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Electronic work-based learning (eWBL): a framework for trainers in companies and higher education

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ABSTRACT

Driven by COVID-19, remote work is popularising. Companies and employees are increasingly embracing its benefits of flexibility and convenience, showing reluctance to return to full-time office schedules. Similarly, companies and HEIs started offering remote forms of work-based learning (WBL) – or eWBL. However, remote work presents social and psychological barriers associated with physical isolation that need addressing. In the context of WBL, which aims to provide a real-work environment for students, it is essential to explore these barriers as they might undermine the development of critical competencies associated with WBL, particularly creativity, teamwork, collaboration, networking and situational awareness. While research has started producing alternatives to overcome some of these limitations, we still miss a robust framework for designing and implementing these and other potential new strategies that could further enhance eWBL. To address this gap, a comprehensive framework is developed by integrating literature recommendations with results from 27 case studies derived from the Erasmus + Project eWBL. The framework comprises five primary phases: design, preparation, onboarding, delivery, and assessment. Each phase contains several sub-phases that offer practical implementation steps to WBL trainers in higher education and industry on how to deliver high-quality eWBL.

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1. Introduction

Over the past three decades, advances in globalisation and digital technology have continuously reshaped the labour market, with present jobs disappearing and new ones emerging in the years to come (Dabic et al. 2023). These changes are putting strong pressure on higher education institutions (HEI) as it is no longer sufficient to provide students with theoretical knowledge. To deal with the ever-evolving work environment, graduates require skills and attitudes such as collaborative problem-solving, interpersonal communication, teamwork, critical thinking, self-efficacy and self-directed learning. WBL emerges as a learning approach that contributes to narrowing these skill gaps by allowing learners to engage with real-work situations (Gamage 2022; Lester and Costley 2010; Perusso and Wagenaar, 2021).

Parallel to the developments in WBL, the rapid advance of communication technology allowed the popularisation of remote work as a valid work arrangement, evolving from hot desking to a fully functional work mode. Understanding the benefits of remote work, such as geographical

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flexibility, lower commuting time, and reduced living costs (Pretti, Etmanski, and Durston 2020), companies and HEIs started to offer remote forms of WBL – or as we defined for this document, eWBL.[1]

Despite its exponential adoption during the COVID-19 pandemic, eWBL is still a new phenomenon. There is currently little research about it, notwithstanding the various opportunities it brings for companies, HEIs and learners (Hora et al. 2021; Maini, Sachdeva, and Mann 2021). Firstly, eWBL offers interns greater flexibility by providing work opportunities with geographically distant employers, including those on other continents (Irwin et al. 2022; Massingill 2013). Secondly, eWBL allows students to effectively combine their internship with other university commitments, such as lectures and exams (Pretti, Etmanski, and Durston 2020). Thirdly, eWBL is more cost-effective for interns as they save on commuting and living expenses. This cost-effectiveness is especially relevant for opportunities in vibrant yet often costly employment hubs such as large European capitals (Pretti, Etmanski, and Durston 2020).

Additionally, eWBL gives companies access to a broader talent pool, including candidates from lower-income backgrounds and with physical disabilities (Kraft, Jeske, and Bayerlein 2019). This increased diversity is particularly beneficial for start-ups and small and medium enterprises (SMEs) as it extends their reach when searching for suitable interns to fill the company's skill gap (Jeske and Axtell 2014). Finally, eWBL is well-suited to foster digital skills like digital communication as well as attitudes such as self-directed learning, proactivity and time management (Bayerlein and Jeske 2018; Irwin et al. 2022; Roy and Sykes 2017); competencies that are increasingly relevant in a digital world.

Despite the points mentioned above, there are still concerns regarding the effectiveness of eWBL. These reservations arise primarily from the fact that one of the fundamental principles of 'traditional' WBL is the immersion of students in a real work environment. This immersion, as highlighted by Raelin (2007), is crucial in developing competencies such as communication, collaboration, networking, and a clearer understanding of career paths (Raelin 2016). Hence, to evaluate the effectiveness of eWBL, it is crucial to assess the extent to which the physical distance between interns and the workplace hinders the efficacy of eWBL as a valuable learning experience.

Literature on eWBL has already reported several implications associated with physical distancing. The most evident is the reduced social interaction between interns, co-workers, and the organisation as a whole (Irwin et al. 2022; Jeske and Axtell 2014). Interns bond less and are emotionally detached from their work teams (Johnson, Bettenhausen, and Gibbons 2009). This lack of social interaction is associated with lower general satisfaction with virtual internships (Hora et al. 2021; Pretti, Etmanski, and Durston 2020). Moreover, even though digital natives use different forms of feedback in their online interactions, such as 'thumbs-up' and chat (Cheikh-Ammar and Barki 2014), the absence of a physical workspace makes it less likely for remote interns to receive opportunistic or accidental feedback than traditional interns (Bayerlein and Jeske 2018).

Networking opportunities are also restricted since interns rarely meet their bosses or colleagues (Gill 2020). Furthermore, research suggests that the lack of in-person communication may decrease task clarity; interns do not fully understand the task or are kept waiting for a response to a question (Pretti, Etmanski, and Durston 2020). Similarly, asynchronous communication can also harm cooperative and creative work since these activities require strong interaction and continuity (Gill 2020). Finally, Jeske and Axtell (2014) suggest that eWBL undermines the sharing of corporate values and workplace culture due to fewer opportunities for observation and interaction with the organisation. Table 1 lists the main advantages and limitations of eWBL indicated in the literature.

