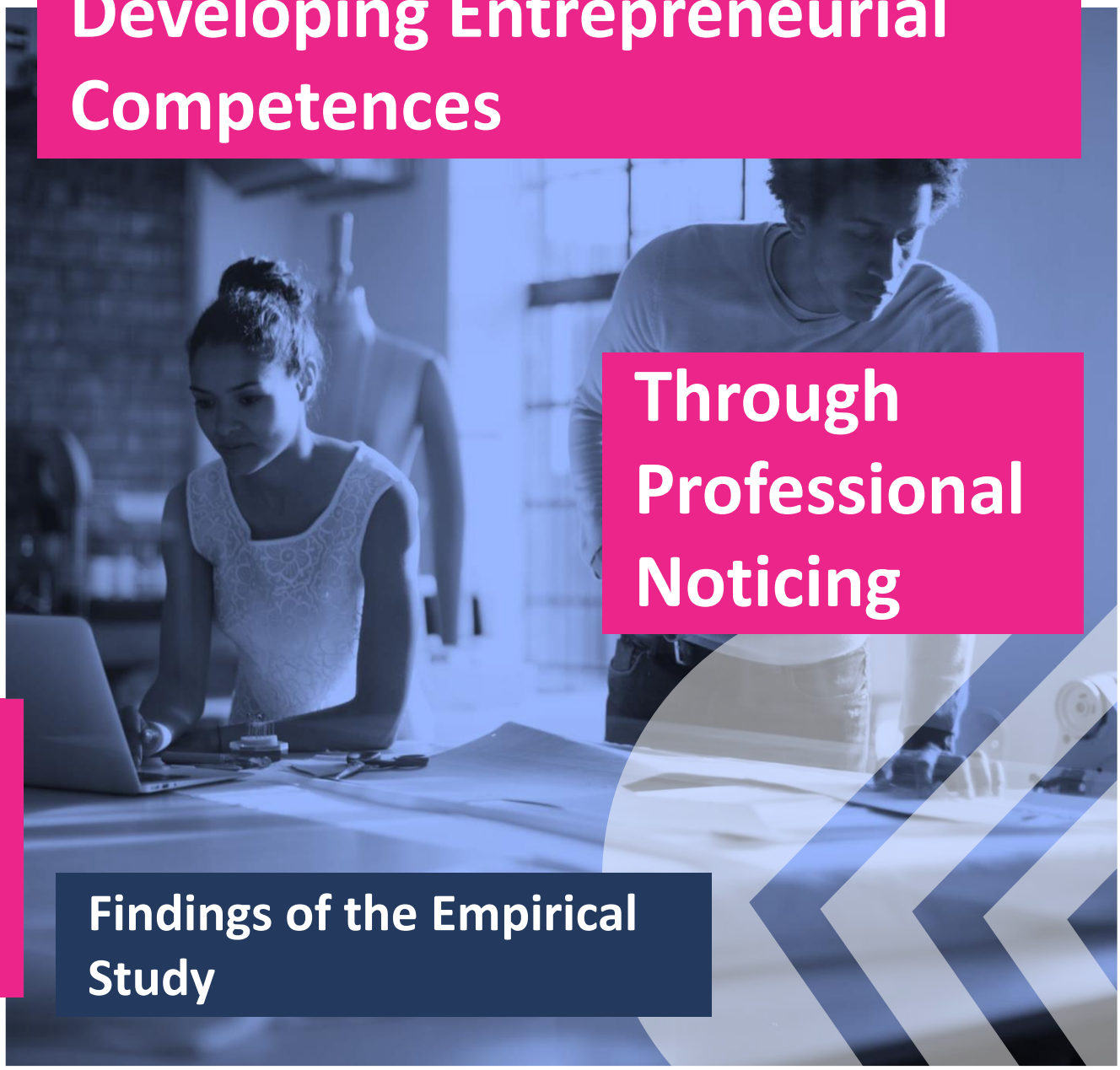
Developing Entrepreneurial Competences



Through Professional Noticing

Findings of the Empirical Study

PROMISE
Professional Noticing to Improve Entrepreneurship Education

November 2025
Developing Entrepreneurial Competences Through Professional Noticing: Findings of the Empirical Study

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Potential of Professional Noticing to Improve Entrepreneurial Competences

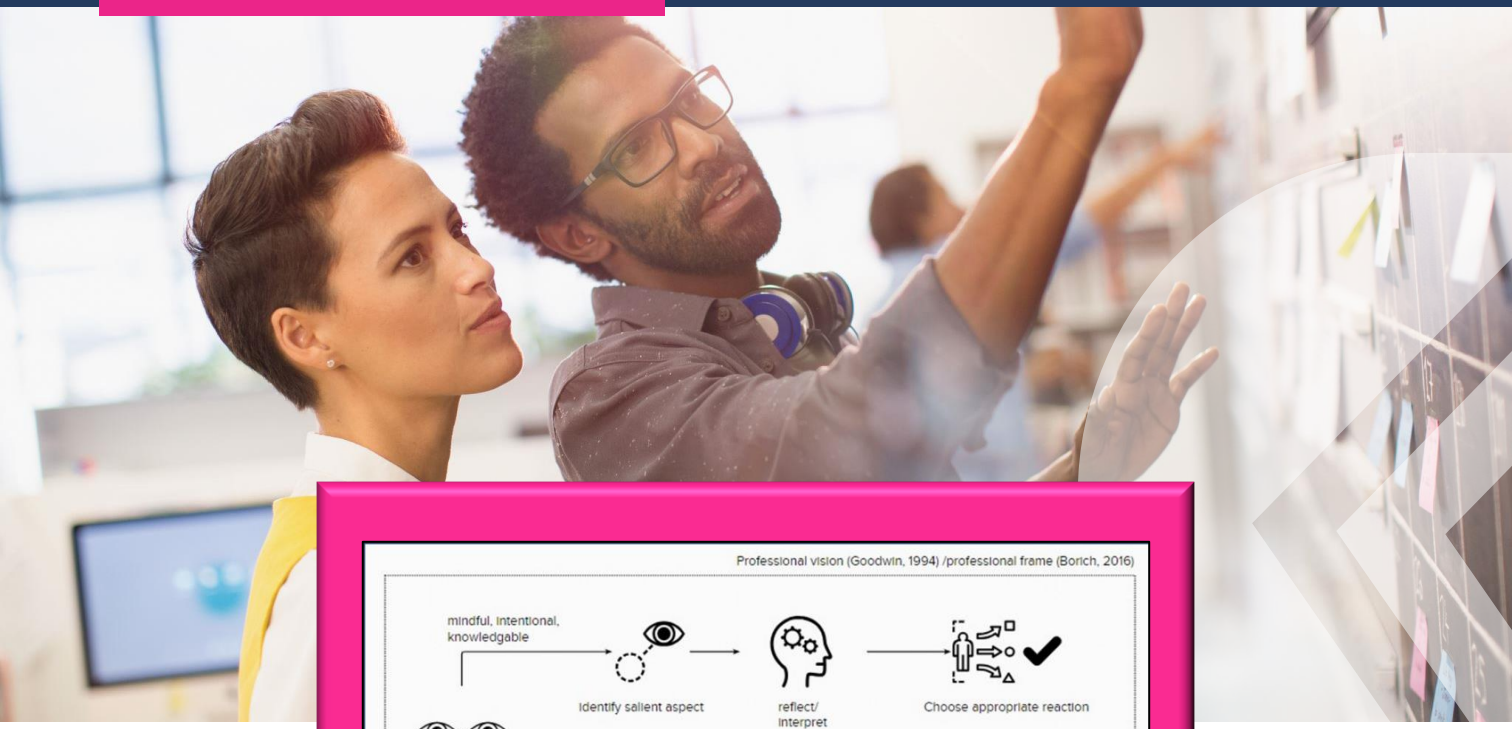
INTRODUCTION

In today's rapidly evolving professional landscape, the ability to think entrepreneurially, like spotting opportunities, solving problems creatively, and adapting to uncertainties, is increasingly vital across all fields. One promising approach in this evolution is Professional Noticing (PN), defined as the capacity to observe one's environment, discern salient information, interpret its relevance, and make informed decisions (Rooney & Boud, 2019). It refers to the intentional, selective process of attending to salient features of practice and experience, enabling informed and timely action within professional contexts. It involves both perception and interpretation, allowing professionals to actively discerning specific elements from the surrounding environment and making meaning from them in light of one's prior knowledge and goals (Mason, 2002; Boud & Walker, 1990; Rooney & Boud, 2019).

