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A Formative-Assessment ePortfolio for Learning Competencies: From Hype to Psychopedagogy

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Widely implemented across higher education, ePortfolios are often portrayed as powerful learning tools. However, despite growing recognition, their conceptual ambiguity, diverse implementations, and varying outcomes continue to fuel debates. In many cases, an emphasis on technological aspects over psychopedagogical considerations has led to tensions, failures, and rejection. We argue that ePortfolios must be meaningfully aligned with psychopedagogical objectives to ensure effective implementation and learning outcomes. Our primary goal is to present a formative-assessment ePortfolio model designed to support the development of learning competencies in undergraduate higher education. Grounded in socioconstructivist, cognitivist, and systemic theories, our model integrates structured feedback loops, learner agency, and flexibility to support self-directed and deep learning. Key conditions for successful adoption include a clearly defined pedagogical design, continuous guidance, and adaptability. Beyond presenting the model, we aim to clarify its conceptual foundations, demonstrate its applicability across disciplines, and provide insights for researchers and practitioners. Implemented within a third-year Education Sciences program, it fosters cognitive learning dimensions, learning regulation, cooperative learning, and professionalization while offering an alternative to traditional assessment. Future research should further investigate its transferability and impact, helping to refine and strengthen the proposed model.

The digital portfolio, or ePortfolio, is widely used and recognized as the eleventh high-impact practice by the American Association of Colleges and Universities (Lu, 2021; Watson et al., 2016). It is also widely praised in academic discourse, with many publications highlighting its benefits. Despite this recognition and growing adoption, it is frequently romanticized and portrayed in an overly idealized manner (Mueller & Bair, 2018). However, its actual impact remains debated. As Meeus et al. (2006) stated, "the concept of ePortfolio has many different meanings" and can be seen as a "container concept" (p. 127) due to its diverse forms, applications, and implementations in higher education.

This ambiguity, coupled with unclear practices and inconclusive evidence, fuels controversy, as the term ePortfolio can refer to fundamentally different pedagogical objects depending on the context—from a summative certification tool to a professionalization space, or to a reflective learning journal. Comparative studies confirm that, in practice, these meanings diverge widely across levels (undergraduate vs graduate), fields (professional programs vs general education), and intended functions (presentation, assessment, learning, or development; Fischer et al., 2020; Meeus et al., 2006; Petit & Bélisle, 2018; Petit et al., 2018). When the purpose is not explicitly framed, instructors and students tend to infer their own interpretation, which may diverge from the intended pedagogical aims (Lu, 2021). The issue is therefore not multiplicity per se, but the absence of boundary conditions: without a clearly articulated purpose, the ePortfolio remains polysemic, making it difficult to use and to assess consistently. In short, what is called ePortfolio in one program may mean a certification dossier, while in another it is a reflective learning pathway—two pedagogical uses that can be fundamentally incompatible in practice (Fischer et al., 2020) yet hidden under the same label.

In the Francophone higher education context, the expansion of ePortfolios—closely tied to the generalization of the Competence-Based Approach—adds another layer of complexity, particularly because assessment practices remain largely summative and disciplinary in nature (written exams, synthesis papers, oral presentations), with little space for formative feedback or reflective learning. In this context, the introduction of the ePortfolio represents not merely a change of assessment format, but a pedagogical shift toward making learning processes explicit, requiring students to articulate, justify and document their development rather than reproduce disciplinary knowledge (Coulet, 2024; Ferrier, 2024, 2025; Le Boucher et al., 2019; Messaoui & Pélissier, 2024; Romainville & Fischer, 2020). Therefore, unlike the North American context, their implementation requires a cultural and pedagogical repositioning. ePortfolios not only introduce a new medium but also challenge entrenched assessment norms and require sustained guidance to help instructors and students navigate this shift from product-based evaluation to process-based learning—in other words, from *showing a result* to *making learning visible* (Ferrier & Connac, 2025a; Le Boucher et al., 2019; Romainville & Fischer, 2020).

On the other hand, the flexibility of ePortfolios makes them both trendy and powerful, easily adaptable to users' needs—for example, for either formative or summative assessment, and for profession-specific or learning-related competencies (Le Boucher et al., 2019; Meeus et al., 2006). In this context, ePortfolios provide

an alternative, performance-based, and authentic assessment method, distinct from traditional end-of-course certification tests, while fostering reflective thinking and deep learning (Abrar-ul-Hassan et al., 2021; Lu, 2021; Segaran & Hasim, 2021; Wade & Yarbrough, 1996). However, the same structural openness that makes ePortfolios versatile also generates interpretative uncertainty, making ePortfolios difficult to define or assess without clarifying their context, purpose, and learning objectives. Therefore, many professionals struggle to fully grasp what ePortfolios entail and how to design, implement, and use them effectively. This challenge extends to undergraduate students, who often lack a clear understanding of what an ePortfolio is or how to engage in the deep learning, long-term reflection, and metacognitive processes it requires.

This confusion stems from the fact that flexibility, although often presented as a strength, becomes problematic when the pedagogical intentions and assessment criteria are not made explicit. As Meeus et al. (2006) demonstrated, a proliferation of overlapping typologies and purposes of ePortfolio obscures rather than clarifies what is expected from both instructors and learners. In a similar vein, Lu (2021) showed that without a clearly framed guidance structure, openness tends to dilute formative learning because students struggle to understand *what* is meant to be learned and *on which basis* it will be assessed. The issue is therefore not flexibility itself, but the absence of conceptual and practical boundaries—much like improvisation in jazz, which only becomes meaningful once the jazzman has fully mastered the underlying structure.

Consequently, many implementation attempts fail to produce meaningful outcomes, exposing tensions between pedagogical intentions and actual perceptions and results (Boéchat-Heer, 2018; Boéchat-Heer & Vallat, 2019; Fischer et al., 2020; Fischer & Romainville, 2020; Meeus et al., 2006; Mueller & Bair, 2018; Petit & Bélisle, 2018; Petit et al., 2018; Romainville & Fischer, 2020; Segaran & Hasim, 2021; Tessaro, 2020; Tochel et al., 2014; Wade & Yarbrough, 1996; Zeichner & Wray, 2001).

Beyond these conceptual ambiguities, ePortfolios are often implemented in a top-down manner, with little pedagogical support (Fischer et al., 2020; Messaoui & Pélissier, 2024; Mueller & Bair, 2018). The emphasis is typically placed on their technological features (Pélissier & Messaoui, 2024), rather than on an innovation-driven approach centered on the educational act (Cros, 2019). Paradoxically, when introduced without pedagogical framing, these technologies often create more obstacles than benefits for learning (Boéchat-Heer & Vallat, 2019; Petit & Bélisle, 2018; Petit et al., 2018; Tessaro, 2020).

To address these converging limitations, we advance a clear psychopedagogically grounded model and methodology for implementing an innovative formative-assessment ePortfolio in undergraduate education. Given the multiplicity of interpretations surrounding ePortfolios, conceptual clarity is crucial for successful implementation. Our primary objective is to clarify our ePortfolio model to prevent misconceptions and rejection by grounding it in a robust theoretical framework. The second objective is to propose a model that is both adaptable and transferable across disciplines, student cohorts, and institutions. After clarifying the ePortfolio's definition, context, and theoretical foundations, we detail our model and provide an overview of its impact, particularly on cognitive dimensions, self-regulation, cooperative learning, and the professionalization process.