Academics have proposed various strategies to address the limitations of eWBL. One of the most recurring is fostering a close intern-supervisor relationship at the company and the university. Mentored interns have more opportunities to share knowledge and experience with co-workers and peers. This closer interaction contributes to developing communication skills and critical thinking (Jeske and Linehan 2020; Ruggiero and Boehm 2016). It also increases networking opportunities and alleviates alienation and social disconnection feelings (Hora et al. 2021).

Table 1. Main advantages and disadvantages of eWBL.

Advantages	Limitations	Main references
Broader recruiting opportunities Less commuting time Lower living expenses Flexible study-work balance Foster digital skills Self-directed learning Proactivity and time-management More inclusive	Less social interaction Less feedback Communication issues Undermines cooperation Undermines creativity Less networking Lack of immersion Weaker corporate culture	Bayerlein and Jeske 2018; Gill 2020; Hora et al. 2021; Irwin et al. 2022; Jeske and Axtell 2014; Kraft, Jeske, and Bayerlein 2019; Maini, Sachdeva, and Mann 2021; Massingill 2013; Pretti, Etmanski, and Durston 2020; Roy and Sykes 2017.

Clearer communication is also recurrently mentioned as a central mechanism to mitigate the task clarity issues mentioned earlier (Poulsen and Ipsen 2017). Similarly, having more frequent interactions with co-workers and opening several lines of communication between the company and its interns offers learners a sense of connection and belonging with the team (Pretti, Etmanski, and Durston 2020).

Lastly, the literature suggests that the intern's personality and skill set are crucial factors in determining their success in eWBL (Cook 2020; Gamage 2022). To excel in virtual internships, interns need to be self-motivated, independent workers who are proactive about their tasks and seek support from more experienced colleagues when necessary (Jeske and Axtell 2014). They should also possess excellent time-management skills (Massingill 2013). Therefore, companies and HEIs should be attentive to these characteristics in their students, both warning about the importance of this skill set and training e-interns for them (Jeske and Axtell 2014).

1.1. Research gap

Despite the recommendations highlighted above, eWBL is still a new phenomenon that is not yet widely understood by HEIs and employers. We do not have an exhaustive list of best practices in eWBL, with multiple alternatives to improve it yet to be explored. Likewise, we miss clear guidelines regarding the creation of support structures and learning opportunities within eWBL (Bayerlein and Jeske 2018). Specifically, there is a need for in-depth qualitative work on the general thoughts and feelings surrounding eWBL to understand the factors affecting its quality (Pretti, Etmanski, and Durston 2020), together with a robust framework that indicates the practical steps necessary to implement these recommendations (Roy and Sykes 2017).

Leveraging on the transition of thousands of internships from in-person to remote due to the COVID-19 pandemic, the eWBL Project explored how 27 WBL providers across Europe have dealt with the shift to eWBL and what challenges and alternatives they have found. Drawing on the project outputs, this document aims to offer educators and trainers at HEIs and companies a robust *framework of tools and strategies on how to set up, implement and assess eWBL*.

2. Materials and methods

Given the new and unexplored nature of the subject, we followed Yin (2014) and adopted an explorative and inductive research approach to design the framework. More specifically, we followed a multiple case study method based on 27 case study reports produced by the eWBL project.

Because the primary data used to design the case studies was collected by multiple partners, in different languages, analysed at the local level, and not always available to the authors of the present paper, we do not present the intra-case analyses here.[2] Section 2.1 details the methodology employed by the eWBL project to produce the 27 case study reports. Section 2.2 describes how we, the authors of the manuscript, used the project materials to design our framework.

2.1. Data collection and analysis for the case studies

The eWBL project includes five partners; four HEIs from the Netherlands, Germany, Italy and Slovenia and one industry partner from Ireland. The eWBL project leader chose these partners because they provide a good representation of all European Union member states in terms of economic development and HE philosophies and educational traditions, that is, the Anglo-Saxon, Humboldtian and Napoleonic ones. (Sam and Van der Sijde 2014).

The identification of the cases by the project partners involved desk research, the project partners' network and indications from universities' career centres. Project partners in Germany, Netherlands and Slovenia also referred to data from a previous Erasmus + project, WEXHE, which explored WBL provision across Europe to support the selection. This process identified 40 potential cases, with each project partner providing eight. From this list, 27 were translated into final cases. The primary selection criteria were the diversity of disciplinary areas and the duration of the internship, with preference given to those lasting three months or longer.

Data to design the cases came from semi-structured interviews conducted by the project partners with companies, HEIs representatives, and students or alumni that completed the virtual internship. A total of 86 participants were interviewed: 27 HEIs instructors, 27 internship supervisors at the companies, and 32 students or alumni. Around 74% of cases derive from applied sciences faculties, 22% from humanities and social sciences, and 3% from natural sciences. About 81% of cases describe placements lasting between three and six months. Eleven per cent lasted for less than three months, and 7% for more than six months. Germany and Italy contributed with six cases each. The other partners contributed five each, totalling 27 cases. Table 2 summarises the case distribution.

The interviews took place between February and June 2022, lasted between 30 and 45 min, and were conducted in the local language. The case studies (but not the interview transcripts) were translated into English by the project partners and revised for grammar consistency by the Irish partner.

The questionnaire used for the interview included only open questions. It was adapted to each participant group (HE, companies and students), generally addressing five main areas: (i) how the transition from WBL to eWBL was in terms of design and implementation, (ii) how the transition impacted the learning outcomes, especially theoretical knowledge acquisition, practical experience and soft skills development, (iii) how eWBL impacted the notion of workplace culture, (iv) the main drivers and barriers for eWBL and (v) the long-term impact of eWBL on WBL.[3]

Experienced researchers from each project partner analysed the data at the national level to write the case study reports. The data analysis adhered to Miles, Huberman, and Saldana (2014) following an explanatory stance using analytic progression. The researchers extracted the most relevant concepts from the respondents' raw data and clustered them according to the impact responses had on the five dimensions highlighted above.