Professional Noticing is a process that unfolds in distinct but interrelated phases: (1) Perceiving or Attending, (2) Interpreting Reasoning, and (3) Deciding (König et al., 2022). Some have extended this to a fourth phase, (4) Responding/Reacting, which emphasises how decisions are enacted in practice and feed back into future noticing cycles (Jacobs et al., 2010; van Es & Sherin, 2021). This professional framework is a structured perspective shaped by experience, enabling professionals to evaluate situations objectively and respond with competence (see Figure 1, Borich, 2016).

PN is a transversal skill that enables learners to respond effectively to dynamic conditions and identify opportunities arising from change. Despite its potential, PN has been underutilised in entrepreneurship education. Integrating PN into teaching could help students become more reflective, proactive, and capable of navigating complex challenges that are essential not only for entrepreneurs but for professionals in any domain.

INTRODUCTION



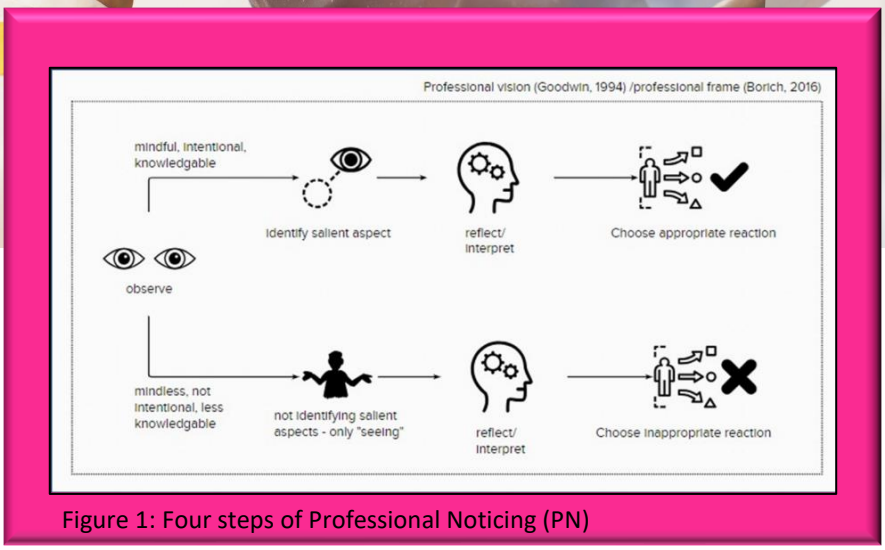


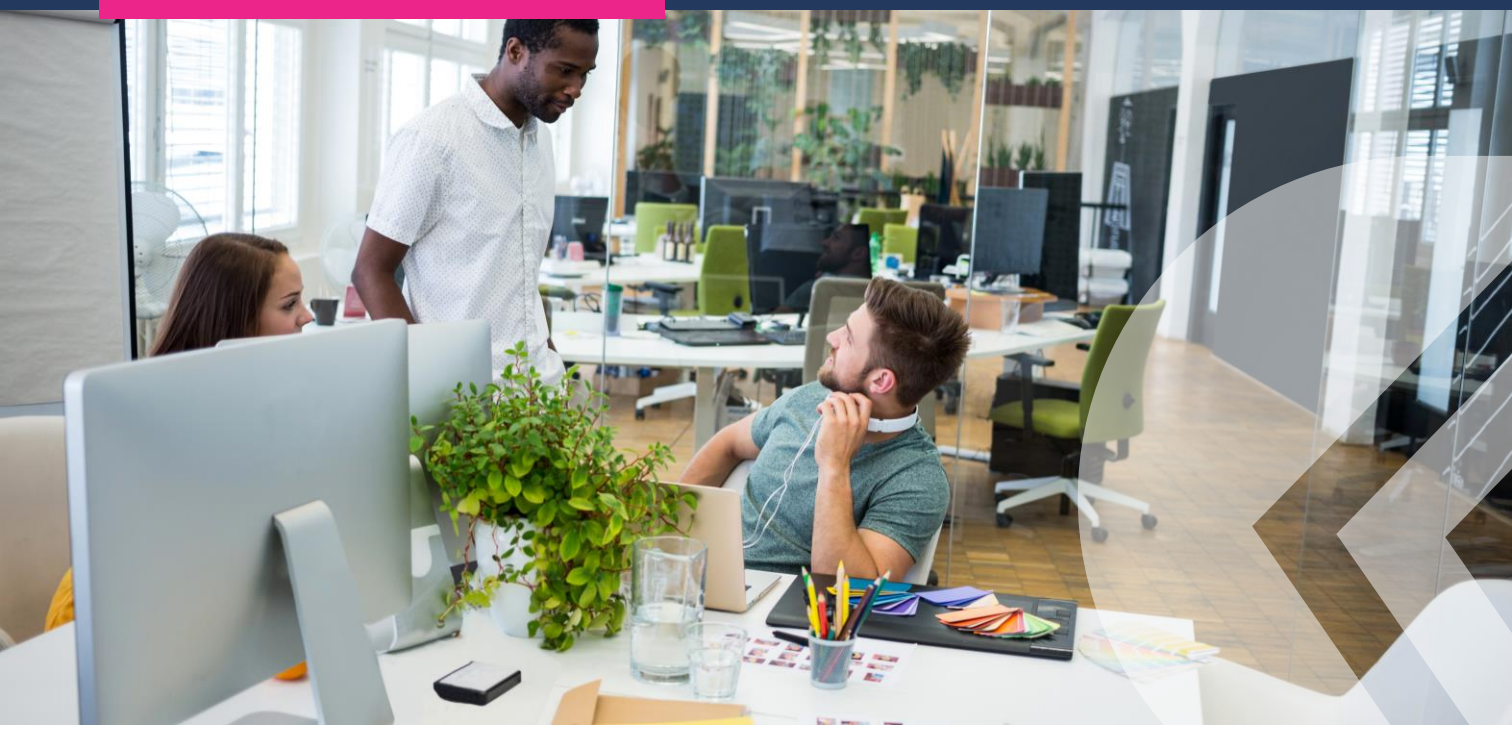
Figure 1: Four steps of Professional Noticing (PN)

The aim of this report is twofold. It summarises the findings of an international empirical study conducted to evaluate the effectiveness of Professional Noticing in improving entrepreneurial competences. In addition, it highlights useful pedagogical approaches and tools for educators to enhance entrepreneurial education and provides guidance on how to integrate these approaches into education systems and institutionalise them within curricula.

The European Union (EU) funded PROMISE project (Professional Noticing to Improve Entrepreneurship Education) is an Erasmus+ initiative aiming to integrate Professional Noticing (PN) into entrepreneurship and intrapreneurship education for students in higher education institutions. This report draws on the collective expertise of Universität für Weiterbildung Krems (Austria), University of Turku (Finland), Universidad Complutense de Madrid (Spain), and Momentum (Ireland). Together, these institutions provide valuable insights from their experiences in testing Professional Noticing in practice and evaluating its effectiveness in fostering entrepreneurial competences.

