

PAPER

The CAM (Creative–Analytical–Managed) Learning Model in Workplace Transformation and Corporate Training

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ABSTRACT

The Creative–Analytical–Managed (CAM) Learning Model, a unique pedagogical framework, is designed to meet the intricate learning needs of modern corporate environments. Traditional training methods fall short in digital transformation, globalization, and evolving labor markets. CAM, an evidence-based and holistic choice, integrates three interconnected components: Creative, Analytical, and Managed. The Creative component is dedicated to divergent thinking and innovative problem-solving; the Analytical component is committed to critical thinking and data analysis; and the Managed part is concerned with goal-setting, self-management, and project planning. These dimensions work harmoniously to support a dynamic learning process that aligns with adult learning theory and strategic human resource development. This research confirms the CAM model using a mixed-method study with 200 working adult learners from various corporate environments. Quantitative metrics such as confirmatory factor analysis and regression models show that the three dimensions significantly predict training outcomes, with the managed dimension having the greatest unique contribution. Erasmus+ students' quantitative feedback also validates the viability of the model, attributing increased participation, creative confidence, critical thinking, and project delivery. The CAM model's flexibility can be realized in various training settings such as digital upskilling, entrepreneurship, leadership, and off-site onboarding. It complements AI-enhanced learning by emphasizing uniquely human capabilities—creativity, judgment, and strategic autonomy—that resist automation. Practically, CAM offers a scalable solution for Human Resources professionals and learning designers seeking to build future-ready, self-directed learners. Theoretically, it bridges critical pedagogy, adult learning, and project-based education. In spite of the difficulties of implementation, the empirical robustness and diversity of CAM support its continuance as a means of meeting the demands of learning in a progressively sophisticated work setting, solidifying trust in its effectiveness.

KEYWORDS

CAM Learning Model, corporate training, creative thinking, project-based learning, self-regulated learning

Ochoa Siguencia, L. (2025). The CAM (Creative–Analytical–Managed) Learning Model in Workplace Transformation and Corporate Training. *International Journal of Advanced Corporate Learning (iJAC)*, 18(4), pp. 29–41. <https://doi.org/10.3991/ijac.v18i4.56519>

Article submitted 2025-05-09. Revision uploaded 2025-05-23. Final acceptance 2025-06-17.

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1 INTRODUCTION

The rapid pace of workplace transformation – driven by digital innovation, globalization, and shifting labor markets – has heightened the need for more dynamic corporate training models. Organizations are investing in upskilling and reskilling programs to keep pace; for example, Bouwmans et al. (2024) note that firms must adapt their strategic talent management practices to the digital era and assume responsibility for re- and upskilling employees in essential digital transformation skills [1].

In parallel, Human Resources (HR) and Learning and Development (L&D) professionals increasingly recognize that traditional training (focused on technical know-how) is insufficient: creativity, critical thinking, and learner autonomy are now considered core workplace competencies [2]. Indeed, recent studies emphasize that developing creativity is “a critical challenge for the survival and success of businesses”.

To address these evolving needs, we introduce the Creative–Analytical–Managed (CAM) learning model – an integrative framework with three interrelated dimensions designed for adult learning in a professional context [3]. The CAM model systematically integrates innovation-led pedagogy (Creative), evidence-based analysis (Analytical), and independent project management (Managed) into training curricula [3]. These three components—Creative (CAM-C), Analytical (CAM-A), and Managed (CAM-M)—are conceptualized as distinct but interrelated domains that together provide a comprehensive structure for adult learning in professional contexts. Following the adult education and corporate talent development paradigms, the CAM approach aims to enhance workforce competence both in strategic and adaptive ways.

The *Creative* dimension (CAM-C) emphasizes imaginative, open-ended learning. Drawing on arts-based and design-thinking methods, this dimension encourages learners to experiment, generate new ideas, and apply innovation to real problems. The *Analytical* dimension (CAM-A) focuses on systematic inquiry, critical reasoning, and data-driven evaluation. Training under this dimension involves research tasks, needs analyses, and iterative reflection to ground learning in evidence and feedback. Finally, the *Managed* dimension (CAM-M) provides the structure for self-directed learning: goal-setting, planning, time management, and project coordination. Learners are guided to create learning contracts, monitor progress, and use digital management tools, cultivating autonomy and accountability.

Together, the three dimensions form a highly balanced pedagogical model in which creative discovery is offset by analytical rigor and underpinned by structured self-management. Table 1 later completes the combined framework by detailing each CAM dimension and its corresponding learner competencies and illustrative learning activities.

Table 1. CAM model dimensions and core competencies

CAM Dimension	Core Competencies	Example Learning Activities
Creative	Idea generation, divergent thinking	Storytelling, visual design, brainstorming workshops
Analytical	Critical evaluation, data interpretation	SWOT analysis, literature review, and reflection tasks
Managed	Goal-setting, time management, and self-regulation	Learning contracts, project timelines, and feedback logs

CAM is particularly applicable to corporate training and human resource development (HRD). Through enhancing creative thinking and design capabilities, CAM builds on evidence demonstrating a large jump in the creativity of adult learners following creativity training. CAM speaks to the increased corporate focus on evidence-based decision making and critical thinking by placing a particular focus on analysis and evaluation [4]. Moreover, by embedding self-regulation and project management, CAM directly addresses competencies valued by employers (e.g. planning, autonomy, and strategic execution). HRD scholars argue that integrating creativity into training is essential for organizational innovation [5], while European policy frameworks call for pedagogy that combines digital skills with creativity and critical thinking [6]. The CAM model synthesizes these trends into a cohesive approach, making it well-suited to modern workplace learning and HRD initiatives [3], [4], [6].