Theoretical Foundations of Formative-Assessment ePortfolios

To better define ePortfolios, it is crucial to acknowledge their pedagogical implications. As Meeus et al. (2006) stressed, ePortfolios are not neutral tools and "cannot be used indiscriminately within an educational vision. Nor is it a learning tool suitable for all competencies" (p. 127). On the contrary, to fully harness the potential of an ePortfolio, its conceptual framework must be clearly defined and integrated into its design and implementation. Rather than relying on a simple "to-do list" for implementation, there is a fundamental need to integrate ePortfolios meaningfully into pedagogical design and learning objectives, avoiding both "romanticization" and *techno centrism*. Mueller and Bair (2018) used the term *romanticization* to refer to the tendency in ePortfolio literature to highlight its transformative or "high-impact" potential while downplaying the practical and pedagogical challenges associated with implementation—such as student or instructor resistance, workload, or lack of guidance. In other words, the idealized discourse surrounding ePortfolios often contrasts sharply with the complexity, uncertainty and friction observed in real teaching situations. This gap between the promises attributed to the tool and its actual uptake in practice contributes to a narrative that celebrates the ePortfolio more than it interrogates the conditions under which it effectively supports learning. By *techno centrism*, we refer to a different but related mechanism: the implicit belief that the introduction of a digital tool, in and of itself, is sufficient to improve learning or assessment (Tricot, 2017). In the case of ePortfolios, this techno-solutionist stance tends to constrain rather than expand pedagogical possibilities, especially when the tool is implemented without guidance, a clearly articulated pedagogical project or reflective design framework (Boéchat-Heer & Vallat, 2019; Pélissier & Messaoui, 2024; Petit & Bélisle, 2018; Petit et al., 2018; Tessaro, 2020).

Fundamentally, ePortfolios are grounded in socioconstructivist, cognitivist, and systemic frameworks, in which interaction and guidance play a crucial role in learning (Abrar-ul-Hassan et al., 2021; Dévé et al., 2009; Lu, 2021; Meeus et al., 2006; Petit & Bélisle, 2018; Verslype et al., 2017). Therefore, beyond clear institutional support, pedagogical planning, and structured guidance, the conceptual framework underpinning ePortfolios must be well understood and carefully considered when implementing them in a course or, even more critically, at the institutional level. This issue is particularly salient in traditional French universities, where end-of-course summative assessment—especially in *Cours magistral* (lecture-based) settings—has long been the dominant, if not the only valued, norm.

A key challenge is, therefore, breaking away from vertical knowledge transmission and certification-driven assessments toward formative approaches (Connac, 2016). This shift also calls for a change in posture for all stakeholders (learners, peers, and instructors), moving from passive roles to active co-participation in both learning and the ePortfolio process (Boéchat-Heer & Vallat, 2019; Petit & Bélisle, 2018; Romainville & Fischer, 2020). This shift in posture is not merely behavioral but epistemic: engaging in an ePortfolio requires students to become what Albero and Nagels (2011) called *maîtres d'usages*—that is, agents who construct meaning through the situated organization of their own activity rather than recipients of preformatted expectations. In Jonnaert's (2011) perspective, competencies are not pre-existing attributes but enacted within the activity itself, through a dynamic process of engagement, reflection, action, and adaptation in often unstable learning situations, rather than through the reproduction of predefined outcomes.

Pedagogically, this corresponds to a continuum ranging from a "seated school" of transmission, to a "standing school" of task execution, and ultimately to a "school of movement" in which learners become authors and regulators of their own learning (Collot, 2002). Such a posture, aligned with type-3 pedagogy, relies on cognitive self-regulation (Cosnefroy, 2010) and on the learner's ability to stabilize and render their own learning trajectory intelligible over time—what we have conceptualized as an organizational closure of learning (Ferrier, 2024).

This epistemic shift also redefines the instructor's role: instead of transmitting knowledge or evaluating a finished product, the instructor becomes a guide who creates the conditions for learning to emerge through co-participation and iterative feedback—a posture that remains uncommon within traditional university assessment. In this sense, ePortfolios are not merely reflective tools but structural mediators of a transformation in how learning is enacted, recognized and sustained. They therefore represent more than a technological innovation: they reconfigure roles and responsibilities, reshaping the very grammar of teaching and learning in higher education. Co-participation is thus not an optional pedagogical feature but a systemic and structural condition for the learning model mobilized by ePortfolios.

In ePortfolios designed to develop learning competencies, students select works—based on peer and instructor guidance and feedback—that reflect their own learning journey. The instructor evaluates the quality of the learning process rather than merely assessing the final work itself, highlighting the importance of regular guidance, support, and feedback. Students should have the opportunity to document both their learning process and challenges in a safe environment, fostering learner agency, deep learning, reflection, and the development of learning competencies. Consequently, ePortfolios can bring significant value to higher education, as there are currently few tools that better support and assess students' learning competencies (Meeus et al., 2006).

Despite their potential, two critical dimensions of ePortfolios remain largely underestimated in both literature and practice: their role as a formative assessment tool and as a pedagogical approach (Abrar-ul-Hassan et al., 2021). Yet, "the fundamental principle underlying ePortfolio aimed at learning competencies is to foster a self-directed learning process" (Meeus et al., 2006, p. 133). This underestimation is well documented in both the literature and in practice. Most studies still conceptualize ePortfolios primarily as assessment products or repositories of evidence, while far fewer examine the ePortfolio as a formative process. Likewise, its pedagogical dimension remains largely underexplored in empirical research (Pélissier & Messaoui, 2024; Petit & Bélisle, 2018; Tochel et al., 2014). Although widely used as tools for documenting life skills or certifying professional competences, ePortfolios are far less frequently approached in higher education as authentic *assessment-for-learning* devices. Yet, drawing on contemporary work in educational assessment (Cieutat & Connac, 2021; Muller & Normand, 2013) and updated theories of formative assessment (Hadji, 2012), ePortfolios have the potency to support learning through a dual mechanism: by providing iterative feedback throughout the construction of ePortfolio pieces, and by allowing students to revise and resubmit their work until it meets the intended learning outcomes.

According to Lu (2021), ePortfolios are deeply rooted in Kolb's experiential learning theory (Kolb, 1984), Deci and Ryan's self-determination theory (Deci & Ryan, 1985), and Zimmerman's Self-Regulated Learning approach (Zimmerman, 2013). Among other influences, we can also add Pekrun's work on the regulation of academic emotions (Pekrun, 2006; Pekrun et al., 2002), as well as Freinet's

classic yet still alternative approach to *Pédagogie nouvelle* (Freinet, 1964), particularly regarding the role of experience and cooperation in learning. Following Meeus et al. (2006), ePortfolios can also be seen as a Vygotskian psychological tool that expands a learner's zone of proximal development (see also Pélissier & Messaoui, 2024).

The wide variety of ePortfolios makes their definition a complex task. Nevertheless, drawing on the five invariants identified by Wade and Yarbrough (1996), we can outline the essential components to consider when designing a course based on learning competencies and ePortfolio assessment. (a) ePortfolios should reflect development and learning over time, typically spanning a long period such as a semester or an academic year, and should include more than just one or two items, pieces or themes. (b) ePortfolios benefit both teachers and students. For students, they offer a platform to document and reflect on their learning. Simultaneously, they provide teachers with a valuable tool to assess students' progress and achievements. (c) ePortfolios should offer students opportunities for choice, allowing them—based on instructor and peer guidance and feedback—to decide which items to include and how to structure them. Additionally, students may have a say—or at least a clear understanding—of which aspects are assessed and the criteria used for evaluation. (d) ePortfolios should showcase authentic student-produced work, reflecting the learner's own effort and development, and capturing forms of growth and potential that traditional one-shot tests cannot reveal. They are intended as powerful tools for authentic, self-directed, and deep learning. In this sense, *student-produced* refers to work that is created and meaningfully integrated by the learner, rather than plagiarized, externally generated (e.g., by AI), or assembled without personal engagement. (e) ePortfolios should act as a self-reflection tool, enabling students to analyze their work and set future goals. By reviewing their early efforts and comparing them with later pieces, they can track their progress and recognize their growth over time (Wade & Yarbrough, 1996).

As Zeichner and Wray (2001) noted, a critical factor distinguishing different types of ePortfolios is who determines their content and the extent to which this is predefined or left to students to decide which pieces to include. Three main ePortfolio conceptions are generally distinguished. The first is instructor-oriented, reflecting the instructor's expectations and intentions. The second is learner-oriented, where, due to flexible guidelines, learners construct it individually. The third is learning-oriented, emphasizing acquired competencies and problem-solving through individual and/or collaborative approaches (Petit & Bélisle, 2018). Finding a balance among these three approaches—prescribed pieces and possibility of choice, self-selected evidence, and both individual and cooperative work—may be the most effective strategy.