Unlocking the Power of Professional Noticing for Entrepreneurship Higher Education

Professional Noticing in Practice



We conducted an international empirical study at three higher education institutions in Austria, Finland and Spain, as well as in vocational education settings in Ireland over two semesters (Autumn 2024 – Spring 2025). To evaluate the effectiveness of PN in improving entrepreneurial competences, we conducted an empirical study to answer following research questions:

- **How effective is Professional Noticing as a methodology to improve entrepreneurial education from the point of view of students and teachers?**
- **What entrepreneurial competences does Professional Noticing particularly support?**

In support of this aim, we adapted the European Commission's **EntreComp** framework for entrepreneurship competence, which serves as a reference model intended to promote entrepreneurship as a core competence across educational and professional settings (Bacigalupo et al., 2016). The EntreComp framework is organised into three interrelated competence areas: Ideas and Opportunities, Resources, and Into Action (see Figure 2).

Figure 2: The EntreComp framework organised into three interrelated competence areas: Ideas and Opportunities, Resources, and Into Action.

Mixed-methods research design

Data Collection Methods	Piloting Countries				Data Analysis Methods
	Austria	Finland	Ireland	Spain	
Student survey (n=183)	n=23	n=47	n=36	n=77	Cross-tabulation, correlation analysis, factor analysis
Semi-structured teacher interviews (n=15)	n=2	n=4	n=5	n=4	Thematic qualitative content analysis

Table 1 Summary of the mixed-method data used in the research.

We used a mixed-methods research design, combining quantitative and qualitative data to evaluate the effectiveness of PN in entrepreneurship education. The primary data sources included a student survey (altogether 183 respondents) and 15 teacher interviews. Both quantitative and qualitative analysis methods were employed to assess the effectiveness of the Professional Noticing approach in enhancing entrepreneurial competences (see Table 1).

The Student Survey was administered via Webropol, a secure online platform, and included structured Likert-scale items and open-ended questions. It assessed 14 entrepreneurial competences adapted from the European Commission's EntreComp framework, as well as four dimensions of PN: observe, identify, interpret, and react. Students evaluated their competences before and after PN-based training.

Teacher interviews were semi-structured and lasted 30–40 minutes. They explored educators' experiences with PN, its impact on teaching and learning, and the development of students' entrepreneurial competences.

Pilots and Open Educational Resources

This section leverages the collective expertise of Universität für Weiterbildung Krems (Austria), University of Turku (Finland), Universidad Complutense de Madrid (Spain), and Momentum (Ireland) in testing the Professional Noticing pedagogical approach across various educational settings. Additionally, it introduces the Open Educational Resources (OERs) developed as part of the PROMISE project, which were piloted by teachers in educational contexts.

Pilot Trainings

The Professional Noticing pedagogical approach was tested in a wide variety of educational settings to explore how it could support the improvement of entrepreneurial competences. Teachers used the Open Educational Resources (OERs) developed by the project to explore how Professional Noticing can be applied in education. More details about the rationale behind the Open Educational Resources (OERs) can be found in the next section.

The pilot trainings were carried out in different types of courses, ranging from creative incubator programmes and professional development workshops to business studies, vocational education, teacher training, and marketing. These pilots took place both in higher education institutions and vocational education, with a total of 15 training sessions.

The learners who participated came from diverse backgrounds. They included start-up teams, alumni, undergraduate and postgraduate students, and vocational learners from fields such as equine studies, construction, catering, and fashion. The age range of participants was broad, although most were between 20 and 24 years old. The youngest participant was in the 15–19 age group, while the oldest belonged to the 65–69 age group.

Open Educational Resources (OERs) Rationale

The Open Educational Resources (OERs) developed within the PROMISE project aim to promote a reflective, inclusive, and competency-based approach to teacher education through the lens of Professional Noticing. The design of these OERs responds to a dual objective: to enhance Professional Noticing as a pedagogical competence, and to embed it within the entrepreneurial mindset articulated by the EU EntreComp framework**,** which conceptualises entrepreneurship as a transversal capacity to transform ideas into value for others.

PROMISE OERs align with EntreComp in three interrelated competences areas. Under 1) **Ideas and Opportunities,** teachers learn to "spot opportunities" and "value ideas" through the observation and reflection stages, while ethical and sustainable thinking is integrated into the inclusivity checklist and open licensing principles. Under 2) **Resources**, educators engage in self-awareness, motivation, and collaboration, particularly when adapting the lesson to diverse learner needs and contexts. Finally, the 3) **Into Action** area corresponds to the practical phases of lesson implementation, where noticing becomes a means of taking initiative, planning and managing learning activities, coping with uncertainty, and learning through experience. Thus, each element of the template operationalises an aspect of the entrepreneurial mindset within pedagogical practice.

PROMISE OERs reframe teacher noticing as an entrepreneurial act—one that involves curiosity, initiative, ethical awareness, and the ability to transform reflection into pedagogical value. By merging the reflective discipline of Professional Noticing with the creative, action-oriented ethos of EntreComp, these resources promote a new model of teacher professionalism: observant, adaptive, collaborative, and committed to generating meaningful educational impact within diverse and changing contexts.

PROMISE OERs

Comprising a User Guide, a Professional Noticing Lesson Plan Template and a number of Lesson Plan Examples.

The User Guide serves to scaffold the teacher's engagement with noticing processes—identifying key classroom cues, interpreting their significance, and designing appropriate responses.

The parameters included in the Lesson Plan Template are as follows:

- **Success Criteria:** Defining what success looks like allows teachers to visualise the application of noticing in practice, with teachers and students alike engaging in goal-setting and self-assessment.
- **Lesson Outline and Timing:** The division into Starter Activity, Introduction, Development, Application Task, and Review & Reflection reinforces cyclical learning processes that correspond to aspects like Taking the initiative and Planning and management within EntreComp.
- **Assessment and Reflection**: This translates the metacognitive dimensions of noticing into demonstrable outcomes. EntreComp's Learning through experience competence is explicitly reinforced, as reflection becomes a form of active learning rather than a retrospective evaluation.
- **Inclusivity and Accessibility Checklist:** The final section of the template embodies the EntreComp principle of Ethical and sustainable thinking. By encouraging inclusive language, accessible materials, and respect for copyright and open licensing, it situates professional noticing within a culture of responsibility and openness.

PROMISE OERs also embody the core values of open education: accessibility, inclusivity and shared authorship. Licensed under CC BY-SA 4.0, they are designed for reuse, adaptation, and translation across European educational settings. This openness reflects EntreComp's emphasis on mobilising resources and working with others, supporting the creation of collaborative professional learning networks.

PROMISE Open Educational Resources (OERs) are freely available here

02

Results of the International Study

International Student Survey

To explore students' perceptions of the effectiveness of Professional Noticing (PN) in enhancing entrepreneurial skills, we conducted quantitative analyses that revealed the following:

- Professional Noticing supports a broad range of entrepreneurial competences.
- A strong positive correlation was found among competences related to self-directed learning, indicating that PN fosters autonomy and reflective thinking.
- Demographic factors such as age, gender, and educational level did not significantly influence the development of entrepreneurial competences.
- Students perceived PN as a valuable tool that enhanced their ability to think critically, plan strategically, and reflect meaningfully on their actions.

Students reported moderate to significant improvement in entrepreneurial competences after the training, with an average perceived improvement score of 3.5 out of 5 (see Figure 3). **The most improved competences were Learning through experience and Creativity**, both scoring 3.7. Competences related to financial literacy, mobilising resources, and coping with uncertainty showed the smallest improvements, although they still experienced a moderate increase.

