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WP4.4 — Impact Analysis

Critical Thinking & Creativity - Sessions, Boosters, Obstacles, and Quantified Results

How have students' skills progressed
and what changes in teaching practices for teachers?

This document links the quantitative results of the grid-based assessment (distribution of students across the four proficiency levels) with the qualitative analysis of sessions, drivers (boosters), and obstacles (barriers) reported by the teams. Detailed graphs by group and context are included in the attached presentation (WP4_Etude_graphique.pptx).

1. Data and Method

The assessment focuses on two cross-cutting competencies: critical thinking and creativity.

Assessment grids were co-developed at the start of the partnership to ensure consistency in the evaluation and to enable collaborative collection of impact data. Over time, these grids proved to be tools not only for assessment but also for designing teaching activities. Thus, the data collected pertain to both the development of student competencies and changes in teaching practices.

1.1 Jointly Developed Rubrics

Transversal skills are expected at four levels of acquisition:

- critical thinking (IDENTIFY, APPLY, ACT, COACH levels)
- and creativity (levels PROVIDE, GENERATE, IMPROVE, INNOVATE)

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ESPRIT CRITIQUE – GRILLE FINALE

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		ESPRIT CRITIQUE EN CLASSE Ce que l'évalué fait face à une demande, en classe	ESPRIT CRITIQUE A L'ECOLE Ce que l'évalué fait dans le cadre de l'établissement scolaire	ESPRIT CRITIQUE HORS DE L'ECOLE Ce que l'évalué fait hors de l'école, dans la société
LEADERSHIP	**Niveau 4 – APPRENDRE AUX AUTRES**	- Aider les pairs en classe à utiliser une méthode scientifique - Les aider à intégrer des connaissances disciplinaires à la résolution d'un problème - Les aider à trouver des sources d'information, y compris l'utilisation de l'IA - Les aider à utiliser l'IA pour le mieux	En collaborant à un projet multidisciplinaire / une résolution de problème : - Être assertif - Montrer son leadership - Aider les autres à connecter des informations et connaissances multidisciplinaires - Coacher les autres sur la manière d'utiliser l'IA pour le mieux	Hors de l'école, coacher des pairs pour : - Discerner les influences et interprétations sociales - Choisir la connaissance sur les réseaux sociaux - Choisir les sources d'information et appliquer une méthode - Être indépendant d'esprit - Utiliser l'IA pour ce qu'elle apporte de mieux
DEPUIS…À	**Niveau 3 - AGIR**	- Estimer seul comment résoudre des problèmes - Choisir des sources d'information et des connaissances multidisciplinaires pour répondre - Faire des liens entre les matières pour résoudre un problème - Utiliser l'IA pour ce qu'elle apporte de mieux	En collaborant à un projet multidisciplinaire / une résolution de problème : - Utiliser des connaissances multidisciplinaires - Utiliser des sources d'information pertinentes - Utiliser l'IA pour ce qu'elle apporte de mieux	Hors de l'école, - Intégrer des connaissances scolaires et des sources d'information pertinentes - Avoir une pensée indépendante - Agir avec d'autres - Utiliser l'IA pour ce qu'elle apporte de mieux
CONNAISSANCE	**Niveau 2 - APPLIQUER**	- Utiliser les connaissances disciplinaires en réponse à une demande simple - Estimer les informations disciplinaires pertinentes nécessaires - Savoir que l'IA peut induire en erreur - Savoir que l'IA peut aider à mieux informer	- Relier les connaissances multidisciplinaires nécessaires en réponse à une demande/à un projet de l'établissement scolaire - Estimer, avec des pairs, les informations multidisciplinaires pertinentes nécessaires - Savoir que l'IA peut induire en erreur - Savoir que l'IA peut aider à mieux informer	Hors de l'école, - Intégrer des connaissances scolaires pertinentes en réponse à un problème de société - Savoir que l'IA peut induire en erreur - Savoir que l'IA peut aider à mieux informer
	Niveau1 - IDENTIFIER	- Faire la différence entre connaissance et interprétation - Poser les faits et limiter une question disciplinaire - Acquérir des connaissances disciplinaires	- Poser les faits et limiter la question multidisciplinaire de l'établissement scolaire - Identifier les influences entre pairs	- Identifier les phénomènes d'influences sur les réseaux sociaux - Être conscient des normes de groupes sociaux, valeurs et croyances sociales - Poser les faits et limiter le sujet
	NIVEAU 0 OU MOINS	AUCUNE CONNAISSANCE DU SUJET, PAS DE DIFFERENCE ENTRE CONNAISSANCE ET INTERPRETATION, PAS DE METHODE SCIENTIFIQUE		