Another challenge concerns the organization of ePortfolios. Once again, the best approach likely involves a well-balanced structure that combines a predefined framework (e.g., introduction, selected pieces, reflective sections, and conclusion) with the flexibility for students to fill each section with their own work and tools, ensuring alignment with expected learning outcomes and requirements. However, this flexibility may also lead to avoidance strategies, as some students choose tasks perceived as easier or less cognitively demanding. Flexibility becomes pedagogically meaningful only when anchored in explicit learning intentions and assessment criteria. This framework accommodates formative, summative (certification-oriented), self-, and peer assessment (Abrar-ul-Hassan et al., 2021; Le Boucher et al., 2019; Petit & Bélisle, 2018).

Beyond their structure and organization, the effectiveness of ePortfolios also depends on how they are implemented and supported throughout the learning process. The impact of ePortfolios stems from three key factors: the construction process, guidance, and feedback (Zeichner & Wray, 2001). In this regard, the role of guidance, mentoring, and social interaction among learners, peers, and instructors is particularly significant. Indeed, students are often not well-prepared nor accustomed to being responsible and self-directed in their academic learning. Numerous studies have underscored this aspect and highlighted how support, regular feedback, interaction, and cooperation are crucial for a successful ePortfolio experience (Abrar-ul-Hassan et al., 2021; Dévé et al., 2009; Mueller & Bair, 2018; Petit & Bélisle, 2018; Petit et al., 2018; Segaran & Hasim, 2021; Verslype et al., 2017). Instructor and peer mentoring can be integrated into ePortfolio construction through regular checkpoints to review and discuss artifacts. Encouraging cooperation and peer review within the ePortfolio guidelines also support engagement. Together, checkpoints and a clear timeline foster sustained engagement and co-construction throughout the process, rather than limiting involvement to the final deadline.

Against this backdrop, we designed a formative-assessment ePortfolio focused on learning competencies. This original ePortfolio was implemented with third-year undergraduate students in Education Sciences (Licence 3). It was introduced at the beginning of the second semester to ensure that students had acquired the necessary technical skills to work with relative autonomy in addressing complex situations (Meeus et al., 2006; Petit & Bélisle, 2018).

This ePortfolio model was developed in response to a set of recurrent pedagogical limitations observed in previous assessment modalities in our teaching context and literature. Traditional summative exams typically fostered surface-level learning and short-term retention, with minimal evidence of transfer, cognitive and

regulatory development, cooperative engagement, reflexive thinking, or the authentic enactment of competencies. Even when coursework replaced high-stakes exams, students often produced assignments that complied with formal expectations without authentically demonstrating the construction of competencies—a phenomenon reinforced today by the availability of generative AI tools that can produce "plausible" but derivative work. The challenge was therefore not only to move away from summative testing, but to design an assessment environment where students would have to become the authors of their learning process rather than the executors of a task with expected outcomes. In addition, in the French context, universities are increasingly expected to prepare students for professional transitions, which requires assessment formats that make the developmental trajectory of competencies visible (Postiaux & Romainville, 2011). This diagnosis also emerged from the students themselves. Indeed, several reported that previous assessment formats—which they referred to as "one-shot tests with no memory lasting"—did not allow them to show how and what they had really learned, but only to reproduce expected answers (Ferrier, 2024). The ePortfolio model was conceived precisely to respond to these three blind spots: surface learning, delegation of authorship, and the absence of a space where learning and professionalization can be enacted rather than merely declared. From this starting point, the model was structured so that authorship, feedback, and progressive competency enactment became the core mechanisms of assessment rather than its by-products. Thus, in our model, the ePortfolio is not designed as a digital showcase but as an activity system in which learning becomes observable through iteration, feedback, and progressively enacted authorship.

A Formative-Assessment ePortfolio Model for Learning Competencies

The model has been implemented in a course on General Pedagogy and Comparative Didactics at Paul Valéry University in Montpellier (France) during the 2022/23 academic year, with third-year undergraduate students in Education Sciences. The course includes lecture sessions, held for two hours per week for a large group of students (*Cours magistral*, 26 hours from January to May), and discussion sessions in smaller groups, three hours every three weeks (*Travaux dirigés*, 13 hours). The ePortfolio is introduced just before students choose their master's specialization, ensuring its relevance within the curriculum and supporting their professional development. The instructor is a full university professor specializing in Education Sciences with extensive experience in ePortfolios, fully meeting the expertise requirements (Boéchat-Heer & Vallat, 2019; Meeus et al., 2006; Petit et al., 2018; Tessaro, 2020).

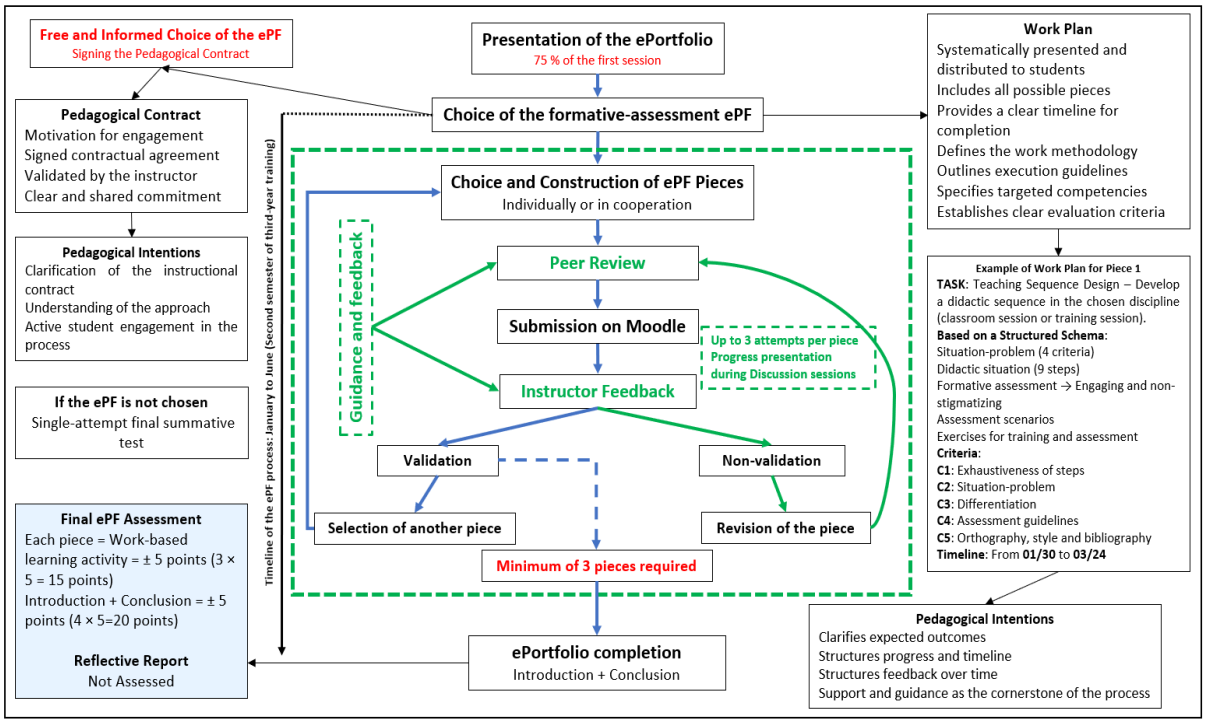
Figure 1 provides a visual representation of the formative-assessment ePortfolio model, illustrating the structured feedback loops, the role of peer and instructor review, and the integration of pedagogical intentions. The model seamlessly integrates the three types of ePortfolio conception: the instructor's intentions, the learner's autonomy, and the necessity of documenting learning traces, either individually or cooperatively. It also involves the four types of assessment: formative, self-assessment, peer assessment, and certification-based assessment.