Improved skills and abilities

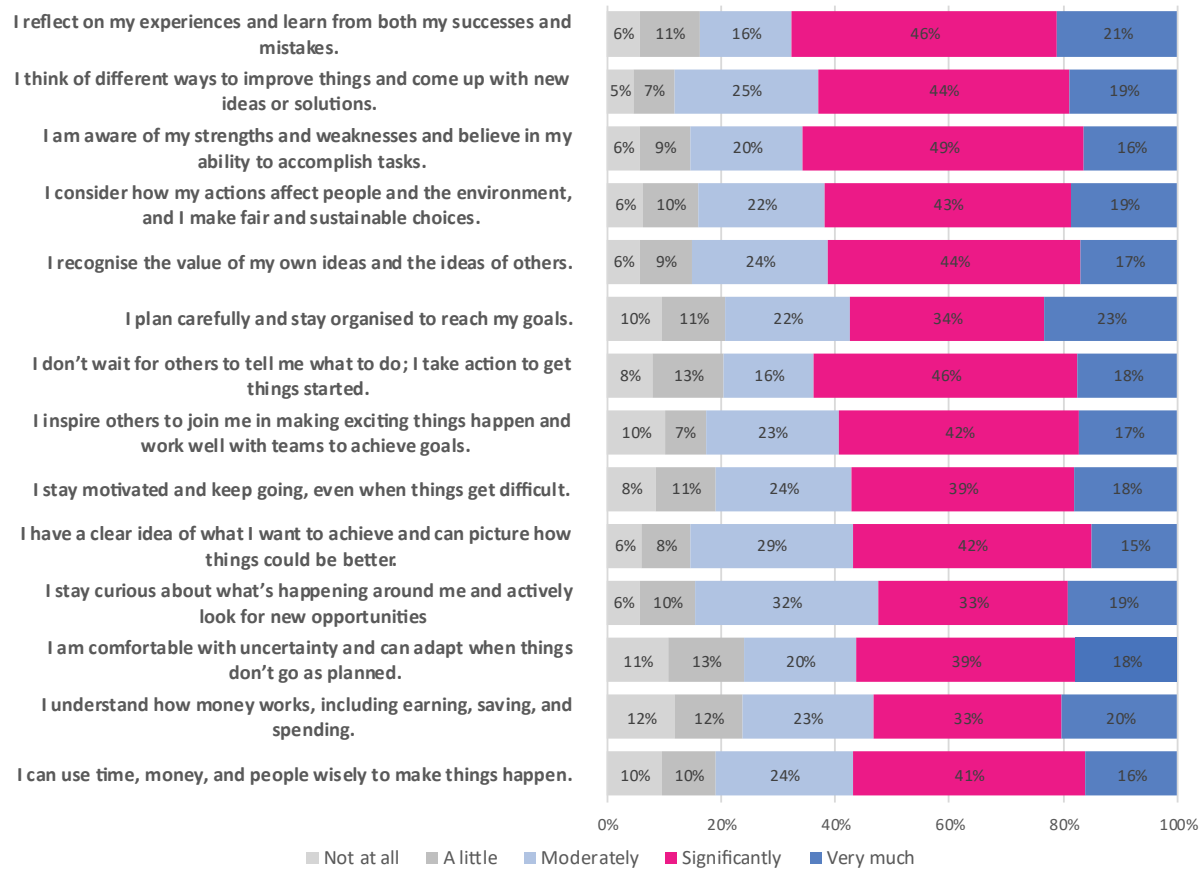


Figure 3. *To what extent do you feel your skills and abilities have improved as a result of the training, n = 178*

The quantitative analysis was extended further through the examination of descriptive variables and their cross-tabulation across background characteristics such as gender, age, and educational background. Next, we employed a statistical method of Pearson's correlation coefficient to assess how strongly different variables were related to each other, and whether those relationships were positive or negative. Finally, we conducted an exploratory factor analysis, which helped us group related items together, simplifying the data and providing clearer insights by highlighting key patterns and reducing complexity.

The Factor Analysis

Revealing that PN supports various entrepreneurial competences.

Six distinct competence factors emerged, with the strongest and most significant factor was Factor 1, Entrepreneurial Learner with Enhanced Noticing Skills, which showed the most significant transformation following the pilot training. All entrepreneurial competences and all PN skills were strongly represented in this factor and showed high loadings, showing that PN is a tool improving students' entrepreneurial competences, such as capacity to think critically, plan strategically and reflect on their actions.

PN is a tool

improving students'

entrepreneurial competences

1. **Entrepreneurial Learner with Enhanced Noticing Skills –** This group showed the greatest growth after the pilot training, particularly in experiential learning and planning. They demonstrated improved abilities to observe and identify key elements in their environment.
2. **Strategic Financial and Resource Management –** Some students already displayed strong skills in this area before training, particularly in financial literacy and mobilising resources.
3. **Motivation and Team Leadership –** Highlights students' pre-existing leadership qualities and perseverance, with the ability to inspire and mobilise other.
4. **Tolerance for Uncertainty –** Reflects the students' prior capacity to handle ambiguity and risk, with no significant change observed after the training.
5. **Empathy and Social Responsibility –** Some students already demonstrated a strong ethical mindset and commitment to sustainable thinking before the pilot training.
6. **Perception –** This factor is characterized by the ability to recognize important aspects in complex situations, a skill that some students already possessed.

Insights from Teacher Interviews

The qualitative analysis of 15 teacher interviews conducted across Austria, Finland, Ireland, and Spain revealed that educators consistently highlighted the value of Professional Noticing (PN) for structuring teaching, enhancing reflection, and fostering student agency. Teachers described a shift from lecturer-centred approaches to facilitative roles, emphasizing observation, interpretation, and dialogic learning. PN was perceived to strengthen opportunity recognition, creativity, risk awareness, and collaboration among students. Moreover, the analysis identified challenges: while observing and noticing came naturally, interpreting ambiguous situations and reacting with decisions remained demanding for many learners, highlighting the need for scaffolding and iterative practice.

The analysis of 15 teacher interviews across Austria, Finland, Ireland and Spain revealed several recurring themes.

Emerging themes from the data:

1. **Professional Noticing (PN) was consistently valued for providing a clear and structured sequence** (observe, identify, interpret, and react) that helped educators scaffold teaching and support decision-making in entrepreneurial learning contexts. Teachers highlighted a noticeable shift from knowledge transmission toward facilitation, with PN encouraging dialogic engagement, reflection, and collaborative learning.
2. **PN was perceived to strengthen key entrepreneurial competences,** particularly opportunity recognition, creativity, resilience, and collaboration. Educators noted that students became more attentive to weak signals and team dynamics, developing greater self-awareness and risk management skills. PN also supported the integration of digital tools, such as AI-assisted brainstorming, to enrich the noticing process and foster critical reflection.
3. **While observing and noticing emerged as accessible skills for most learners, interpreting ambiguous situations and reacting with decisions were identified as more challenging.** Teachers reported that students often sought clear-cut answers and showed hesitancy when faced with uncertainty, underlining the need for scaffolding, iterative practice, and ethical framing in PN-based pedagogy.

Reflections and Limitations

While the findings highlight PN's potential to strengthen entrepreneurship education, several limitations must be acknowledged.

Too diverse in scope?

First, the pilots were diverse in scope, ranging from short workshops to semester-long courses, which complicates cross-case comparability and limits generalisability. Most implementations were small-scale, with some relying on adapted field notes or limited participant numbers, reducing the depth of available evidence.

Time constraints and cognitive load

Second, teachers reported challenges related to time constraints and cognitive load. Short sessions often left little room for iterative cycles of noticing, interpretation, and reaction. Novice learners in particular struggled with ambiguity, searching for "correct" answers rather than exploring multiple interpretations. This suggests that PN requires scaffolding, progressive practice, and a safe environment to normalize uncertainty.

Dependent on readiness and institutional context

Third, the integration of PN was highly dependent on teacher readiness and institutional context. Some educators noted difficulties with assessment design, course fit, or lack of clear guidance. Successful adoption appeared to rely on motivated instructors, supportive environments, and contexts where active, experiential learning was already valued.

Long-term sustainability

Finally, while PN showed promise across disciplines, its long-term sustainability will depend on embedding it into curricula, providing professional development for educators, and designing assessment tools that capture growth in subjective skills such as observation, reflection, and ethical judgement. Future studies should therefore test PN in larger cohorts, extend it to additional domains, and explore digital enhancements, such as AR/VR or AI tools, that can scaffold noticing in complex and hybrid learning environments.