2.2. Data analysis for the framework

The present framework was formulated by the authors drawing upon insights from the 27 cases, five national reports summarising the case study results at the national level and one synthetic report that overviewed all the cases. The formulation process involved the following analytical steps:

Table 2. Distribution of the case studies.

Country	Cases	Disciplinary area	Cases	Duration	Cases
Germany	6	Applied Sciences	20	Up to 3 months	3
Italy	6	Humanities and social sciences	6	3–6 months	22
Ireland	5	Natural sciences	1	Over 6 months	2
Slovenia	5	**Total**	**27**	**Total**	**27**
Netherlands	5				
Total	**27**				

First, we familiarise ourselves with virtual and traditional WBL literature, particularly papers that offered inputs on framework design. Zhao and Johnson's (2012) model, which departs from online learning theory, speaks of four essential elements: planning, strategizing, evaluating, and comprehending. Similarly, Roy and Sykes (2017) propose a framework based on planning, engaging, assimilating and reflecting. Several models from WBL literature speak of similar pillars. Both Raelin (1997; 2007) and Ferrández-Berrueco, Kekale, and Devins (2016) propose that WBL should be arranged following a planning, delivering and evaluating sequence.

Following Miles, Huberman, and Saldana (2014) approach to qualitative data clustering, we clustered the insights from our data to arrive at five fundamental phases in the structuring of high-quality eWBL, which align with the models outlined by the literature. The five phases are (1) design, (2) preparation, (3) onboarding, (4) delivery and (5) assessment.

To create a preliminary framework, we filled in the five phases with data that pertained to specific aspects within each phase (or sub-phases). For instance, based on several cases that emphasised the importance of training students for online job interviews, we included this recommendation in the 'preparation phase', sub-phase 'recruiting'. To increase transparency, we also specify, in parenthesis, the supporting cases associated with a certain finding. The letter denotes the country of origin[4], while the number indicates the corresponding case study. For instance, 'G1' means German case one.

Lastly, we validated our findings with feedback from WBL experts. The panel included six academics and internship supervisors from HEIs with expertise in online learning, remote work or WBL, and four internship supervisors from different companies. We gathered their input with the collaboration of the eWBL project partners. We then integrated the feedback from the experts into the final framework. Figure 1 outlines the methodological process employed.

3. Results

Our framework includes five phases divided into several sub-phases. The following sections detail each of them. We start each section by introducing the general relevance of that particular phase to eWBL and then explore the specific activities (sub-phases) that are relevant in that phase. At the end of each session, a table summarises the main outputs.

3.1. Design

The design phase comprises the planning of eWBL at the curricular level. Several design elements overlap with traditional WBL, including which semester WBL takes place, its duration, how many learning credits to award, the type of employment contract, the general responsibilities of interns and employers, etc. However, insights from the case studies stressed numerous particularities of eWBL.

Firstly, results indicate that disciplines like management and engineering are more adaptable to the online environment than, for instance, hospitality and social care, which require closer face-to-

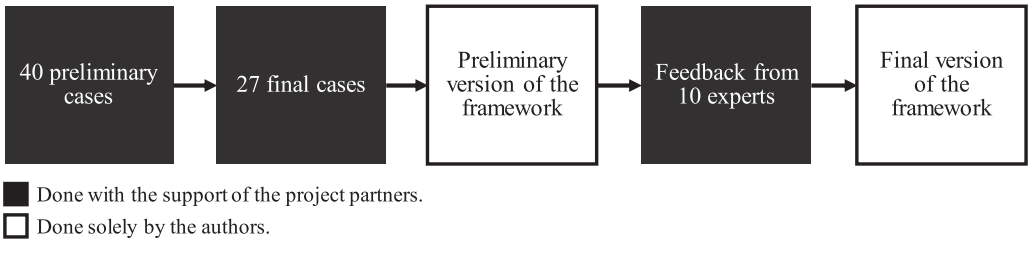

Figure 1. Methodological process.

face interaction (I1, IR4, N5, S3). Consequently, eWBL design should reflect how remote work impacts the particularities of each academic field.

Secondly, eWBL design must consider (and capitalise on the fact) that virtual internships are well suited to foster competencies associated with the digital world, including digital communication, proactivity, and time management oftentimes at the expense of teamwork, creativity and networking skills (I6, IR1, IR2, N2, N5, S2). Therefore, eWBL design must consider these differences and reflect them in the expected learning outcomes.

Lastly, companies must recognise the added costs that employees incur while working from home, including heating, electricity, IT equipment (laptop, monitor, printer), software, office supplies, high-speed internet, and ergonomic office space (N2).

It is important to note that the design phase should encompass the planning of eWBL at a more general level and should be flexible enough to accommodate different job descriptions and employers' needs. It should offer a template that students and mentors can fill up with elements specific to their job experience, i.e. based on the following phases of the present framework. Table 3 overview the main insights of the design phase.

3.2. Preparation

Unlike the design phase, the preparation phase encompasses the more practical activities that companies and HEIs have to perform before the beginning of the 'work' phase of the internship. Items that require particular attention include (i) aligning the intern's skills with remote work, (ii) establishing and implementing online application and recruiting procedures, and (iii) providing training to HE and company staff on the needs of remote work.

3.2.1. eWBL skills alignment

Insights from the case studies (IR1, IR2, N2, N5, I5, S2) highlight that eWBL interns benefit from possessing a distinct set of competencies, namely proactivity, self-efficacy, digital literacy, and time management. Although these skills can be improved on the job, students who lack familiarity with them before commencing their virtual internships are likely to face challenges working remotely.