During the first lecture session (mid-January), the ePortfolio is presented in detail to students, who can then choose between a traditional summative one-shot end-of-course test or engaging in the process. In both assessment formats, the same learning outcomes are at stake. This informed choice is formalized through a pedagogical contract (see Appendix A), ensuring clarity among stakeholders (learners, peers, and instructor) and confirming that the student fully understands not only the option itself but also the implications and responsibilities attached to it (Fischer et al., 2020; Romainville & Fischer, 2020). The ePortfolio is supported by Moodle tools within the university's digital learning environment.

When constructing their ePortfolios, students may select the digital tools they deem most appropriate to achieve the expected learning outcomes. Thus, flexibility should not be understood as permissiveness, but as a bounded space of choice aligned with competency development. The only mandatory requirement is to upload their files (the pieces) to the Moodle cloud—which is dedicated to ePortfolio construction and feedback loops—within the specified timeframe for each piece. Allowing students to choose their own digital tools is a crucial decision, as it: (1) helps avoid pitfalls related to the lack of mastery of various ePortfolio technologies among different stakeholders (instructors, students, designers, technical services, administration, etc.); (2) ensures that tools align with task requirements without unnecessary features that could interfere with execution and comprehension; and (3) fosters a complexity-oriented approach to learning by leveraging tools that facilitate feedback and iterative revision of student work. Thus, rather than adopting a technology-centered approach, we deliberately chose to emphasize the pedagogical foundation of the ePortfolio. From a psychopedagogical standpoint, this decision can enhance students' mastery of their Personal Learning Environment and strengthen their self-efficacy in using digital learning tools (Boéchat-Heer, 2018). Moreover, ePortfolios often present challenges due to the technologies involved and the significant human and time investment they require. These factors can seriously impact the success and acceptance of the approach (Boéchat-Heer & Vallat, 2019; Petit & Bélisle, 2018; Tessaro, 2020).

Figure 1

Schematic Model of the Implementation of the Formative-Assessment ePortfolio for Learning Competencies



Note. Guidance and feedback sessions are highlighted in green. The ePortfolio process runs throughout the second semester of third-year training (January–June). Students receive structured feedback from peers and instructor at designated checkpoints, allowing them to refine and improve each piece before its final validation. The work plan provides clear guidelines, milestone deadlines, and a structured timeline for feedback integration, ensuring a transparent and supportive evaluation process aligned with well-defined validation criteria for each piece.

From the outset, students receive a Dalton-Freinet-inspired work plan (Capitanescu-Benetti et al., 2024) detailing six possible ePortfolio pieces, along with their timelines, implementation guidelines, an informative bibliography, and the competencies to be developed (see Figure 1 for an illustration). Students then select three pieces to complete, deciding whether to work individually or cooperatively. For each piece, students are allowed three attempts, supported by both peer and instructor feedback. Before each submission, they receive peer review as authors and, in turn, provide feedback when acting as reviewers. Discussion sessions offer a space to share progress on pieces and receive guidance, clarifications, and feedback from both peers and the instructor. This aligns with the logic of educational assessment (Cieutat & Connac, 2021), which values interaction, enabling learners to refine their work through clear guidelines, mutual support, time markers, and feedback. The process also allows students to set their own assessment timeline within the designated timeframe for each piece, aligning with the principle of a personalized evaluation schedule (Gremion & Maubant, 2024).

Ongoing support from both the instructor and peers is a cornerstone of our model. The ePortfolio is designed to foster cooperation and engagement through pedagogical scenarios that actively involve all stakeholders at every stage (Petit & Bélisle, 2018). Concretely, the support is operationalized in practice through structured cycles of feedback that alternate between peers and instructors. After a phase of content transmission, students begin drafting a portfolio piece, which they first submit to a peer-review process for horizontal feedback—either during class time or asynchronously through cooperative arrangements such as peer tutoring, mutual aid or guided re-reading (Dabo & Connac, 2022). The revised version is then discussed with the instructor during dedicated guidance sessions, allowing for vertical feedback and clarification. Through these back-and-forth exchanges, learners progressively stabilize both their work and their understanding of expectations. Because each piece can be revised before final validation, support is not occasional but embedded in the temporal architecture of the ePortfolio itself, making feedback a structuring condition of learning rather than a post-hoc correction. In this configuration, assessment becomes part of the

learning process rather than its endpoint (Ferrier, 2024; Ferrier & Connac, 2025a). In this sense, our ePortfolio model is not simply accompanied by feedback: it is built through feedback—through a shift from being evaluated to becoming evaluative of one's own development. Guidance and feedback sessions are highlighted in green in Figure 1, with opportunities for interaction embedded throughout the process.

Within a socioconstructivist framework, educational partners act as guides, while the ePortfolio serves as a tool to support the learning process (Dévé et al., 2009). The goal is to cultivate guided autonomy (Verslype et al., 2017) and support learners in developing self-directed learning skills (Meeus et al., 2006). According to Gremion and Maubant (2024), assessments serve as a powerful synchronizer of learning, and learners' competencies become apparent when they act as their own analysts, evaluating the gap between the expected outcomes of a task and their own performance. Similarly, Roblez (2024) stressed the need to rethink assessment by placing the learner at the center of the process within a situated perspective—in which competence emerges through a situated encounter with a problem—accepting errors not as failures, but as levers for regulation and learning (see also Jonnaert, 2011).

Thus, in our model, assessment acts as a formative tool designed to support the learning process. This is achieved through structured feedback loops while allowing students the flexibility to set their own learning pace by adjusting and selecting the timing of their assessment. Within this framework, mistakes are not failures but opportunities for regulation and improvement without causing discouragement and disengagement (Cieutat & Connac, 2021).

The work plan clarifies the expected learning outcomes by specifying each developed competency, the work process, instructions, time sequences, and assessment criteria (see Figure 1 for an illustration). It is systematically presented, serving as a checkpoint for progress and an opportunity to clarify expectations. This reflects the necessary transparency of the pedagogical contract between stakeholders (Romainville & Fischer, 2020) and underscores the importance of structuring feedback, guidance, and support throughout the entire process (Capitanescu-Benetti et al., 2024). It also corresponds to the idea that, within a curricular training framework, the ePortfolio should reveal implicit aspects and provide learners with a coherent understanding of their academic pathway (Romainville & Fischer, 2020; Tessaro, 2020).

Each piece of the ePortfolio concretely applies themes covered in class, following the course's chronological progression, and serves as a distinct learning and assessment scenarios aligned with expected outcomes. These scenarios include designing and organizing a didactic sequence, developing a pedagogical project, or structuring a cooperative learning activity. Students can accumulate up to 3×5 points throughout the process, based on five criteria per piece (see Figure 1). During the completion phase, they write an introduction and a conclusion, earning the remaining 5 points of the individual assessment, for a total of 20, which is standard in the French academic grading system. Thus, our model involves four types of assessment. The various feedback sequences support formative assessment, self- and peer-assessment, while a certification-based assessment takes place at the end of the process. Additionally, students write a reflective report, which remains unassessed to minimize tensions between personal writing and evaluation—an issue that often hinders the development of reflective skills (Fischer et al., 2020; Fischer & Romainville, 2020; Le Boucher et al., 2019).

Although the ePortfolio can be constructed cooperatively—enabling learners to work together on projects and document their process—its learner-centered nature makes it a unique and individual production: an authentic student-produced work. This framework clearly illustrates the shift from a teaching-centered paradigm to a learning-centered one, shaped by social interactions within a systemic yet personalized approach (Dévé et al., 2009). We have labeled this learning-competencies model as a formative-assessment ePortfolio.