Approaches from National Findings

The following sub-sections provide an overview of the outcomes and insights of the empirical study from each participating country: Austria, Finland, Ireland, and Spain. They illustrate how Professional Noticing (PN) and the PROMISE Open Educational Resources (OERs) influenced entrepreneurial education and competence development at the local level. Key lessons learned, possible difficulties adapting the pedagogical approach and recommendations for the sustainable integration of PN into teaching frameworks are also discussed. Additionally, the national findings bring out some differences, as the national results varied and reflected the unique characteristics and contexts of each country.

Austria

In Austria, 52 students participated in PROMISE pilots using three Open Educational Resources across alumni workshops and the Creative Pre-Incubator (CPI) programme at the University for Continuing Education Krems. The pilots combined student surveys and teacher interviews to explore how Professional Noticing (PN) can enhance entrepreneurial learning and coaching in hybrid and work-based settings.

Student findings

Survey data showed that learners entered with strong competences in curiosity (score 4.4 out of 5) and creativity (score 4.3 out of 5), indicating solid foundations in opportunity recognition and ideation. After the training, students reported clear improvements in vision and goal setting (score 3.6 out of 5), sustainable thinking (score 4.1/5), and self-efficacy (score 4.3/5). These results suggest that PN helped learners translate ideas into actionable and ethically grounded strategies while building confidence and reflective awareness.

In one pilot, students used AI tools to identify business opportunities and learned to notice patterns and limitations in AI-generated ideas. This deepened their understanding of risk, opportunity, and decision-making. As one teacher explained, *"Learners became more attuned to using Generative AI in dynamic business environments, leading to more nuanced problem-solving and decision-making processes" (*interviewee A2). In the second pilot, PN encouraged reflection on team dynamics and feasibility, with one participant deciding to exit a venture after recognising signs of burnout, a strong example of entrepreneurial resilience.

Educator perspectives

Teacher interviews confirmed that PN improved coaching quality and learner engagement. It strengthened active listening, non-directive guidance, and personalised interventions, shifting the educator role from instructor to facilitator. As one coach noted, *"It helps students feel seen and understood, thereby increasing their self-confidence. It supports them in formulating their own learning needs. It allows for better alignment between coaching support and entrepreneurial development phases."* (interviewee A2)

PN also helped surface hidden team conflicts and fostered psychological safety, an essential foundation for creative collaboration and learning from failure. One interviewee observed that *"emotional neutrality and creating a psychologically safe space were essential"* (interviewee A1).

Educators linked these outcomes to several EntreComp competences, including opportunity recognition, creativity, risk management, and working with others. Self-awareness, resilience, and sustainable thinking emerged as transversal competences strengthened by PN practice. *"PN enabled deeper insight into team failure, which is essential for opportunity recognition and decision-making,"* as one coach summarised (interviewee A1).

Challenges and recommendations

Time limitations in the short alumni workshops restricted the depth of reflection and feedback. *"Conducting a PN-based workshop in 45 minutes instead of 75 was a challenge,"* one facilitator explained. *"Participants mentioned they would have benefited from additional time to reflect and refine their insights"* (interviewee A2). Some learners initially found the PN framework abstract and required concrete examples before applying it effectively. Teachers also noted that PN requires continuous practice and peer dialogue to become an intuitive part of learning and coaching.

Following recommendations were highlighted:

- Embed PN in teacher-training frameworks to support sustainable use.
- Integrate PN across longer learning sequences instead of single workshops.
- Use digital reflection tools and hybrid environments (e.g., apps, AR/VR, AI-based ideation tools) to make noticing visible in distributed learning contexts.
- Foster psychological safety and open dialogue to help learners interpret uncertainty as a learning opportunity.

Overall, the Austrian pilots confirm that Professional Noticing is an effective method for developing entrepreneurial thinking, reflective decision-making, and adaptive expertise. By combining AI, structured reflection, and personalised coaching, PN cultivates the metacognitive skills needed for continuous learning and innovation in dynamic work environments.

Finland

A total of 67 students took part in the pilot courses, with 47 completing the student survey. In Finland, Professional Noticing was integrated in business courses at the University of Turku. The pilot included four courses, each focusing on a different theme: accounting and tax planning, horizon scanning, scenario planning, and start-up creation. Participants included bachelor's, master's, and PhD students. Two of the four courses also included international students. Most of the students (62% of the Finnish respondents) were aged 20–24 and held a bachelor's degree as their highest level of education.

Competence development and key student outcomes

The students in Finland entered the pilot courses perceiving themselves as having slightly lower entrepreneurial competences and Professional Noticing skills compared to the average of all survey respondents. Only skills related to financial literacy and mobilising resources were higher before the pilot training compared to the average results of the international study. The responses from Finnish students after the training were largely consistent with the overall international survey results, with only minor differences observed. Finnish students reported greater improvement than the average in following entrepreneurial competences: coping with uncertainty, financial literacy, creativity, and ethical and sustainable thinking.

In their responses to open-ended questions, students highlighted the following competences as the most valuable in their future working lives:

- Teamwork and cooperation
- Taking initiative
- Ability to inspire and motivate others
- Adaptability and awareness
- Critical observation and decision-making
- Ability to identify opportunities and evaluate risks

However, in multiple-choice questions, students rated lower levels of improvement compared to the average in areas such as inspiring others and working effectively in teams, taking initiative, and learning through experience, despite recognising these as valuable competences for working life. This discrepancy may partly be attributed to the specific content and focus of the pilot courses in Finland.

Educator perspectives

All four interviewed teachers agreed that Professional Noticing (PN) had a positive impact on their teaching. It helped enhance the clarity, structure, and relevance of entrepreneurship education, particularly by integrating soft skills and real-world applicability. One educator noted, *"Soft skills used to be nice-to-have skills, but in today's working life they are must-have skills. This OER supports these skills,"* (Interviewee F4). Another educator described, *"PN builds bridge between academic learning and working life."* (interviewee F1).

PN was considered highly effective in developing entrepreneurial competences such as opportunity recognition, adaptability, ideation, and motivation. One educator explained, *"(PN) gives students tools to adapt to constant change"* (Interviewee F2). Another summarised, *"I think increased professional development and self-confidence, and better understanding of one's own skills, abilities and limitations are part of entrepreneurial competences,"* (interviewee F1).

Teachers provided several examples of how PN supports competence development by:

- Teamwork and cooperation
- Increasing students' confidence and their ability to apply theory in practice
- Helping students understand and adapt to megatrends and disruptions
- Equipping students with essential skills for working life
- Supporting the development of ideation, opportunity recognition, perseverance, and planning

Challenges and recommendations

Teachers were generally enthusiastic about continuing to use Professional Noticing and sharing it with colleagues, particularly in courses that emphasize real-world applications and the development of soft skills. However, some challenges were identified. A few students found it difficult to make observations and to obtain the necessary information in fields such as accounting or futures studies. Additionally, some first-year students struggled with the training due to a lack of general academic skills. As a result, Professional Noticing may be better suited for advanced students or for courses with practical components.

Ireland

In Ireland, five vocational education and training institutions piloted PROMISE Open Educational Resources (OERs) across equine studies, construction, catering and fashion. Thirty-six students completed the survey and five educators were interviewed. The pilots, coordinated by Momentum, focused on adapting Professional Noticing (PN) to applied, practice-based learning where observation, feedback and teamwork are central.

Learners noticed connections between observation and professional growth

Irish students entered with strong practical and collaborative competences but limited experience of formal reflective frameworks. Following PN activities, students reported moderate to significant improvements in creativity, planning and management and self-awareness. The explicit observe–identify–interpret–react cycle helped them slowdown in practical sessions, recognise patterns in teamwork and communication, and justify choices more deliberately.