Consequently, to prevent a significant misalignment between students' skill sets and the demands of remote work, HEIs should help students identify their propensity for these competencies (S4, N2, N4) through, for instance, self-assessment tools and counselling services. Several online tools can help students assess their personality traits. If there is an important gap, results (G3, G6, I2, I6, IR4) propose offering training, ranging from workshops with experts to simpler alternatives like sharing online materials, massive open online courses or other virtual training tools.

3.2.2. Recruiting and application

Part of the success of WBL relies on offering students enough high-quality internship positions. While eWBL offers flexible location, not all positions are suitable for remote work, especially in disciplines that require frequent face-to-face interaction. To address this challenge, results from the case studies (I1, N3, N4) suggest filtering vacancies based on their location (city, region or country level), mode of delivery (online, blended, or face-to-face), and the employer's industry (as some industries are more impacted by remote work). This filtering shall facilitate the identification of adequate opportunities.

Table 3. An overview of the design phase.

Dimensions	Key activities
Particularities of eWBL	*Companies and HEIs:* Adapt the design to the particularities of the online environment, considering the influence of (i) academic disciplines, (ii) employers' capabilities, (iii) learning outcomes and (iv) the quality of the work environment.

Curriculum vitae (CV) design and preparation for online job interviews were also mentioned frequently (G1, G2, I5, IR2). A good CV for eWBL should highlight the candidate's capabilities to work independently and give evidence of self-consciousness. Likewise, familiarity with netiquette rules such as having an adequate physical space to attend job interviews, use of formal language, and turning the camera on, is crucial at the interview stage. Again, HE staff can train students in these skills. Training can range from sharing open educational resources and guidelines to more elaborate one-on-one or group coaching with CV review and simulated online job interviews.

3.2.3. Staff training at HEIs and companies

Insights from the cases suggest that trainers in companies, but especially in HE, are not adequately prepared to support students doing eWBL. This lack of preparedness includes technological and pedagogical aspects (G2, G4, I5, N2).

Trainers are not always familiar with the latest technology nor the various productivity tools (e.g. virtual workspaces, collaborative tools) that are central to the success of remote work. Similarly, they are often unaware of the pedagogical demands of online placements, such as the need for more constant feedback, a closer relationship between intern and mentor, and issues associated with poor socialisation. Consequently, it is necessary to offer training to mentors working with eWBL. Table 4 provides an overview of the main findings from the preparation phase.

3.3. Onboarding

Almost all the cases mention that limited face-to-face interaction is a significant issue in eWBL. It restricts the development of certain soft skills like creative and collaborative work, networking, and the absorption of the company culture. Similarly, nearly all of the case studies suggest that the solution to address this issue involved providing interns with comprehensive onboarding activities.

The onboarding phase starts when the intern has secured a placement and is ready to commence working. Data from the cases point out four main activities related to onboarding that one can combine into a one-day event or divide into multi-day events. The four activities are: (i) introducing the internship aims, (ii) meeting colleagues and stakeholders, (iii) detailing the workflow and (iv) IT and other practical matters.

3.3.1. Introducing the internship aims

The onboarding serves to introduce interns to the overall eWBL process. One of these processes includes explaining the central aim of the internship, the intended learning outcomes and the feedback and assessment mechanisms. This introduction should ideally take place in a meeting with the company supervisor, being also a good opportunity for the company to present its history, work culture, and long-term goals (N2).

Table 4. An overview of the preparation phase.

Dimensions	Key activities
eWBL skills alignment	*HEIs:* Assess and train students for key eWBL skills and attitudes such as time management and proactivity.
Recruiting and application	*HEIs:* Customise job offerings to eWBL. Offer support in job applications, including training in CV design and netiquette.
	Companies: Adapt offerings for the particularities of eWBL. Consider using testimonials and virtual job fairs to help in the eWBL adaptation.
Training of HE and company staff	*Technological aspects:* Staff should be up-to-date with productivity and communication tools for remote work, especially at HEIs.
	Pedagogical aspects: Train staff in the unique dimensions of eWBL, including giving constant feedback, following the emotional status of interns, opening multiple communication channels, and offering networking opportunities.

In line with the recommendations outlined in the preparation phase, employers should assess the digital skills and remote work readiness of the interns at this stage. If significant gaps appear, training sessions at the beginning and throughout the internship can bridge these gaps (G2, G6, I1, I2, I4, IR4, S2). Such training might entail synchronous, asynchronous, individual or group activities.

3.3.2. Meeting colleagues and stakeholders

After presenting the general internship aims, the intern should be formally introduced to colleagues and stakeholders. While the onboarding can be done online, several cases (I5, IR2, IR3, G6, N2, N4) recommended a face-to-face event since this might be the only opportunity for the intern to meet colleagues and stakeholders in person. The cases also described various activities that can be used to introduce the interns to co-workers and supervisors. Examples include meet and greet events, group breakfasts or lunches, corporate visits to showcase the company's departments, ice-breaking activities or a small party.

Onboarding events also provide an excellent opportunity to present interns to key IT and administrative staff. Furthermore, onboarding events serve to create social media groups for interns or specific interest groups (G2, IR1, IR2, N3). These virtual groups play a vital role in fostering a sense of community among interns and alleviating feelings of isolation or alienation that arise during the virtual internship.

HEIs should hold similar onboarding events, where eWBL interns from different disciplines meet to network. The case studies (G6, N3, N5) stress that having a network of contacts, even if it includes interns not working for the same employer, helps to minimise feelings of social isolation and creates opportunities to exchange invaluable work experiences.