INDIVIDUEL DISCIPLINAIRE CLASSE → DEPUIS…À… → COLLECTIF TRANSVERSAL SOCIAL

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CREATIVITE – GRILLE FINALE

		CREATIVITE EN CLASSE Ce que l'évalué fait face à une demande, en classe	CREATIVITE A L'ECOLE Ce que l'évalué fait dans le cadre de l'établissement scolaire	CREATIVITE HORS DE L'ECOLE Ce que l'évalué fait hors de l'école, dans la société
INNOVATION	**NIVEAU 4 - INNOVER**	Face à une tâche disciplinaire ou multidisciplinaire en classe : • Proposer des idées originales et non conventionnelles en réponse à une tâche ouverte en améliorant les besoins de la classe • Être audacieux, avoir du courage, être une source d'inspiration • Utiliser l'IA pour formuler et organiser des idées	Face à un projet/une tâche scolaire multidisciplinaire et collaboratif : • Exprimer des idées originales et non conventionnelles pour suggérer des améliorations ou des adaptations • Être courageux.se face à la communauté scolaire, être une source d'inspiration pour les autres • Avec les autres, utiliser l'IA pour formuler et organiser des idées	En dehors de l'école, • Exprimer des idées originales et non conventionnelles pour innover/résoudre des problèmes sociaux • Avoir de l'audace, être une source d'inspiration dans la société • Être indépendant d'esprit • Avec d'autres, en dehors de l'école, utiliser les IA pour formuler et organiser des idées
DEPUIS… À	**NIVEAU 3 - AMELIORER**	Face à une tâche disciplinaire en classe : • Évaluer les idées des autres • Être original • Être flexible • Utiliser l'IA pour formuler et organiser des idées • Générer des idées diverses et originales • Choisir des idées pour améliorer les choses	Face à un projet/une tâche scolaire multidisciplinaire et collaboratif : • Évaluer les idées des autres • Être original avec les autres • Être flexible avec les autres • Générer, en collaboration, des idées diverses et originales • Utiliser l'IA pour formuler et organiser des idées • Sélectionner, avec d'autres, des idées pour améliorer les choses • Établir des liens	En dehors de l'école, • Évaluer les idées sociales • Être indépendant d'esprit • Savoir relier les connaissances scolaires aux questions de société • Générer des idées non conventionnelles, des idées pour adapter et améliorer les choses • Utiliser l'IA pour formuler et organiser des idées
IDEES	**NIVEAU 2 – GENERER**	Face à une tâche disciplinaire en classe : • Utiliser l'imagination • Être curieux • Savoir comment l'IA est faite et ce qu'il faut demander à l'IA pour l'amélioration, l'originalité • Générer une réponse non conventionnelle mais efficace	• Face à un projet/tâche scolaire multidisciplinaire et collaborative • Utiliser l'imagination avec les autres • Être curieux avec les autres • Savoir comment l'IA est faite et ce qu'il faut demander à l'IA pour l'amélioration, l'originalité • Générer, avec les autres, une réponse non conventionnelle mais efficace	• Hors de l'école, • Utiliser l'imagination dans la vie • Être curieux dans la vie • Savoir comment l'IA est faite et ce qu'il faut demander à l'IA pour l'amélioration, l'originalité • Générer une réponse non conventionnelle mais efficace face à un problème hors de l'école / question sociale
	NIVEAU 1 – FOURNIR	• Fournir de multiples réponses, de multiples idées pertinentes face à une tâche disciplinaire en classe • Acquérir de l'inspiration sur des modèles d'innovation, des idées • Acquérir des connaissances et de la culture • Fournir de multiples réponses, de multiples idées pertinentes	• Fournir de multiples réponses, de multiples idées pertinentes dans le cadre d'un projet/d'une tâche multidisciplinaire • S'inspirer de modèles d'innovation, d'idées • Acquérir des connaissances et une culture	• Fournir de multiples réponses, de multiples idées pertinentes en dehors du projet ou de la tâche scolaire • S'inspirer de modèles d'innovation, d'idées • Acquérir des connaissances et une culture
	NIVEAU 0 ET MOINS	PAS D'IMAGNISATION, PAS DE CAPACITE A GENERER DES IDEES DIVERSES FACE A UNE QUESTION OUVERTE		