Educator narratives and reflections

Teachers reported that PN moved their role from instructing to facilitating, providing a shared language for judgement and reflection, and helping surface hidden team dynamics for timely intervention. One educator noted, *"It gave us a structured way to talk about judgement, not just knowledge"* (interviewee I2). Another described PN as *"extremely useful – supported self-reflection, leadership and workplace improvement thinking"* (interviewee I3). Educators linked outcomes to EntreComp competences such as self-efficacy, working with others and learning through experience, and observed clearer transfer from classroom tasks to workplace behaviours.

Challenges and recommendations

Early-stage Vocational Education and Training (VET) learners needed scaffolding in the interpreting and reacting phases. Some sought single right answers and were uneasy with ambiguity. Short course blocks constrained the depth of debrief, and busy workshops made it difficult to capture reflections in the moment.

Recommendations from the Irish pilots include:

- Teamwork and cooperation
- Embedding PN within apprenticeship and further education programmes to build metacognitive and reflective skills
- Providing short, discipline-specific PN prompts and lightweight reflection sheets suited to time-pressured workshops
- Using PN to bridge practical training with entrepreneurship and employability modules so observation, interpretation and action planning are credited in assessment

The Irish pilots show that PN is well suited to skills-based learning. It helps learners and teachers recognise salient cues in real tasks, reflect efficiently under time pressure, and convert observation into purposeful action, strengthening self-awareness, reflection and team learning in Ireland's VET sector.

Spain

The pilot implementation of the PROMISE Professional Noticing Open Educational Resources (OERs) was carried out at Universidad Complutense de Madrid (UCM) and Universidad Autónoma de Madrid (UAM) in Spain. At UCM, 54 students participated, distributed across four groups: two groups comprising of 11 and 6 students from the Grade in Sociology, 31 students from the Double Degree in Early Childhood and Pedagogy and 6 students from Master's Degree in Psycho-pedagogy. The UAM intervention involved 26 students from the MBA Programme. This range of participants enabled the project to analyse how professional noticing could be introduced and adapted across different levels of higher education.

Insights from learners and educators

Across the groups, participants demonstrated improvement in the dimensions of perception, interpretation, and decision-making. The structured OER template facilitated guided observation, collaborative reflection, and evidence-based planning, which led to more responsive and inclusive teaching practices. Reflection sheets, peer feedback, and group discussions allowed participants to connect observation with ethical judgment and instructional design.

The main takeaways from the UCM pilot can be summarised as follows: Teamwork and cooperation

- Integration of theory and practice: The OERs provided a structured bridge between conceptual understanding and classroom application, particularly in reflective observation and inclusive teaching design.
- Development of professional identity: Participants reported a clearer sense of agency and responsibility, viewing noticing as central to their professional growth.
- Collaborative learning impact: Group reflection enhanced metacognitive awareness and strengthened teamwork skills, directly supporting EntreComp competences.
- Although teachers employed different forms of implementation, from structured and guided to collaborative in the Grade courses to project or problem based in the Master, the OERs adaptable format encouraged creative adaptation across disciplines, promoting ethical and sustainable thinking. OERs examples were not strictly followed and teachers felt free to adjust them as required. Reflection-based strategies (e.g., methodological critique, metacognitive questioning) facilitated deeper noticing of student thinking.
- Teachers who demonstrated openness and adaptability were more attuned to student learning; rigid approaches limited noticing. Indeed, more effective noticing occurred when instructors balanced structure and responsiveness. Openness to adapting instructions supported student engagement and creativity.
- Certain topics, like sustainability or AI, encouraged deeper and more meaningful student noticing. In these, noticing was manifested through scaffolding, emotional attunement, and questioning.
- Some participants required more guidance on timing, differentiation, and digital integration, indicating the need for ongoing professional support in the early stages of OER use.
- The competences observed required more explicit identification through formative feedback or integrated evaluation strategies, which were not implemented because of lack of time.

03

From Pilot to Practice

Sustaining and Scaling Professional Noticing

Opportunities for Scaling within National Systems

This section outlines country-specific findings on pathways for scaling Professional Noticing (PN) in Austria, Finland, Ireland and Spain. Educators from these countries provide concrete examples of the requirements for successfully integrating the Professional Noticing pedagogical approach in teaching and facilitating the transition from traditional knowledge-based teaching into transversal competence development in higher education. These national experiences highlight key considerations and opportunities for embedding Professional Noticing within national education systems, offering valuable insights for broader implementation in Europe.

Austria

The interview data underscore that the successful integration of Professional Noticing (PN) into entrepreneurship education is not only a matter of pedagogical design but also of institutional context. Teachers consistently noted that adoption was facilitated when PN aligned with existing course structures, active learning traditions, and supportive learning environments. In such cases, PN was perceived as a natural extension of experiential or problem-based learning.

However, several barriers were also identified. Academic freedom, while valued, meant that the spread of PN often depended on motivated pioneers rather than coordinated institutional strategy. Without broader endorsement or professional development, PN risks remaining a niche practice confined to enthusiastic individuals. Teachers highlighted the need for clearer guidance materials, training opportunities, and sustained support to embed PN systematically across curricula. Institutional constraints such as limited course time, assessment requirements, and competing priorities also restricted the depth of PN implementation. In some cases, workshop durations were too short to allow for full cycles of observation, interpretation, and reaction, while assessment systems were perceived as repetitive or ill-suited to capturing growth in subjective competences. Respondents suggested innovative approaches, such as reflective journals or think-aloud protocols, to better assess PN outcomes.

Finally, the interviews revealed that institutional culture plays a decisive role. Where environments encouraged experimentation and collaborative pedagogy, PN flourished. Where curricula were rigid or teacher preparedness was low, implementation was more difficult. For PN to achieve long-term impact, institutions must therefore provide structured professional development, integrate PN into teacher training programmes, and create spaces for iterative experimentation. This requires balancing academic autonomy with strategic support to ensure that Professional Noticing becomes embedded as a transversal competence across disciplines.

From the Austrian perspective, sustainability of PN integration depends on embedding it into teacher professional development and extending beyond one-off workshops. Both educators involved plan to use PN in future entrepreneurship courses and coaching formats, indicating potential for mainstreaming the approach in higher education incubators. The pilot also showed that PN supports transversal competences such as resilience, ethical reflection, and collaboration, which align with Austria's strategic goals in entrepreneurship education. Institutional support for longer learning sequences and hybrid/digital noticing tools will be critical for scaling PN in Austrian higher education.