3.3.3. Detailing the workflow

One of the most recurring challenges of eWBL reported in the case studies is poor intern-supervisor communication. Supervisors are often unaware of what interns are doing. Similarly, interns frequently complain of unclear instructions and inadequate support. Consequently, eWBL demands a more structured workflow than traditional WBL.

The onboarding phase can address these concerns by including a timeslot to detail the workflow structure. Such introduction should cover (i) the preferred forms of communication for different work situations, (ii) the way the work output will be shared (meeting, email, work platform), (iii) the task distribution frequency (daily, weekly), (iv) the start and end of the work day and (iv) the assessment methods.

The cases G2, IR3, and N2 have also mentioned the benefits of a so-called 'buddy' system for onboarding new employees. It involves assigning interns to an existing employee (buddy) who guides the new intern through the first few weeks or months on the job. The buddy is typically a former intern who is now a permanent employee. This status shall create empathy and closeness between the buddy and the new intern, which can be highly beneficial when explaining the company workflow.

3.3.4. IT and other practical matters

Just because interns work from home, they should not rely on their personal IT equipment nor bear the cost of purchasing office supplies. As mentioned in the design phase, the company should offer IT equipment. In several cases (I5, IR3, G3, N2, N3), the companies used the onboarding day to provide the necessary IT equipment to interns.

Companies also benefit from the onboarding day to install software and security protocols on interns' laptops or mobile phones and distribute documents or other items necessary for remote work. Results also advise offering interns a tutorial on how to use the company system and how to access shared platforms, among others (G2, G6, I2, IR4, S2). Table 5 reviews the key insights of the onboarding phase.

Table 5. An overview of the onboarding phase.

Dimensions	Key activities
Introducing the internship aims	*Companies and HEIs*: Introduce the internship aims, learning goals, feedback and assessment mechanism, etc., preferably with the support of the ILP.
Meeting colleagues and stakeholders	*Companies:* Introduce interns to colleagues, co-workers, IT and administrative staff, and supervisors. Hand out IT equipment and software protocols. *HEIs:* Establish a network among interns working remotely within the faculty.
Detailing the workflow	*Companies:* Present interns to the workflow (task briefing, monitoring, delivery, feedback and assessment). Introduce productivity and communication tools like file sharing, workspaces, etc. Finally, establish clear working hours and breaks to ensure a good life-work balance. *HEIs:* Explain feedback, mentoring and assessment procedures.
IT and practical matters	*Companies:* Hand out IT equipment, install the necessary software, sign documents, and deal with other practical matters.

3.4. Delivery

The delivery phase encompasses the main work activities of the internship. The case studies show that although remote work can improve interns' productivity due to fewer interruptions, less commuting, and flexibility to work when one is most productive, it also contains unique challenges. The data highlights three critical areas associated with the delivery stage of eWBL: (i) task briefing, (ii) task monitoring and (iii) networking and socialisation activities.

3.4.1. Task briefing

Effective communication is essential to successful task briefing. However, with its inherent physical distance, eWBL makes follow-up challenging and inhibits interns from asking questions when needed. Interns complain that they do not fully understand the task at hand, often spending days working under the wrong assumptions. Likewise, supervisors complain that interns do not ask questions or try to clarify issues from the beginning, believing they can complete the task despite the missing information (G1, I6, IR3, N4, S1, S5).

In almost every case study, organisations addressed remote communication challenges through so-called weekly briefing meetings. These meetings usually occur at the beginning of the week, when the supervisor distributes the tasks for the upcoming week. The briefing typically includes (i) a description of the objectives and expectations associated with each task. This ensures that interns fully understand the desired outcomes. It also encompasses an (ii) outline of the background information, such as reference materials, guidelines, or access to relevant databases. It is also advisable to (iii) address interns' questions straightaway or indicate the best person to refer to if not the supervisor himself. Lastly, (iv) the supervisor discusses the deadlines and milestones associated with the assigned tasks. This information assists interns in managing their time effectively.

3.4.2. Task monitoring

The case studies show that task monitoring issues appear on both the interns' and the supervisors' side; interns miss closer support from their supervisors and supervisors complain that they do not know exactly what interns are working on. The dataset introduces two alternatives to improve remote task monitoring.

The first suggests an increase in the frequency of feedback (G5, IR1, N1, N4, S2, S5). The frequency can vary from weekly events to daily check-ups, depending on the nature of the tasks (complex tasks require frequent check-ups) and the availability of supervisors. This is typically achieved through virtual meetings.

The second recommends keeping interns 'visible' on shared work platforms such as MS Teams or Google Meet (I2, G4, N1, N3). This approach ensures that interns are easily accessible for consultation and encourages ongoing collaboration. This strategy can be complemented with shared calendars where supervisors and interns can track each other's schedules and tasks, increasing work coordination.

To optimise remote task monitoring, a combination of these two strategies appears to be the way forward. This involves implementing recurring meetings to monitor progress and milestones, while simultaneously ensuring close accessibility and visibility through shared work platforms. Some cases (G1, I6, N3), however, mentioned that an excess of meetings can be fatiguing and stressful. Results also stress that offering interns autonomy benefits the learning process. Consequently, task monitoring should not be confused with micro-management.

HEIs should also monitor interns' activities. Yet, different from companies, data shows that the universities' role is less to monitor what exactly students are working on and more to check on interns' mental and social well-being, their life-work balance, as well as their adaptation to the remote work routine (IR2, IR5, G3, G5, N2). This support can be achieved through a weekly or monthly meeting which can be combined with a feedback session, as detailed in the assessment phase.

3.4.3. Networking and socialisation

A central benefit of WBL to interns is the opportunity to grasp the social realities of a real work environment and establish a network of contacts. While the analysis of the case studies reveals a negative impact of eWBL on socialisation and networking, it also unveils several alternatives to address this concern.