INDIVIDUEL DISCIPLINAIRE CLASSE → DEPUIS… À… → COLLECTIF TRANSVERSAL SOCIAL

1.2 Assessment Protocol

For each group of students, the percentage of students reaching each level is recorded at different times of the year (T1, T2, T3) and in three contexts: in the classroom, at school, and in society (outside of school).

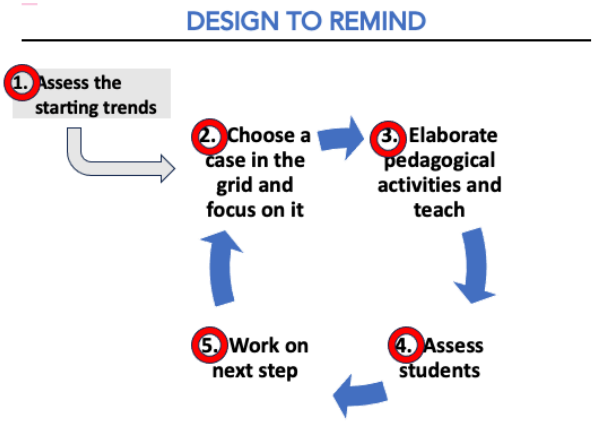
PLANNING

Before end of november	Between november and end of january	Before end of april
Assessment 1	**Assessment 2**	**Assessment 3**

Since the goal is to integrate critical thinking and creativity into teachers' regular curricula, a protocol for integrating the assessment grids into teaching practices was jointly developed.

Support and pedagogical development work in labs, the creation of pedagogical prototypes, and testing of the grids in years 1 and 2 preceded the evaluations in the third year.

Schematic protocol (see details of the protocol in the project documents)



1.3 Data Collection

Data was collected by partner teachers and compiled on a collaborative Padlet. It was then consolidated into an Excel file, which included both numerical results and teachers' comments (type of educational activity implemented, identified barriers and facilitators to student progress).

The distributions were reconstructed from the Excel file (the "CRITICAL THINKING" and "CREATIVITY" tabs). Each column (group × time × context) adds up to exactly 100%. In total, critical thinking comprises 29 measures distributed across T1 (7), T2 (10), and T3 (12); creativity, which was measured more recently, comprises 13. This difference in sample sizes calls for caution when interpreting the "creativity" trends.

To compare the levels with one another, we group IDENTIFY/PROVIDE and APPLY/GENERATE as "basic" levels, and ACT/IMPROVE and COACH/INNOVATE as "advanced" levels (mobilization, analysis, transfer, leadership).

2. Quantitative Results: A Real Increase in Competence

2.1 Critical thinking — a clear improvement over the course of the year

The most striking trend concerns critical thinking. The proportion of students at the higher levels (ACT + COACH) rose from 39% in Q1 to 46% in Q2 and then to 55% in Q3, representing a 16-point increase over the year. Conversely, the lowest level (IDENTIFY) dropped from 29% to 16%, and the ACT level—the ability to gather and evaluate information—jumped from 17% to 37%. **In other words, students are no longer content to simply identify: they analyze, reason, and take action.**

At the group level, this trend is evident almost everywhere. Albufeira's class perfectly illustrates this shift (ACT: 10% → 30% → 40%). At Bel Orme, the MCVA group is making significant progress within the school (ACT: 22% → 60% → 55%). The two cohorts at The Universal School (Aditya, Amreen) show, between T2 and T3, a strengthening of the ACT and COACH levels.