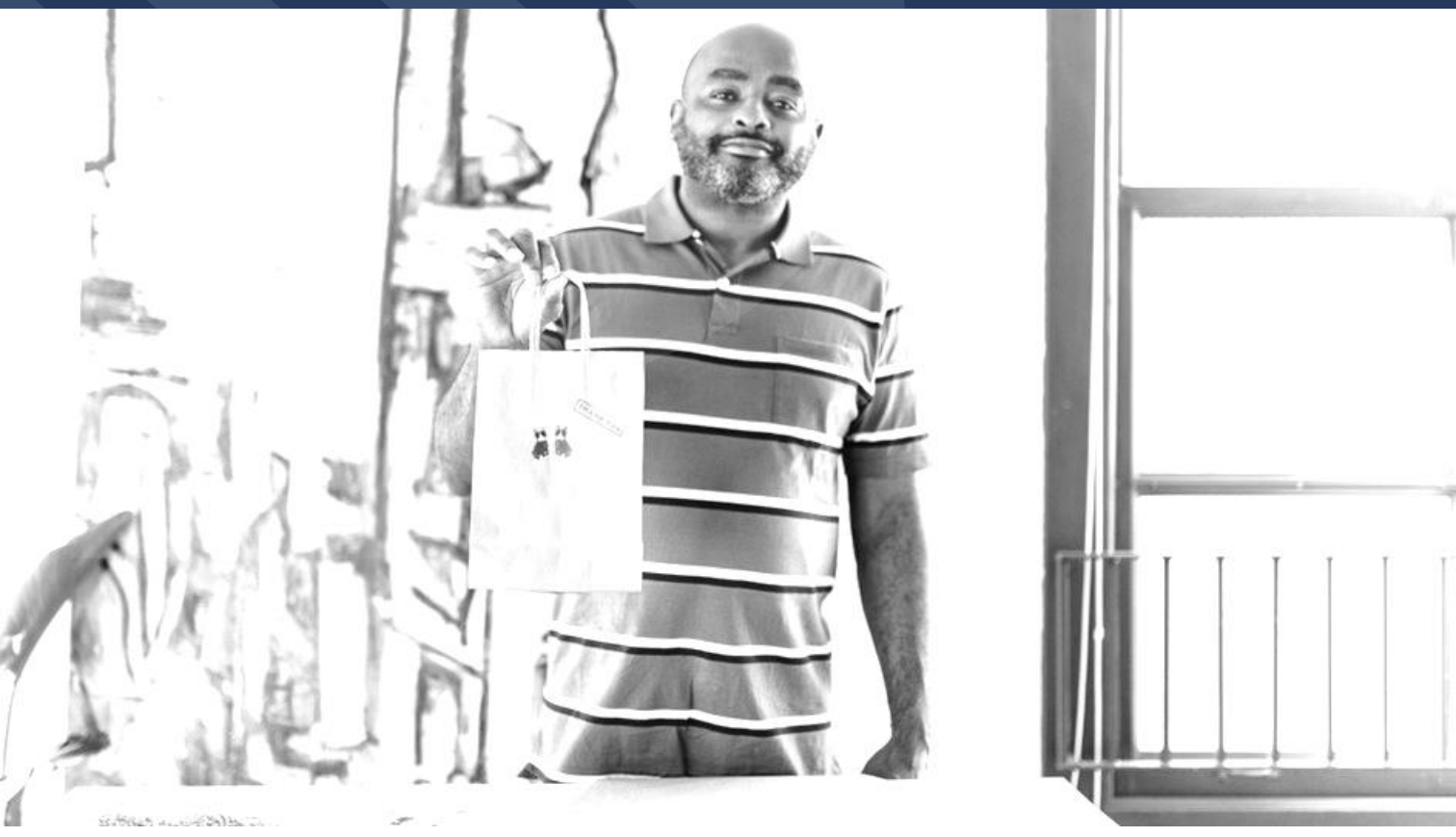
Finland

Teachers were generally enthusiastic about continuing to use PN and sharing it with colleagues, especially in courses that emphasize real-world application and the development of soft skills. However, it was noted that in Finland, academic freedom may pose a challenge, as it allows teachers to independently choose the pedagogical approaches they use.

Sustainable adoption of PN approach can be achieved through following three policies:

1. **Identify pioneers:** Scaling PN within national systems could be achieved through identifying a network of national level pioneering educators, enabling the approach to spread more widely across teaching communities.
2. **Recognise courses suitable for integrating PN approach:** Successful implementation requires identifying courses well-suited to PN pedagogy, particularly those with practical or experiential components that emphasise learning by doing and reflection.
3. **Acknowledge the momentum for curriculum development**: Understanding the curriculum development cycle is important. In Finland, curricula are typically revised every few years, usually every three years, making these periods the most strategic opportunities to introduce curriculum reforms while the time-window is open.

The sustainability of Professional Noticing (PN) in Finland can be enhanced by highlighting its positive impact on students' entrepreneurial competences, such as creativity, taking initiative, collaboration, and coping with uncertainty. Furthermore, dissemination efforts should emphasize PN's value in structuring learning, promoting learner-centred pedagogy, and effectively bridging the gap between theory and practice. These are essential for equipping learners to adapt to rapidly changing societal changes and labour market demands.



Ireland

From the Irish perspective, the sustainability of Professional Noticing (PN) depends on embedding it within vocational education and training where reflection, teamwork and employability skills are core. Educators noted that PN aligns closely with Ireland's national focus on work-based learning and the development of transversal competences in apprenticeships and further education. The pilots demonstrated that PN can be integrated into short practical courses as well as longer professional development programmes, offering a flexible tool for promoting metacognition, problem-solving and reflective practice.

Teachers involved in the Irish pilots expressed interest in continuing to use PN to structure reflection and assessment within Vocational Education and Training (VET) modules. They highlighted its potential for deepening learner engagement and supporting more consistent feedback practices. Sustained adoption will require professional development opportunities for educators, particularly around scaffolding the interpreting and reacting phases of PN, which were found to be the most challenging for novice learners.

Scaling PN nationally could be achieved by embedding it into existing quality and teaching frameworks such as the Further Education and Training Professional Development Strategy and enterprise-oriented initiatives supported by SOLAS. Developing short PN toolkits for vocational tutors, combined with peer exchange workshops, would strengthen understanding and confidence in applying the method across disciplines.

Momentum's coordination of the pilots' positions Ireland to act as a bridge between higher education and VET within future European collaborations. The Irish experience confirms that PN is transferable, adaptable and complementary to national priorities around lifelong learning, innovation and inclusion. Sustaining its impact will depend on institutional support, structured reflection time within courses and continued dissemination of evidence-based practices across Ireland's vocational education network.

Spain

From the Spanish perspective, the sustainability of Professional Noticing (PN) depends on consolidating its use within higher education and teacher training programmes, where reflective practice, creativity, and social responsibility are increasingly recognised as key transversal competences. The Spanish pilots, coordinated by Complutense University of Madrid, demonstrated that PN serves as a powerful framework for fostering entrepreneurial thinking across diverse disciplines, ranging from business and marketing to education and the arts. Teachers and students alike valued its capacity to connect observation and reflection with ethical and innovative action—qualities that align closely with the *EntreComp* dimensions of "Ideas and Opportunities" and "Into Action."

Teachers who participated in the pilot expressed strong motivation to continue using PN as both a pedagogical and metacognitive tool. They reported that the approach enhanced students' ability to recognise opportunities for improvement within their projects, to articulate reflective reasoning, and to collaborate more effectively. Several educators noted that PN supported a shift from content-based to competence-oriented learning, enabling students to develop autonomy, initiative, and resilience when facing uncertainty—attributes central to Spain's national strategy on entrepreneurship education (*Estrategia España Nación Emprendedora*) and to the broader objectives of the European Higher Education Area (EHEA).

Spain

Sustainable adoption of PN in Spain can be advanced through three interrelated pathways:

1. **Integration into Teacher Education and Professional Development**: PN aligns with Spain's growing emphasis on reflective teaching and innovation within initial teacher training and continuous professional development (CPD). Incorporating PN modules into postgraduate programmes in education, pedagogy, and educational innovation would foster a new generation of teachers capable of applying noticing-based reflection to classroom practice, inclusive design, and competence-based assessment. The model also complements Digital Competence Framework for Educators (DigCompEdu) https://joint-research-centre.ec.europa.eu/digcompedu_en offering a human-centred dimension to digital and entrepreneurial competences.
2. **Embedding within Entrepreneurship and Innovation Curricula**: Universities and business schools are increasingly adopting interdisciplinary, experiential models of entrepreneurship education. PN can be integrated into *learning by doing* courses, start-up incubators, and professional coaching formats, providing a reflective scaffold for students' project-based learning. By connecting opportunity recognition with ethical and sustainable thinking, PN reinforces Spain's commitment to the United Nationsthe 2030 Agenda for Sustainable Development https://sdgs.un.org/2030agenda and to the development of socially responsible entrepreneurship.
3. **Leveraging Open Educational Resources (OERs) for Institutional Scaling**: The PROMISE OERs, available in open-access format and adaptable to Spanish educational contexts, provide a sustainable mechanism for wider dissemination. Translating and embedding these OERs within institutional repositories, teacher training platforms, and entrepreneurship networks would facilitate peer learning and adaptation across universities and vocational centres. The open licensing (CC BY-SA 4.0) ensures continuity, encouraging educators to adapt, localise, and expand the resources beyond the project duration.