One alternative is to allow interns to participate in 'senior' online meetings (IR2, N1). Even if their involvement is passive, interns can observe the working styles and behaviours of senior members of the organisation. A brief introduction before the meeting, highlighting the participants' roles and the meeting's agenda, can enhance the interns' experience. Results show that attending such meetings helps interns to absorb the company culture and expand their social network.

Encouraging interns to be active on LinkedIn or similar professional social networks is another useful tool to improve networking (IR3). Moreover, both company and HE supervisors should motivate interns to use their intern status to proactively establish connections, ask questions or arrange informal interactions like coffee breaks with co-workers and senior staff (G3, I5, IR2, N3).

Companies and HEIs also set up virtual events to foster closeness, including online happy hours, games, quiz nights, and other interactive activities. While data show that these activities can be beneficial, several cases portray a view of these events as somewhat artificial or 'top-down', limiting their potential to create deeper engagement among participants (G3, G6, I1, IR2, N2). Interestingly, data also suggested that events attended only by interns have a higher engagement level than those involving management (N2). Such enhanced engagement derives from a sense of ownership felt in interns-only events that are often absent in management-organised occasions. Table 6 overviews the main insights of the delivery phase.

Table 6. An overview of the delivery phase.

Dimensions	Key activities
Task briefing	*Companies:* Virtual meetings are held at the beginning of each week or day. Detail the task deliverables, information sources, milestones, and deadlines. The meeting can be one-on-one or with a larger team.
Task monitoring	*Companies:* Weekly or daily feedback meetings. Work platforms also help to reach interns via calls or chat for closer checks. This can be combined with shared calendars for better task coordination. *HEIs*: Can monitor the intern's progress via weekly or monthly feedback meetings. This is especially relevant to check on interns' social and mental well-being.
Networking and socialisation	*Companies:* Attend senior-level meetings to observe how senior employees behave. Also encourage interns to contact senior people within the organisation and ask questions, advice or to meet. Finally, set up socialisation activities to increase proximity. *HEIs:* Promote similar socialisation events but aimed at interns from the entire faculty or study programme.

3.5. Assessment

Assessment in eWBL typically divides into (i) feedback and mentoring and (ii) formal evaluation. The first is a constructive and continuous process that is sometimes referred to as formative assessment, taking place throughout the entire duration of the internship. The second takes place at the end of the programme and has a more summative orientation, ultimately aiming at learning validation and acquisition of credit points.

3.5.1. Feedback and mentoring

The dataset shows that the most common way to integrate feedback into eWBL is by asking interns to fill out a self-assessment form that evaluates the different learning dimensions of the internship. Then, use the results as a basis for a one-on-one discussion with the supervisor. A Dutch case study (N4) proposes adding group feedback to the process, which includes the intern, his supervisor at the company, co-workers and the supervisor at the HEI. This 360-degree approach offers more accurate feedback as it considers multiple views and concerns.

Virtual meetings are the most straightforward alternative to implementing feedback. The frequency depends on the resources available. However, given the isolated nature of remote work, results recommend weekly events (G5, G6, IR1, N1, N4, S1, S2). When self-assessment is required, it can be conducted via online survey tools like Google Forms or over the HE e-learning platforms.

3.5.2. Formal evaluation

The results indicate no significant difference in the formal evaluation of eWBL compared to traditional WBL. Both typically happen at the end of the internship programme, delivered via a log diary or report. In some disciplines (e.g. design), a portfolio complements this report, providing more concrete evidence of the work done. The internship report encourages the learner to reflect critically on the tasks performed, relate them to the theory acquired at the university, and identify the development of transferable skills. Table 7 summarises the key findings of the assessment phase.

Table 7. An overview of the assessment phase.

Dimensions	Key activities
Feedback and mentoring	*Company and HEIs:* Taking place throughout the whole internship. It can rely on self-assessment reports, one-on-one discussions with mentors, group feedback or, ideally, all of these approaches.
Formal evaluation	*Company and HEIs:* Takes place at the end of the internship, with a summative orientation, ultimately aiming at learning validation and accumulation of credit points. Should adhere to measurable criteria.

4. Discussion

In our proposed framework, the structuring of eWBL unfolds across five distinct phases: design, preparation, onboarding, delivery, and assessment. While this framework rests on a robust dataset and contains several unique features, it is essential to connect our empirical findings with existing literature to explore how insights from scholarly sources can enrich these five stages.

In line with the literature, the *design* phase emphasises that eWBL can foster a relatively different set of competencies than WBL; mainly time management, proactivity, digital communication and self-dependent learning (Bayerlein and Jeske 2018; Irwin et al. 2022). Likewise, results show that compatibility with remote work differs across academic disciplines. Finally, matters related to IT and a safe and ergonomic work environment need consideration, especially by employers. Kamdar (2021) adds that companies should include insurance coverage for home accidents, damaged work equipment, and cyber-security breaches in employment contracts.

More fundamental decisions about design that overlap with traditional WBL also deserve attention. Findings from the WEXHE (2019) project reinforce that a robust WBL design requires a clear

definition of the intended learning outcomes, the assessment methods, the general responsibilities of the interns, the length of employment, contractual and compensation concerns, and potential pathways to long-term employment. These elements are also relevant for eWBL.

Concerning the *preparation* phase, literature (Cook 2020; Jeske and Axtell 2014) corroborates the case study findings suggesting that not all students are readily fit for eWBL because remote work requires familiarity with the specific set of competencies mentioned earlier. Therefore, our framework proposes that HEIs must help students identify their propensity for these competencies through self-assessment tools or counselling services before applying for eWBL positions.