2.2 The effect of context: the more real the stakes, the higher the level

The assessment context has a strong influence. For critical thinking, the proportion of higher levels is 40% in the classroom, 48% in the school, and 72% in society. Creativity follows the same pattern (65% at higher levels in society). This result aligns with a key insight from the article: cross-curricular skills are expressed more fully when the task has real meaning and a real audience (community projects, civic initiatives, field trips).

2.3 Creativity — localized progress, based on a limited sample

Creativity clearly improves where it has been tracked over time: in the Albufeira classroom, the INNOVATE level rose from 20% to 30% and then to 40%. Overall, the sample size is still too small (and concentrated on a single partner) to conclude on an overall trend; the creativity assessment framework would benefit from being expanded in the following year.

3. Analysis of the sessions

The sessions documented reveal a project-based pedagogy, rooted in the Sustainable Development Goals (SDGs) and highly collaborative.

Bel Orme (France)

The activities integrate French, mathematics, English, and vocational education, sometimes through co-teaching: using editorial cartoons on the SDGs, students construct a reasoned argument (observations, challenges, consequences, solutions), first in writing and then orally, with the use of AI (TAAGA group). The MCVA group creates an awareness-raising poster on the life cycle of a cell phone, evaluated by peers and then by a teacher not involved in the project, and followed by a role-playing activity at the Maison de la Nature (stakeholders in the production chain, inequalities, environmental consequences). The STMG group produces a video depicting a professional scenario (scriptwriting, justification of choices before filming) and leads a project

involving actions selected by the “snowball” technic . A collective artwork concludes the year, focusing on the impacts of overconsumption.

Albufeira (Portugal)

The sessions emphasize expression and engagement: commentary on cartoons about the SDGs, creative writing workshop with increasing constraints (3 → 6 → 12 → 24 words, followed by value-driven rewriting), participation in library projects, the “Olimpíadas do Ser,” the “Banco Alimentar,” volunteer work (animal shelter), and the Urban Sketchers project. Creativity and critical thinking are particularly evident outside the classroom.

The Universal School, Ghatkopar (India)

Assessment is based on a lecture-debate (Dr. Jyoti Khambatta), multidisciplinary problem-solving tasks, mind maps, and a strong social commitment—the “Warmth of Winter” visit to the Assisi retirement home—where leadership, empathy, and cooperation are observed.

4. The Boosters: What Made the Difference

Four levers recur across the board and are reflected in the figures.

Cooperation and group selection

Working in pairs or trios, with free choice of partners, creates a “sense of security” and facilitates the flow of ideas. At Bel Orme, two students proved capable of coaching and managing their group—precisely the COACH level we aimed for. The involvement of external participants (Les Débatteurs, Cool’eurs du Monde, an artist, a speaker) offers a perspective different from that of the teacher and makes it easier for students to speak up.

Peer assessment and rubric-based evaluation

Cross-evaluation (one pair evaluates another), often anonymous to limit bias, and the systematic use of rubrics allowed students to understand the value of checking against expectations based on criteria. The opportunity to revise their work before the oral presentation sparked a process of improvement (at Bel Orme, ~40% of students reworked their posters). This is precisely the catalyst that shifts the focus away from the IDENTIFY level toward ACT.

Project-based learning and guided freedom

Performance goals, hands-on activities, role-playing, and the choice of roles and context: the framework is established, but there is genuine freedom. The rules for respectful communication, reviewed at the start of the session, and the teacher’s non-judgmental approach encourage the expression of ideas, including those that “go beyond the boundaries.”