Assessing the Impact of ePortfolios: A Research-Based Perspective

As mentioned earlier, further research is needed to fully grasp the potential of ePortfolios. Despite their growing popularity, systematic studies on their construction process and impact on learners remain scarce. While some recent research has adopted mixed methods (qualitative and quantitative) and hybrid approaches (cross-sectional and longitudinal), findings remain inconsistent (Boéchat-Heer, 2018; Fischer et al., 2020; Fischer & Romainville, 2020; Tessaro, 2020; Verslype et al., 2017). Given the wide variability in how ePortfolios are conceptualized and implemented, greater clarity is needed, and assessing their overall impact remains challenging (Meeus et al., 2006; Tochel et al., 2014; Wade & Yarbrough, 1996; Zeichner & Wray, 2001). A recent meta-analysis illustrates this difficulty: only nine out of 204 studies met the inclusion criteria, yet even among them, methodological differences persisted in research design, ePortfolio types, and implementation (Segaran & Hasim, 2021).

Following these recommendations, we have refined our model and aim to share it with a wider academic community. This will facilitate its adaptation across various training programs and disciplines while ensuring its validation through robust methodologies

Table 1
Overview of the Sequential Mixed-Methods and Hybrid Research Design

Mixed and hybrid methodology	Stages *n* (%)	Procedure	Detail of the procedure
Motivations and non-motivations/ Qualitative Cross-sectional	T0/*n* TOT = 97; NePF = 65 (67%); NonePF = 32 (33%)	Content analysis of the written motivations and non-motivations for choosing (or not) the ePortfolio pathway at the outset	Motivations were collected at the moment students signed the learning contract, in the form of short self-written statements (3–5 lines) explaining their reasons for choosing the ePortfolio. The same procedure was used to gather the motivations for non-choice among students who opted out of the ePortfolio.
Questionnaire Q1–T1/Quantitative cross-sectional	T1 mid-journey / *n* = 34 (52.3%)	A first questionnaire at mid-semester (Q1–T1)	The mid-semester questionnaire (Q1–T1) consisted of 53 items and was administered electronically in early April. It included the four different scales used across the four studies (cognitive, regulatory, cooperative, and professional). At this stage, the longitudinal design of the study was made explicit to participants, who were informed that a second questionnaire (Q2–T2) would be administered at the end of the semester (from late May to mid-June). The instructions clearly stated that the purpose of Q2–T2 was not to verify or reproduce initial answers, but rather to determine whether changes in participants' representations had occurred over time. The Q2–T2 was a slightly adapted version of the initial one and consisted of 57 items. Students were reminded that there were no right or wrong answers, that they were free to express their perceptions openly, and that their responses would remain anonymous with no consequence on their evaluation
Questionnaire Q2–T2/Quantitative cross-sectional	T2 end of course / *n* = 16 (47.1%)	A second Q2–T2 at the end of the semester	
Q1–T1 vs. Q2–T2/ Quantitative longitudinal	T1 vs. T2	Q1–T1 vs. Q2–T2, allowing for both cross-sectional and longitudinal quantitative analysis	
Reflective reports/ Qualitative cross-sectional	T3/*n* = 69 (71%); NonePF = 28 (29%)	A content analysis of the reflective reports produced at ePortfolio completion	The reflective reports written autonomously by students were extracted from all completed ePortfolios. They constitute a full, non-assessed chapter at the end of the ePortfolio.
Interviews/ Qualitative cross-sectional	T4/*n* = 4 (25%)	A content analysis of individual semi-structured interviews conducted after completion of the ePortfolio	Students who had completed all stages of the research process and agreed to further participation were then invited to individual interviews lasting between 45 and 90 minutes.

Note. The design combines cross-sectional and longitudinal approaches across four stages (T0–T4), with the corresponding qualitative and quantitative procedures[1]. All students gave informed consent and were reminded that they could withdraw from the research at any time without justification and without any impact on their academic evaluation.

[1] Because it was not feasible to establish an equivalent control group under authentic teaching conditions, the questionnaires were designed so that each participant served as their own control. Items were therefore designed to allow students to compare the ePortfolio with other assessment modalities they had previously experienced in their university trajectory. Given the conceptual complexity of some constructs, short contextual definitions were provided before the corresponding items to ensure semantic clarity. For example, the item on deep processing (Craik & Lockhart, 1972) was preceded by the following definition: "Deep processing refers to a semantic elaboration of information, as opposed to surface-level processing which attends more to form than meaning." Students were then asked: "Compared with other assessment methods, would you say that working with the ePortfolio fosters deep processing?" Students were already familiar with the key concepts included in the questionnaire, as these had been explicitly addressed in their coursework. Both questionnaires underwent pretesting (clarity, response format, and validity) with similar samples before being finalized. We collected responses on 5-point Likert scales (from 1 to 5) and numerically coded them to compute central tendency and dispersion indicators as well as inferential analyses (ANOVA). We computed chi-square tests from raw frequencies for each response category. A total of 52.3% of students, all novices in the ePortfolio approach, participated in the Q1–T1 questionnaire. This proportion does not differ from random distribution relative to the parent population ($n = 34$, $\chi^2 = 0.14$, $df = 1$, $p = .80$), which reduces the likelihood of initial self-selection bias in favor of the ePortfolio. Of these, 47.1% continued to Q2–T2, a proportion which also does not differ significantly from that expected by chance relative to the Q1–T1 sample ($n = 16$, $\chi^2 = 0.12$, $df = 1$, $p = .80$). ANOVAs we performed both on the raw item data and on the aggregated mean scores of the four scales presented below revealed no significant differences between the two time points (Q1–T1 vs. Q2–T2). The interaction between sub-scale dimensions and temporalities was also non-significant. We therefore retained all participants for subsequent analyses across the studied dimensions, with statistical tests adjusted for sampling variability and respective group sizes. We performed quantitative analyses using raw questionnaire data with both descriptive and inferential statistics (ANOVA and chi-square tests; Howell, 2008). (For detailed results and statistical analyses (including significance testing) for each dimension and sub-dimension, see the four referenced studies.) The interview guide mirrored the dimensions explored in the questionnaires, while allowing for more open-ended and elaborated expression. The interviews were audio-recorded, fully transcribed, and subsequently coded and analyzed. We conducted the qualitative analyses through thematic content analysis based on the extraction of semantic categories from motivations, reflective reports data and verbatim interview data (Bardin, 2013). This mixed analytical approach is consistent with recent methodological recommendations (Daverne-Bailly & Wittorski, 2022).

with a large student cohort. The model has previously been implemented with a large sample of third-year Education Sciences students, with effects observed across cognitive, regulatory, cooperative, and professional dimensions. It was investigated through a mixed and hybrid methodological approach, combining both quantitative and qualitative analyses conducted at different stages of the learning process, in both cross-sectional and longitudinal perspectives. In the field of ePortfolio research, such a mixed and hybrid design is considered essential for capturing its impact (Meeus et al., 2006; Tochel et al., 2014; Zeichner & Wray, 2001). This approach allows for methodological triangulation (Apostolidis, 2006), ensuring that quantitative indicators of change can be meaningfully interpreted considering students' lived experiences and developmental trajectories. Before presenting the promising initial findings derived from four studies, we first outline the common methodological framework used to assess the model. This framework is summarized in Table 1.

Each of the four studies synthesized below drew on a specific subset of these instruments to capture developmental change, combining Likert-scale questionnaire (cross-sectional and longitudinal) measures with qualitative data from students' motivations, reflective reports, and semi-structured interviews. Building on this shared methodological framework, the four studies respectively examine distinct dimensions of the ePortfolio's impact: cognitive processes (Study 1), self-regulation (Study 2), cooperation (Study 3), and professionalization (Study 4).