The literature proposes competence level descriptors to support this self-assessment process (Wagenaar 2018). Table 8 offers an example adapted from Sánchez and Ruiz (2008). It shows level descriptors (1–4) for the competence 'time management', divided into dimensions A to D. Assisted by such a table, students and supervisors should be able to recognise competence gaps and address them with adequate training.

Gavoille and Hazans (2022) suggest basing the self-assessment on the 'big five' personality traits: openness, conscientiousness, extraversion, agreeableness, and neuroticism. The idea is that because remote work has an individual and often isolated nature, students rating high in neuroticism and extraversion will probably struggle more in eWBL. Conversely, those with high levels of conscientiousness and openness might find it easier to work remotely (Gavoille and Hazans 2022; Parra, Gupta, and Cadden 2022). We suggest incorporating both forms of self-assessment into the preparation phase.

Also in the preparation phase, employers should consider offering applicants access to testimonials from previous interns. This helps anticipate potentially negative expectations about eWBL and address concerns interns might have about working remotely (Jeske and Axtell 2014).

Past research advises arranging at least one in-person session before the start of the internship where eWBL interns are introduced to their co-workers and provided with an overview of the internship's aims, work processes, and practical details (Jeske and Linehan 2020; Jeske and Olson 2021). The need for such familiarisation is confirmed by the case studies, appearing in our framework in the *onboarding* phase. In line with our results, Hora et al. (2021) suggest that even a few hours spent face-to-face can foster a collaborative mindset among co-workers that extends to the virtual world, improving communication and cooperation throughout the whole internship experience.

Additionally, both existing literature and the case studies suggest that eWBL requires clear task instruction, frequent feedback, and the use of multiple communication channels. These elements produce better work outputs while mitigating the adverse effects of social isolation (Jeske and

Table 8. Level descriptors for time management (Sánchez and Ruiz 2008).

Competence dimensions	Level descriptors			
	1	2	3	4
A) Clearly defining goals	Does not plan or live in the short term.	Comply with what is externally required.	Enumerates and describes short, medium and long-term goals.	Regularly revises objectives and the degree of achievement.
B) Ranking objectives according to criteria	Confuses priorities with immediate desires.	Confuses priorities or focuses on the easiest objectives.	Establish clear order of priorities.	Differentiate long, medium and short-term priorities.
C) Planning the activities	Does not plan. Act based on urgency.	Planning is too general, often forgetting to include deadlines.	Has a written plan with beginning and ending dates.	The plan includes alternatives and responses to contingencies.
D) Habitually sticking to a plan	Often fall behind or do not achieve objectives.	Meet deadlines but often at the expense of quality.	Achieves goals with sufficient quality and within the deadline.	Not only complete tasks on time but save time for other tasks.

Table 9. The eWBL framework.

Design	Preparation	Onboarding	Delivery	Assessment
A. Curricular components	A. eWBL skills alignment	A. Introducing the aims	A. Task briefing	
B. Particularities of eWBL	B. Recruiting and application	B. Colleagues and stakeholders	B. Task monitoring	A. Formal evaluation
	C. Training of HE and company staff	C. Detailing the workflow	C. Networking and socialisation	
		D. IT and other matters	B. Feedback and mentoring	

Axtell 2014). Similarly, Raelin (2016) highlights the importance of immersing learners in a real work environment to understand the implicit norms, language and behaviour in a given field of work. This immersive experience allows interns to establish a network of contacts and build up their social capital. However, eWBL offers limited exposure to these essential elements (Pretti, Etmanski, and Durston 2020).

The *delivery* phase of the framework addresses both issues. It offers detailed references on how to improve communication and feedback, recommends several virtual socialisation tools, and engagement in senior-lever meetings and social networks to foster networking and a deeper understanding of workplace culture.

Finally, our framework suggests that eWBL *assessment* should encompass formative as well as summative processes. While summative assessment in eWBL mirrors that of traditional WBL, the inherent isolation of remote work heightens the requirement for formative assessment (typically via feedback) in eWBL. Thus, both our study and the research by Jeske and Axtell (2014) highlight the increasing importance of this formative component.

In this context, the existing literature presents several avenues for implementing feedback which are adaptable to eWBL. Raelin (2016) suggests orienting the feedback sessions around the dimensions fostered by WBL, namely practical knowledge acquisition, development of soft skills and attitudes, networking, and career prospects. Congruent with insights drawn from one of the cases, Perusso, Blankesteijn, and Leal (2019) suggest that feedback should encompass not only different dimensions but also different delivery formats, including self-assessment, one-on-one interviews and group feedback. A strategy to integrate these diverse feedback approaches includes a three-step process. Firstly, ask interns to fill out a self-assessment form that evaluates the different learning dimensions of the internship. Then, use the results to support a one-on-one discussion with the supervisor. If conditions allow, add group feedback to it, including the intern, his supervisor at the company, co-workers and the supervisor at the HEI (Perusso, Blankesteijn, and Leal 2019).

Table 9 shows the entire framework. As detailed in section 3.5, feedback and mentoring extend to the delivery phase. Details about each sub-phase appear in Tables 3–8 and in the current section.

5. Conclusion

As the popularity of remote work increases, HEIs need to provide students with the skills and attitudes necessary to succeed in this new work environment. Virtual forms of WBL can support this process. However, there is still little research exploring which adaptations to traditional WBL are necessary to offer a high-quality eWBL experience. This paper contributes to practice by offering educators and trainers at HEIs and companies an overview of several of these adaptations, delivered in the form of a comprehensive five-stage framework.

