizenship through digital technologies
 - iv. Collaborate through digital technologies
 - v. Use codes of conduct and courtesy properly (Netiquette)
 - vi. Manage my digital identity
- c) As for digital content creation, I am able to: (Agreement scale)
- i. Develop digital content
 - ii. Integrate and rework digital content
 - iii. Identify copyright and licenses
 - iv. Quote sources appropriately
- d) As for security, I am able to: (Agreement scale)
- i. Protect devices
 - ii. Protect personal data and privacy
 - iii. Protect health and well-being
 - iv. Protect the environment
- e) As for problem solving, I am able to: (Agreement scale)
- i. Solve technical issues
 - ii. Identify gaps in digital competence
 - iii. Identify technology needs and responses
 - iv. Use digital technologies creatively
- f) In general, I have a critical attitude towards technologies, and I am able to assess their strengths and weaknesses. (Agreement scale)

- g) Regarding the application of technologies in education, I believe that the development of digital competence contributes to: (Agreement scale)
- i. Developing creativity in learning
 - ii. Manage feedback
 - iii. Improve communication with other students
 - iv. Improve collaborative learning
 - v. Keep track of learning
 - vi. Organize learning
 - vii. Build knowledge from different sources (multimodality)
 - viii. Read and understand dynamic resources, and not only sequential learning materials (multimodality)
- h) In my experience as a student, I think it is relevant to promote the development of digital competence. (Agreement scale)

Annex 2.- Interview script

The following script is the original one. During the evolution of the research, some questions have been slightly adapted.

The grades do not reveal all aspects of learning in higher education. When, as students, you do your homework and exercises, you also reflect on the interest of these activities, and comment if you found them interesting. In this interview, we will ask you questions about the subject from which we have invited you to participate.

- The subject has been in person but you have also used digital tools. Could you tell us about your experiences with these two modalities? We would appreciate a

specific answer in which you give us enough details to help us plan classes better in the future.

- What steps have you taken to achieve your grade? What did you do?
- Have you followed any indicative guideline? If so, where did you find this guide?
- In this subject, what sense has the teaching and your learning left you?
- How do you think this subject has influenced your way of understanding and practicing education?
- How would you describe the support that the teacher has given you and the comments that she has made to you throughout the subject?
- Do you think that teachers should provide more support in the face-to-face and online activities of this subject? What support should it be? What kind of support?

Annex 3.- Focus group script

The following script was used in the Warsaw Focus Group (11/05/2022). Equivalent scripts were used in the other focus groups. If needed, verification topics were added to the initial questions to elaborate on the responses.

- Teachers and students interacted face-to-face and used digital tools. Could you tell us about your experiences in these two modalities? Please be specific and give us as much detail as you can so that we can understand you and your experiences for a better future planning.
 - What do you understand about hybrid learning and blended learning?
 - Mixing online and onsite participants
 - Using digital tools
 - Which is your experience in online learning?
 - How do you feel about these modalities?

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- Do you prefer using digital tools in the classroom? To complement the learnings after the classroom at home?
- Do you think teachers know planning appropriate strategies of ICT integration in their classes?

- Which steps did you accomplish in order to accomplish your grade? What did you do?
 - To what extent does the grade influence your learning?

- Did you follow any guidelines? If so, where did you find these guidelines?
 - Do you find guidelines useful for your learning?
 - What role do the teachers have in guiding you across the subject?

- How do you think the subject has influenced your understanding and practice of education?
 - What innovative teaching styles did you find more appealing?
 - What's the role of the university teacher you expect?

- How would you describe your teacher's support/feedback during this subject?
 - Did you find a step from previous educational levels?

- Would you expect more support from teachers in working face-to-face and on-line in the same subject?
 - What would it be?
 - What kind of help would it be?