AI as a partner in reflection

Integrated into the learning objectives and questioning, AI was demystified and used as a lever for skill development rather than as a cheating tool—a point discussed further below.

5. Obstacles: What Posed Challenges

Mastering AI and verifying sources

The most frequently cited obstacle is the uncontrolled use of AI: verbatim copying, inability to verify and organize information, and difficulty using AI "as a guide only." Many students themselves admit to not having verified the reliability of sources. This is the main point of friction between the APPLY level and the ACT level.

The cumbersomeness and subjectivity of assessment

Several teams report that assessment activities take too long (two 50-minute sessions, with attention waning), that observation-based assessment is difficult to manage (five groups for two teachers), and that self-assessment does not always align with observations. Peer assessment remains difficult for a majority of students, as personal feelings sometimes override the criteria.

The gaze of others and self-image

A major obstacle is one's self-image within the group: the fear of how others perceive them hinders participation, and any new situation triggers feelings of discomfort—even after the initial exercises have been completed.

Accessibility of the grids

For CAP students with special needs, the worksheet proved to be "too difficult to understand." The complexity of the tool can therefore hinder the most vulnerable students if it is not adapted. The noise level during group work and some peer judgments may also have held certain students back.

6. A catalyst for change for teachers

The introduction of criteria-based rubrics acted as a "catalyst for change." Several years of project work and a process of co-developing tools, coaching, working on prototypes, and testing were necessary. **However, none of this would have been possible without the willingness of teachers and their students to engage in an active process of change.** The results now measured prove them right and demonstrate a "return on investment."

A design challenge, now validated by the results

Translating abstract concepts (critical thinking, creativity) into observable indicators was demanding—and the accessibility of the rubric for vulnerable populations remains a real obstacle. But the time invested upfront is reflected in the quality of learning: the 16-point increase in critical thinking at higher levels objectively demonstrates the "gain in pedagogical clarity" described in the article.

Stepping out of the comfort zone: project-based learning

The article links classroom dynamics to project-based learning and group work. The boosters confirm this (group selection, external speakers, supervised freedom), as does the emergence of student "coaches"—the concrete manifestation of the COACH level in the grids.

AI, from Level 2 to Level 4

Students who had plateaued at Level 2 were able to reach Level 4 thanks to guided use of AI. This point requires some nuance. AI remains both the most frequently cited obstacle (copying, lack of verification) and a powerful lever when guided by explicit criteria. It is precisely at the APPLY → ACT juncture that this shift occurs, visible in the rise in the ACT level (17% → 37%).

Mathematics: Letting Go of Control to Gain Autonomy

A math teacher's account illustrates the shift toward self-assessment and peer assessment. The identified obstacle (self-image within the group) sheds light on the winning strategy: leading by example, progressing from the simplest to the most complex, and fostering an open, non-judgmental discussion to help students "step back" and gain perspective.

Creativity: Looking Beyond the Classroom Walls

The article notes that creativity is more easily expressed outside of school. The figures confirm this strikingly: 72% higher levels of critical thinking and 65% higher levels of creativity in a societal context, compared to 40% in the classroom for critical thinking. Involving students in revising the rubrics (co-designing the criteria) appears to be a way to transfer this success into the school setting.

7. Conclusion and Recommendations

The results show that the rubrics have "boosted" classroom performance. By shifting the teacher's role from knowledge holder to skills facilitator and placing the student at the center of their own assessment, the project has streamlined learning—as evidenced by the measured rise in higher proficiency levels, particularly in critical thinking and in real-world contexts.

Three avenues could be explored for the coming years:

- Simplify and adapt the rubrics for vulnerable groups (streamlined versions, accessible language), so that the tool does not become a hindrance.
- Strengthen "AI literacy": explicit criteria for verifying sources and using AI "as a guide," to ensure a smooth transition from APPLY to ACT.
- Expand the monitoring of creativity (more groups, T1→T3) and transfer the successes observed outside the classroom to the classroom, particularly through the co-design of criteria with students