The most impactful elements relate to how work is organised and distributed in eWBL, which requires far more structure compared to traditional WBL. There is also the need for more constant feedback (ideally given daily), the fostering of relatively different competencies, oriented towards self-dependency rather than teamwork, and the added value of onboarding activities and similar in-person interaction, even if far briefer than in traditional WBL.

Moreover, the increasing significance of eWBL for the future of HE is prompting the research interest of educators, which started developing theoretical alternatives to its several issues. However, we miss a unifying structure to integrate these solutions effectively. In this context, our framework makes a valuable contribution to WBL theory. It offers a systematic examination of eWBL that encompasses solutions to specific issues yet also considers the entire internship journey, from design to delivery to assessment. Researchers can use this framework to enhance their comprehension of specific features while maintaining a comprehensive view of the overall process.

6. Limitations and future research

There are a few relevant limitations to this work. Although we tried to build a comprehensive model, we understand that every framework requires adaptations to the demands and resources of organisations and HEIs. Certain disciplinary areas, such as management, design, and engineering, naturally lend themselves to remote work and can more easily apply the concepts outlined in this framework. However, other disciplines where face-to-face interaction is central, like health and social care, might undergo more radical changes; perhaps focusing on the remote aspects of the job such as telehealth. Likewise, for the lack of staff or resources, smaller organisations and HEIs perhaps cannot incorporate all the recommendations provided here. Nevertheless, these resource constraints should not deter these organisations from implementing several of the recommendations highlighted in the present framework.

Additionally, our data comes from a European context where WBL is reasonably consolidated and IT infrastructure is relatively widespread. We do not know if the recommendations offered here would fully apply in environments with different cultural, educational and infrastructural backgrounds.

Regarding future research, we believe more empirical data is necessary to further corroborate and adjust the mechanisms suggested here; inside and outside of Europe and in different disciplinary areas. Moreover, it would be beneficial to evaluate the impact of the present framework against real-life examples. Insights from practice would improve the results and support the design of more advanced models. They could also guide how to tailor eWBL programmes to different contexts and populations.

Notes

1. From electronic work-based learning, which is also the name of the project where the data set for this paper originates. The term is used interchangeably with virtual internships, which is how eWBL is commonly referred to in the literature.
2. The 27 case studies are available on ewbl-project.com
3. The full questionnaire is available for download at www.ewbl-project.com
4. 'I' stands for Italy and 'IR' for Ireland.

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Data availability statement

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Appendix: questionnaires employed to gather case study data

To HEIs

1. Briefly describe your role at your HEI and how it is connected to WBL.
2. How did your HEI adapt its face-to-face WBL to the virtual environment, especially in terms of:
   a. preparation of students
   b. preparation of administrative and academic staff
   c. partnership with companies/organisations
   d. material and tools offered
   e. online/offline balance
3. What are the main differences and similarities between virtual and face-to-face WBL in terms of:
   a. nature of students' tasks
   b. quality assurance
   c. IT infrastructure
   d. assessment and evaluation
   e. students' compensation
4. What impact did the shift from face-to-face to virtual WBL have on the development of:
   a. soft skills like teamwork, communication, time management, etc?
   b. practical experience
   c. disciplinary knowledge
   d. developing a professional network
5. To what extent has the culture of the workplace been reflected in students' learning experiences?
6. Any specific tool or methodology was used to support the culture transfer?
7. Overall, what were the main advantages and disadvantages of virtual WBL for:

   a. students
   b. HEIs?
8. What advice do you have for other HEI implementing virtual WBL?
9. What are the long-term social and economic consequences of in-person to virtual WBL shifts?
10. What elements of virtual WBL do you think will remain online and why?

To employers

1. Briefly describe your role at your company and how it is connected to WBL.
2. How did the organisation adapt WBL to the virtual environment, especially in terms of:
   a. organisation of work and distribution of tasks
   b. IT requirements (software, work platforms)
   c. teamwork
   d. students' mentoring and feedback
   e. socialisation and networking
   f. preparation of company staff
3. What are the main differences and similarities between face-to-face and virtual WBL concerning:
   a. administrative components
   b. the quality of interns' work and deliverables
   c. work assessment, evaluation, and feedback
4. What impact did the shift from face-to-face to online WBL have on the development of:
   a. transversal competencies like problem-solving, communication, and self-efficacy.
   b. job experience.
   c. disciplinary knowledge
   d. developing a professional network
5. To what extent do interns absorb the 'culture of the workplace'?
6. Any specific tool or methodology was used to support the transfer?
7. What were the main advantages and disadvantages of the implementation of virtual WBL?
8. What advice would you give to other organisations implementing virtual WBL?
9. What are the long-term social and economic consequences of in-person to virtual WBL shifts?
10. What elements of virtual WBL do you think will remain online and why?

To students and alumni

1. Briefly describe your study programme (institution, duration, faculty, etc.)
2. How was your virtual WBL organised in terms of:
   a. organisation of work and task distribution (job description, time availability, work routine)
   b. IT requirements (software, work platforms)
   c. teamwork (with other interns and senior employees)
   d. mentoring and feedback (from the company and HEI side)
   e. assessment and evaluation (from the company and HEI side)
   f. socialisation
3. How did the virtual WBL impact the development of your:
   a. soft skills like teamwork, communication, time management, etc.
   b. practical experience
   c. contribution to your theoretical knowledge
   d. developing a professional network
4. Do you feel that you have acquired the 'company or work culture'?
5. Any specific tool or methodology was used to support this transfer?
6. What were the main advantages and disadvantages of virtual WBL?
7. Did your virtual work experience prepare you well for future work?
   a. Did you miss components of your practical experience due to the virtual environment?
8. What advice would you give to other interns, HEI and organisations engaged in virtual WBL?