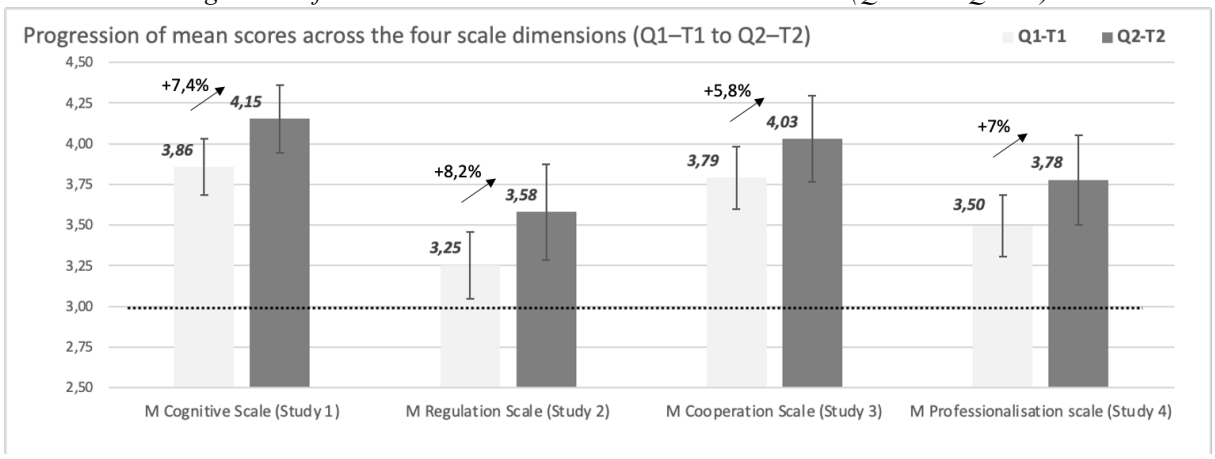
The implementation of the model involved a large cohort of third-year undergraduate Education Sciences students (n = 97, third-year, age M = 21.3, SD = 1.9, 6.2% male). At the outset, 67% of students (n = 65) chose the ePortfolio pathway and justified their choice and motivation during the first lecture (T0). When students were given the option between completing an ePortfolio and taking a summative end-of-semester assessment, they significantly preferred the ePortfolio model (χ^2 = 11.2, df = 1, p < .001). Among these students, 52.3% agreed to participate in a first mid-semester questionnaire Q1–T1 (n = 34, age M = 21.1, SD = 1.8; all female and novices in the ePortfolio approach). A retention rate of 47.1% from this first sample was maintained for Q2–T2 (n = 16). Of this latter group, 25% volunteered for individual end-of-course semi-structured interviews (n = 4; T4), and 100% of the reflective reports were included in the qualitative corpus (T3; see Table 1).

In addition, several students decided to join the ePortfolio pathway later in the semester, bringing the final participation rate to 71% of the cohort (n = 69), further supporting the strong preference for this formative model (χ^2 = 17.33, df = 1, p < .001). This strong preference for the ePortfolio suggests that students perceived it not only as an assessment format, but as a meaningful learning environment.

To make the developmental effects of the ePortfolio visible, the results are presented through a three-layered empirical illustration. First, a global overview of the evolution of mean scores between Q1–T1 and Q2–T2 shows an overall progression across the four learning dimensions (cognitive, regulatory, cooperative, and professionalization) (Figure 2).

Figure 2

Progression of Mean Scores Across the Four Scale Dimensions (Q1–T1 to Q2–T2)



Note. All values are reported on a five-point Likert scale (from 1 to 5). The upward trend across timepoints indicates a developmental reinforcement of perceived cognitive, regulatory, cooperative and professionalization effects. Mean scores above 3.0 reflect positive values, with systematic improvements from T1 to T2 across all four dimensions. Percentage gains are calculated relative to the usable range of the Likert scale (1–5), (i.e., Gain% = {raw gain / 4} × 100. Error bars represent the standard error of the mean {SEM}).

Table 2
Mean Scores and Standard Deviations (Q1–T1 vs. Q2–T2) for Each Sub-Dimension of the Four Scales Used Across the Studies (5-Point Likert Scale)

Cognitive scale (Study 1)	Deep processing	Responsibility	Metacognition	Mastery of knowledge	Reflexivity	Self-assessment	Legitimacy	α
Q1–T1	3.82 (± 0.97)	4.03 (± 1.03)	3.76 (± 0.82)	3.71 (± 1.06)	4.38 (± 0.89)	3.71 (± 1.14)	3.59 (± 0.96)	0.84
Q2–T2	4.13 (± 0.62)	4.56 (± 0.63)	3.75 (± 0.68)	4.25 (± 0.68)	4.50 (± 0.52)	3.94 (± 1.34)	3.94 (± 0.85)	0.79
Gains (%)	0.30 (7.5%)	0.53 (13.25%)	-0.01 (-0.25%)	0.54 (13.5%)	0.12 (3%)	0.23 (5.75%)	0.35 (8.75%)	

Regulation scale (Study 2)	Self-efficacy	Motivation	Autonomy	Affect regulation	Self-regulation	Stress regulation	Mental load regulation	α
Q1–T1	3.71 (± 1)	3.56 (± 1.26)	4.12 (± 1.07)	2.74 (± 1.16)	3.29 (± 0.97)	3.12 (± 1.17)	2.24 (± 0.78)	0.82
Q2–T2	3.94 (± 1.06)	3.94 (± 1)	4.5 (± 0.73)	3.38 (± 1.09)	3.63 (± 1.02)	3.50 (± 1.15)	2.19 (± 0.83)	0.81
Gains (%)	0.23 (5.75%)	0.38 (9.5%)	0.38 (9.5%)	0.64 (16%)	0.33 (8.25%)	0.38 (9.5%)	-0.05 (-1.25%)	

Cooperation scale (Study 3)	Tool-mediated collaboration	Perceived proximity to peers	Peer support and peer feedback	Perceived proximity to the instructor	Self-assessment supported by peer feedback	Coherence between learning and assessment	Recommendations for implementation	α
Q1–T1	4.03 (± 0.94)	3.91 (± 1)	3.7 (± 1.1)	3.06 (± 1.25)	3.71 (± 1.14)	4.21 (± 1.15)	3.94 (± 0.98)	0.87
Q2–T2	4.31 (± 0.95)	3.63 (± 1.2)	4.06 (± 0.77)	3.25 (± 1.73)	3.94 (± 1.34)	4.75 (± 0.45)	4.25 (± 0.68)	0.75
Gains (%)	0.28 (7%)	-0.29 (-7.25%)	0.37 (9.25%)	0.19 (4.75%)	0.23 (5.75%)	0.54 (13.5%)	0.31 (7.75%)	

Professionalizatio n scale (Study 4)	Professional identity	Career projection	Professional integration	Perceived proximity to the future profession	Perceived proximity to future colleagues	Belief in one's future professional integration	Mastery of professional strategies	α
Q1–T1	3.68 (± 1.12)	3.97 (± 1)	3.32 (± 1.07)	3.91 (± 1.16)	3.18 (± 0.90)	3.12 (± 1.07)	3.29 (± 1.17)	0.89
Q2–T2	4.19 (± 1.11)	4.19 (± 1.11)	3.56 (± 1.31)	4.13 (± 1.02)	3.31 (± 1.08)	3.50 (± 1.10)	3.56 (± 0.73)	0.91
Gains (%)	0.51 (12.75%)	0.22 (5.5%)	0.24 (6%)	0.21 (5.25%)	0.14 (3.5%)	0.38 (9.5%)	0.27 (6.75%)	

Note. Gains indicate the observed developmental change over time, and Cronbach's α values confirm the internal consistency of each scale. Percentage gains are calculated relative to the usable range of the Likert scale (1–5), (i.e., Gain% = {raw gain / 4} × 100).

Second, a finer-grained analysis of each sub-dimension within these scales specifies where change occurred and to what extent (Table 2). Finally, selected verbatim excerpts collected at different stages of the process (T0, T3, and T4) illustrate the lived experience underlying these quantitative gains, showing how students progressively internalized cognitive, regulatory, collaborative, and professional dimensions (Appendix B). Taken together, these three layers of evidence provide a triangulated understanding of the impact of the ePortfolio, rather than relying on isolated indicators.

Our first study explores how the ePortfolio model fosters cognitive learning dimensions by structuring feedback loops that support "learners' organizational closure" (study 1). This process helps students refine their work based on perceived learning outcomes and their own actions. Key cognitive dimensions—reflexivity, responsibility in learning, mastery in knowledge construction, deep information processing, and self-assessment—are reinforced. Reflective reports and interviews highlight additional gains in knowledge embodiment, long-term memorization, metacognition, feeling of legitimacy, and meaning attribution. Feedback emerges as a crucial factor, enabling error analysis, clarifying expectations, and guiding adjustments. Regular checkpoints and clear timelines further support engagement throughout the process (Ferrier, 2024; Ferrier & Connac, 2024c).