Interview findings revealed that Spanish teachers perceive PN not merely as a methodological innovation but as a mindset conducive to personal and institutional transformation. Several indicated plans to incorporate PN-inspired reflection cycles into their syllabi and assessment frameworks, linking them with collaborative peer review and self-assessment mechanisms. However, they also highlighted structural challenges to long-term sustainability, such as limited curricular flexibility, high teaching loads, and fragmented institutional support for pedagogical innovation. Addressing these barriers requires coordinated action at both departmental and policy levels, fostering spaces for experimentation, reflective teaching communities, and recognition of innovative practices in academic evaluation systems.

To further consolidate the project's legacy, **new actions are being planned to present PROMISE's results to the wider Spanish university system.** These dissemination initiatives will include targeted presentations at national education conferences, collaborative workshops with university innovation offices, and outreach to networks such as the Spanish Network of University Service-Learning (*Red Española de Aprendizaje-Servicio Universitario* (https://www.aprendizajeservicio.net/red-espanola-aps/) Such actions will extend the visibility of the Professional Noticing approach, encouraging its uptake across faculties and institutional innovation programmes. By engaging decision-makers, curriculum designers, and teaching excellence centres, these events aim to embed PN within Spain's broader pedagogical reform agenda and promote inter-university collaboration around reflective and entrepreneurial teaching.

In parallel, a **new digital innovation line** would ensure the ongoing accessibility and scalability of PN training. The team could develop a **Natural Language Processing (NLP)-based chatbot** that will serve as a digital tutor guiding teachers through the PN process. This intelligent assistant will offer personalised prompts, reflective questions, and feedback aligned with the four PN dimensions—observe, identify, interpret, and react. By simulating dialogic reflection, the chatbot will help teachers internalise the noticing cycle and apply it autonomously in classroom and curricular design. The system will also include interactive access to the PROMISE OERs, offering educators real-time pedagogical guidance, sample lesson plans, and inclusivity checklists. Such a tool represents a major step toward digital sustainability, as it transforms PN into an adaptable, technology-supported practice capable of reaching large numbers of educators within and beyond Spain.

Spain

Scaling PN nationally could be facilitated through partnerships with university innovation centres and networks as those mentioned above, which link higher education institutions with regional ecosystems of innovation and sustainable entrepreneurship. Furthermore, integrating PN into Erasmus+ mobility programmes, inter-university collaborations, and European teacher academies would amplify Spain's role as a bridge between reflective pedagogy and entrepreneurial competence development across Europe.

In sum, the Spanish pilot confirmed that Professional Noticing is highly transferable and culturally compatible with Spain's educational priorities. Its sustainability will depend on continued institutional endorsement, integration into teacher education frameworks, and the active dissemination of open resources. The planned national outreach and digital tutor initiative ensure that PN will continue evolving as a living, adaptive methodology. By reinforcing reflection, inclusivity, and ethical entrepreneurship, PN has the potential to become a cornerstone of Spain's future-oriented pedagogy—one that empowers learners and educators to observe, interpret, and act creatively within ever-changing social and professional environments.

European Level

The national findings and dissemination actions will play a pivotal role in extending the long-term European impact of PROMISE project's initiative to integrate Professional Noticing (PN) into entrepreneurship and intrapreneurship education for students in higher education institutions. By combining pedagogical innovation, for instance, with artificial intelligence, the new consortium with a scalable model for digital support, would enable educators across Europe to engage with Professional Noticing through adaptive, language-sensitive technologies. These developments could strengthen cross-border collaboration, enrich the project's open educational repository, and promote a pan-European culture of reflective and entrepreneurial teaching. In doing so, the PROMISE project's ongoing leadership in dissemination and technological design ensure that its legacy will endure as both a pedagogical and digital innovation, advancing the principles of open, inclusive, and sustainable education throughout Europe.

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04

Suggestions and Guidance from Educators

Professional Noticing (PN)

Implementation and integration into educational practices

This report highlights valuable insights and recommendations provided by educators regarding the implementation and integration of Professional Noticing (PN) into educational practices. Based on interviews and survey data collected during the empirical study, educators shared constructive feedback on the opportunities, challenges, and practical strategies for embedding PN into curricula aimed at developing entrepreneurial competences.

Drawing on their experiences, educators offered guidance on topics ranging from preparing students for PN activities to fostering inclusive and supportive environments that encourage meaningful engagement. The need for institutional support emerged as a recurring theme throughout these discussions, with educators emphasising the importance of adequate training resources, lesson plans, as well as practical strategies for overcoming barriers such as limited class time and varying levels of student readiness.

To ensure the sustainability of Professional Noticing as an integral part of educational practices, this report underscores the importance of embedding PN into institutional frameworks. To support this effort**, a practical checklist is provided** *(see page 30)* **to guide educators in implementing Open Educational Resources (OERs) and integrating PN into their teaching.** This checklist includes recommendations for integrating OERs into educational settings and diverse disciplinary contexts. It provides actionable strategies to support educational practitioners and institutional stakeholders in gaining a deeper understanding of how to adopt and adapt Professional Noticing, while ensuring that it aligns with course objectives, enhances student learning, and fosters skills development.

Checklist for Implementing Professional Noticing Open Educational Resources

Before the course

- ❑ **Clarify learning objectives**: Align the OER with specific EntreComp competences (e.g., opportunity recognition, creativity, teamwork).
- ❑ **Plan timing within curriculum:** Decide whether PN activities work best as an introduction, mid-course experiential learning, or end-of-course reflection.
- ❑ **Prepare facilitators:** Ensure teachers understand the PN cycle (observe–notice–interpret–react) and the pedagogical rationale. Provide short training or peer exchange if possible.
- ❑ **Adapt scenarios where needed:** Tailor examples to sector-specific or disciplinary contexts (e.g., construction, hospitality, pedagogy).

During implementation

- ❑ **Scaffold the PN cycle:** Guide learners progressively from observation to interpretation and reaction, rather than expecting mastery in one session.
- ❑ **Balance group and individual work:** Combine individual reflection with collaborative discussion to deepen noticing and interpretation.
- ❑ **Create a safe environment:** Set ground rules for respectful observation and feedback to reduce discomfort when observing peers.
- ❑ **Allow sufficient time:** Avoid compressing activities; if time is limited, focus on one phase in depth instead of rushing through all four.
- ❑ **Integrate digital tools** (optional): Consider AI, AR/VR, or collaborative platforms to enhance observation and reflection.

After the activity

- ❑ **Encourage reflection:** Use reflective journals, debriefing discussions, or peer feedback to consolidate learning.
- ❑ **Innovate assessment:** Explore methods such as think-aloud protocols, reflective essays, or case-based evaluation to capture subjective skill growth.
- ❑ **Collect feedback:** Ask learners for input on clarity, relevance, and perceived skill gains to refine future implementation.

Institutional considerations

- ❑ **Embed PN in curricula:** Integrate OERs into recurring programmes instead of one-off workshops.
- ❑ **Provide professional development:** Offer training for educators in PN pedagogy and assessment methods.
- ❑ **Foster a supportive culture:** Encourage experimentation and collaboration among teachers to share best practices.
- ❑ **Ensure strategic support:** Link PN adoption to institutional priorities (e.g., entrepreneurship, transversal competences, sustainability).

05

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*The PROMISE project has adhered to the principles of Open Science, ensuring transparency, accessibility, and reproducibility throughout its research and pedagogical processes. All outputs—including the Professional Noticing framework, Open Educational Resources (OERs), methodological guidelines, and national reports—have been developed and shared under open licenses (CC BY-SA 4.0), allowing free access, adaptation, and reuse by educators and researchers. The consortium has also promoted open peer exchange through public dissemination events, open-access publications, and digital repositories that comply with FAIR data principles (Findable, Accessible, Interoperable, and Reusable). By aligning with the European Commission's Open Science agenda, PROMISE contributes to a sustainable culture of knowledge sharing and collaborative innovation across educational and research communities.

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