Our second study highlights how the model fosters self-regulated learning (study 2). Findings show positive effects on autonomy, self-efficacy, motivation, and stress adjustment, with affect regulation displaying the greatest improvement. Although the workload remains sustained, stress regulation improves over time, suggesting that increased cognitive engagement does not translate into increased emotional strain. As students internalize the ePortfolio process, they gain autonomy, control, and agency. Feedback, guidance, and meaningful learning experiences support this adjustment. Positive emotions, including enjoyment and self-confidence, emerge through key ePortfolio features such as support, feedback, error understanding, and planning (Ferrier & Connac, n.d., 2023, 2025b).

Our third study examines the social dimension of learning (study 3). Quantitative results show a positive evolution in cooperation throughout the process, particularly in perceived alignment between training and assessment, the ePortfolio's collaborative potential,

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the quality of support, and its recommended use. These effects do not seem to depend on students' perceived closeness to peers or the instructor, but rather on the structural features of the ePortfolio itself. Qualitative findings reinforce these trends, highlighting its role in fostering cohesion, cooperative learning, knowledge co-construction, mutual support, and active engagement. However, organizational challenges related to group work dynamics remain (Ferrier, in press; Ferrier & Connac, 2024a, 2024b).

Our fourth study explores the professionalization dimensions (study 4). Findings show that students reinforce their professionalization process and professional choice throughout the process. The most significant benefits emerge in professional projection and proximity to their future profession, with the strongest progression observed in the construction of their professional identity. Qualitative data further highlight the ePortfolio as a concrete tool for preparing for professional practice, enhancing engagement and commitment. It also clarifies learning expectations and their practical implications, fostering an integrative view of competencies as transferable to professional contexts. The model also supports the development and internalization of professional attitudes and ethics (Ferrier & Connac, 2025a).

Finally, we conducted a comprehensive review of ePortfolio models, analyzing their impacts while positioning our own, and providing a detailed account of each step along with the associated pedagogical documents. Findings showed that the model helps students identify their acquired competencies and supports their transferability, while also being highly valued by students, who intend to apply it in their future learning and teaching practices (Ferrier & Connac, 2026).

Limitations

The limitations of our model have been discussed in the studies, with the most critical being the need for strong support during the initial weeks of ePortfolio implementation to help students adopt the self-directed learner posture it requires.

Another limitation of our model concerns its implementation context. While it was initially developed within the field of Education Sciences, its effectiveness lies in its core features, making it potentially transferable to other training programs and academic settings. Its formative, competency-based approach seems easily adaptable across disciplines, provided the same theoretical framework is maintained. This potential for transferability is supported by similar ePortfolio models successfully applied in fields such as Second Language Learning (Abrar-ul-Hassan et al., 2021), Cross-disciplinary inquiry-based learning (Mueller & Bair, 2018), and Archaeology and Art History (Verslype et al., 2017), although outcomes related to self-evaluation, reflective thinking, engagement, and autonomy remain inconclusive. More broadly, ePortfolios are now used across a wide range of disciplines—from Social Sciences to Technical Engineering (Le Boucher et al., 2019; Lu, 2021; Segaran & Hasim, 2021). However, the diversity of models and implementation contexts still makes it difficult to generalize their impact (Segaran & Hasim, 2021; Tochel et al., 2014).

Lastly, transitioning from traditional lectures and certification-based assessments to an ePortfolio approach entails a workload for all stakeholders. Nevertheless, as Meeus et al. (2006) pointed out "Going through an ePortfolio is certainly labour intensive . . . but this is also true of the other tools" (p.133) and other practices.

Beyond these limitations, it is important to note that participation in the ePortfolio was voluntary rather than mandatory. Despite its significantly higher workload, 71% of third-year students ultimately completed the formative-assessment ePortfolio rather than the summative end-of-course test—a choice they justified with statements such as: "That's what students are looking for today . . . we should have the same thing everywhere."

With this article, our goal was to clearly present our model and share it to facilitate its transferability and encourage its application, allowing other researchers and practitioners to assess its impact. This, in turn, will help refine and improve the model.

Future Directions

The conclusions established by our studies could be extended in several directions. Beyond the documented gains, several limits and unanswered questions emerged from the implementation of the model. A first research direction concerns the durability of the effects: while the results show short-term developmental reinforcement, it remains unclear whether these benefits persist over time or translate into situated professional practice after graduation. A second avenue relates to the conditions of equitable cooperation, as some students reported asymmetries in engagement and responsibility within peer interactions, suggesting that this dimension may require additional scaffolding. A third unresolved question concerns the transferability of the model: further studies are needed to examine whether similar effects would be observed across other disciplines, academic levels, pedagogical cultures or instructors—and to what extent the model retains its formative value beyond its original context. A fourth limitation concerns the costs of engagement (cognitive load, time, regulation efforts), which merit deeper investigation to better understand how guidance can be optimized without reducing learner agency. Finally, the statistical power of the present findings

remains constrained by sample attrition between T1, T2 and T4; replication with larger cohorts is needed to consolidate effect tendencies and test the robustness of developmental trajectories.

To address these questions, future research could mobilize longitudinal designs and diversified methodologies, including larger and more heterogeneous samples, to determine whether the ePortfolio functions as a temporary learning accelerator or as a structurally transformative practice. It would also be relevant to explore additional outcomes, such as the development of prosocial competencies or long-term transfer once students enter professional life, and to broaden the scope of inquiry to test the adaptability of the model in other institutional and cultural settings.

Conclusion: Toward a Meaningful Integration of ePortfolios

By situating ePortfolios within a clear conceptual framework rooted in socioconstructivist, cognitivist, and systemic perspectives, we argue that they are not universally suited to all educational contexts. To move beyond their romanticized image or common pitfalls—such as technological challenges, tensions, or rejection—greater conceptual clarity and further research are needed to avoid reducing ePortfolios to a passing trend in alternative assessment. Future research should further examine how our model operates across different assessment cultures, particularly outside the Francophone context, to determine whether the developmental gains documented here are context-dependent or transferable across institutional ecologies.

When well-designed and grounded in theory, ePortfolios can foster reflective thinking, deep and self-directed learning, along with greater responsibility and engagement. They support both formative and summative assessment, including peer and self-assessment, and offer a meaningful alternative to one-shot, certification-based tests. Yet, simply labeling a tool as an ePortfolio does not guarantee its effectiveness.

For successful implementation, three key conditions must be met: (a) a clearly defined pedagogical design, (b) structured support through regular feedback loops, and (c) flexibility to encourage adoption and integration. One of the main strengths of our model lies in its adaptability, enabling it to align with diverse pedagogical objectives while maintaining a strong formative-assessment focus within a well-defined theoretical framework.

By presenting our formative-assessment ePortfolio model for learning competencies, we aim to contribute to the need for clarity while providing empirical insights into its impact. Our goal is to share it with researchers and practitioners for further testing and critical analysis. Future research should therefore explore its application in greater depth to refine its formalization.

To conclude, ePortfolios must be firmly anchored in psychopedagogy, as their full potential can only be realized within a structured framework. Therefore, we emphasize that a well-designed framework must be the alpha and omega of any ePortfolio experience, guiding it from inception to completion.

Ultimately, our model also constitutes a call for epistemic awareness: in teaching Education Sciences, we are not merely transmitting knowledge *about* education but *enacting* it in practice—just as teaching Cognitive Psychology mobilizes applied cognitive psychology in action. From this perspective, we aim to move ePortfolio discourse from enthusiasm and hype toward a grounded psychopedagogical framework.

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Appendix A
Portfolio Engagement and Pedagogical Contract

This contract is a formal component of the pedagogical process. It is presented to students after the initial explanation of the model to ensure informed commitment and clarity of expectations.

PORTFOLIO ENGAGEMENT CONTRACT

First name: _____ Last name: _____

How to construct a portfolio piece: (several answers possible)
☐ Clearly explain what you intend to produce
☐ Demonstrate what you are able to accomplish
☐ Draw on the course content and readings
☐ Follow the instructions and assessment criteria
☐ Have the piece proofread by another student

What must be included in a portfolio piece: (several answers possible)
☐ The first and last names of the author(s)
☐ The first and last name of the peer reviewer
☐ Your hobbies or personal interests
☐ Your phone number
☐ The bibliographical references used
☐ Your personal opinion of the course
☐ Your professional project

How should a portfolio piece be submitted for evaluation? (one answer only)
☐ By email
☐ By postal mail or deposited in XXX
☐ On the university MOODLE platform (ENT)

How many times can a portfolio piece be revised? (one answer only)
☐ None – the first evaluation is final
☐ Twice, with an explanation of what has been revised
☐ Twice, without explanation of revisions
☐ As many times as desired

What must the final portfolio contain? (one answer only)
☐ All drafted pieces + introduction + conclusion
☐ Only validated pieces + introduction + conclusion
☐ Whatever the student chooses

What motivates me to complete a portfolio? *(Student's personal motivation – open response)*

I commit to attending all classes (except in cases of force majeure): ☐ YES ☐ NO
I understand that the average correction time for a portfolio piece is one week: ☐ YES ☐ NO
I am aware that feedback on portfolio pieces is provided only during lectures and tutorials: ☐ YES ☐ NO

Signature:

Appendix B

Developmental Progression Illustrated Through Excerpts From Verbatim Statements

Stage	Cognitive dimensions (Study 1)	Regulation dimensions (Study 2)	Cooperation dimensions (Study 3)	Professionalization dimensions (Study 4)
Motivations (T0)	"I find the portfolio interesting because it is something we work on continuously throughout the semester. I feel more confident because the work is checked along the way. I also find it more relevant, since the other type of exam would help me retain much less of the content" (Student 17); "This project interests me because it gives meaning to the course, unlike standard test questions" (Student 35).			
Non-motivations (T0)	"For the sake of simplicity, I chose the other modality. . . . The ongoing assessment system implied by the portfolio does not really suit me. I prefer having a single evaluation at the end of the semester" (Student 2).			
Reflective reports (T3)	"a fascinating experience involving constant reflection and continuous learning. The possibility of having several attempts allowed for deeper thinking in order to better meet expectations. . . . It is much more than a simple assignment—it is a completely different kind of construction and reflection" (Student 61); "an opportunity to reflect on one's own work, to take a step back and identify one's strengths and weaknesses. . . . It fosters autonomy and engagement, as I was actively involved in selecting and organising my own work" (Student 66).	"This work gave us the possibility to fail without stress or pressure because we can improve our work thanks to feedback, without feeling discouraged" (Student 15); "I was very anxious about this portfolio at first—it seemed vague and I didn't really understand what was expected. But once I started the first piece and submitted it for the first time, I began to understand how it worked. I really enjoyed creating it and seeing it take shape piece by piece" (Student 62).	"We chose to work as a pair, but this didn't prevent us from also talking with other students who were working on the same pieces and reviewing their work. It was interesting to see which ideas we had in common, which ones differed, and how each of us implemented them depending on our educational project" (Student 31); "It was thanks to cooperation that I was able to open myself to other perspectives, new ideas, and areas for improvement that I would not have identified on my own" (Student 50).	"This portfolio was a genuine tool for both professional and personal development. Some of the pieces were surprisingly useful during my admission interviews for graduate schools. It also allowed me to put myself in the position of a professional—it creates immersion by asking us to design processes or projects that an actual practitioner would carry out" (Student 18); "This portfolio really helped me project myself into my future role as a teacher. It led me to create and present concrete elements of the profession, such as a classroom plan or a teaching project" (Student 39).
Interviews (T4)	"You become really invested in it. . . . It's not something you just memorise by heart. . . . The portfolio actually makes sense. . . . There is more reflection—you're really 200% inside the process. . . . With the feedback we can learn from our mistakes and act on them, so they stop being mistakes and become strengths." (Student 22); "certain qualities need to be mobilised—concentration, attention. . . . You really have to be 100% present . . . and process the information in depth. . . . Yes, there is a real awareness, a questioning of one's work, . . . checking if everything is coherent and understandable. . . . It is alive, . . . lasting—a form of 'living knowledge'. . . . It is an activity of trying to understand. . . . You are responsible for the progress of your work and for its quality" (Student 15).	"To be honest, the first piece was very difficult . . . because it was new, . . . everything felt very unclear. . . . You need time to adapt. . . . I think I didn't understand the approach at first because I didn't understand what was really expected. . . . But we were encouraged to try again and we had several chances—nine in total for three pieces, . . . which is actually a lot. . . . Of course, there can still be a bit of stress, . . . but I didn't experience it negatively—quite the opposite. I really invested myself 100%. . . . You can build self-confidence and self-esteem quite easily, because once you understand the approach and the course content and you use them as intended, really internalizing the process, it becomes very beneficial. . . . It's almost impossible to end up with a negative outcome. . . . Yes, it takes time—like any real learning, . . . but it's not rote memorization, and that's what makes the workload, even if it is substantial, not become a barrier. . . . In the end, you reuse what you've learned" (Student 47).	"It's a collaborative task—you're working individually but also as part of a group. . . . You need to agree on the substance of the work. . . . What is valuable in collaboration is that I might think I've understood something, and then my peers tell me 'No, look, that's not it,' and they help me correct it. . . . There are very positive aspects—at first there is real motivation because you share competencies and know-how—but also negative aspects related to how people work and their level of commitment. We are not all equal in terms of responsibility. . . . So, I have mixed feelings about peer collaboration. . . . That's where the portfolio also shows its limits. . . . Several values are needed for it to work—including empathy, because you need to understand what the other person feels if you don't do your part. And also, punctuality, consistency" (Student 15); "The portfolio really becomes a collective construction—still individually authored but nourished by shared moments where we exchange and review each other's pieces. . . . The required peer review and discussion phases help enormously. I have carefully proofread pieces for others, and I think that helped them too. . . . As a group, we make more progress than when working alone. . . . It is essential because if you stay too long in the dark, you can get stuck, whereas working in a group helps you move forward" (Student 47).	"It also reflects what society expects. . . . It even made me realise that being a project coordinator could be a path for me, . . . it really fit who I am. . . . It made me think about it seriously. . . . Or even becoming an instructional designer to build training programs. . . . I told myself: this might actually be something I'd be interested in. It opened up career perspectives I had not previously considered." (Student 15); "I could really project myself into the profession. . . . You feel almost ready to enter the world of work. . . . It clearly helps you start forming a professional identity. . . . It's really about taking on the professional posture. . . . You already feel almost like a teacher in training. It helps us build our identity as professionals. . . . It's more representative of what we will actually be doing. . . . Now that I have completed the portfolio, I'm glad I did it because it has already been useful to me, . . . and it will be useful later as well. . . . The portfolio approach creates a link between three moments: the present (as I'm working on a piece), my existing experience, and the future professional context. . . . It will really help me in practice—it's the kind of learning that stays with you. It's truly theory preparing for practice. I think I'll keep it for at least the next five years and refer back to it" (Student 47).

Note. Excerpts were collected at different stages of the research (T0, T3, and T4). This table maps student discourse onto the four assessed dimensions (cognitive, regulatory, cooperative, and professionalization). The excerpts illustrate (1) initial motivations or non-motivations at entry (T0)[1], (2) reflective meaning-making during portfolio completion (T3), and (3) the internalization of competencies and identity-related shifts expressed in post-hoc interviews (T4). Taken together, they provide qualitative evidence of the developmental trajectory fostered by the ePortfolio process.

[1] At the end of the course, 29% of students (n = 28) did not choose the ePortfolio and 14.3% (n = 4) agreed to provide a written explanation for their non-choice.