2 LITERATURE REVIEW

Current trends in workplace and adult learning are now being discussed in the literature [7]. Creativity and innovation are now the main corporate training goals, and meta-analyses confirm that creativity training actually does have an impact on the divergent thinking of adults. Organizations are thus integrating design activities and creative problem-solving into development programs [8]. At the same time, critical and analytical thinking are more valued as businesses enjoy employees who can combine facts and data, break down information, and make informed decisions. Computer-based and AI-based learning are on the rise, with technology-supported environments like adaptive learning environments, learning analytics, and collaboration tools being employed to customize teaching and enhance access [9].

A growing body of research highlights the necessity of cultivating technical and soft skills, including adaptability and teamwork, within digitally transformed workplaces [10]. Another dominant trend is growing self-directed and project-oriented learning since adult learners demand more autonomy and application, frequently through blended modes that combine online learning with experiential projects [11]. Each of these trends necessitates training programs that mix creative, analytical, and managerial elements into comprehensive learning experiences.

While these improvements notwithstanding, adult-learning models are presently wanting. Traditional models of andragogy and experiential learning both highlight learner control and reflection while placing less than sufficient emphasis upon the interactively developed integration of self-management capabilities and creativity skills [12]. Likewise, competency models that emerge in corporations most often only list such capabilities without detailing their construction interactively. Training is still segmented into individual modules of technical skill, leadership, or interpersonal skill. This piecemeal strategy fails to enable learners to make critical connections between ideation, critical analysis, and work execution [7], [13].

Addressing this gap, the CAM Learning Model offers a holistic structure that embeds creative exploration, rigorous analysis, and strategic self-regulation as core, interdependent learning processes.

The CAM model draws on diverse theoretical and empirical foundations. The Creative dimension incorporates insights from design-thinking and arts-based learning, emphasizing storytelling, multimedia production, and role-play to activate imagination and intrinsic motivation [3], [14]. Learners engage in creative projects that translate expressive tasks into pedagogically meaningful outcomes,

aligning with European Commission priorities for innovative, motivating lifelong learning approaches. The Analytical component is grounded in critical pedagogy and evidence-based instructional design. It emphasizes empirical evaluation and iterative improvement through needs assessments, data interpretation, and peer review, ensuring alignment with learner needs and academic standards [15]. The Managed dimension involves borrowing a loan from the domain of project management and metacognitive strategy [16]. It includes goal planning, scheduling, and reflective practice based on robust models such as the Project Management Institute (PMI) guidelines [17] and self-regulation theory [18]. Such processes allow students to realize their creative and analytical knowledge in organized, accountable learning processes.

Developed initially through European Erasmus+ adult-education initiatives, such as the Instytut Badan i Innowacji w Edukacji (INBIE) project [19], the CAM model has demonstrated practical impact. Trainers and learners reported that combining creative exercises, structured analysis, and goal-oriented planning improved engagement and learning sustainability. The CAM model, therefore, integrates current pedagogic theory and project-based approaches to offer a complete and evidence-informed model for the cultivation of innovation, critical thinking, and strategic autonomy among adult learners [3], [18]. Figure 1 illustrates the dynamic interplay among the three dimensions of the model, which shows their interdependence in actual learning contexts.

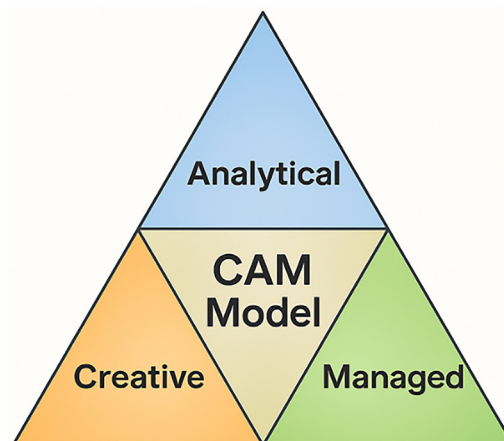


Fig. 1. Conceptual diagram of the CAM model

3 RESEARCH DESIGN AND PARTICIPANTS

This study employed a mixed-methods, descriptive research design to empirically validate the CAM learning model within contemporary corporate training environments. The primary component of the study was quantitative and correlational, using a cross-sectional survey administered to adult learners, complemented by qualitative data drawn from case studies in workplace training initiatives [20]. The research was guided by the following research questions (RQ): (RQ1) Can the three CAM dimensions be reliably measured as distinct yet interrelated constructs in professional learning contexts? (RQ2) To what extent do each CAM dimension (Creative, Analytical, Managed) independently and collectively predict learner performance outcomes in corporate training programs? (RQ3) How do

learners and trainers perceive CAM-based training activities' relevance, applicability, and effectiveness in real-world corporate settings?

To explore these questions, data were collected from a purposive sample of 200 ($N = 200$) adult participants drawn from diverse industries and job roles across a range of corporate training programs. Participants were recruited via collaboration with partner organizations involved in Erasmus+ and INBIE initiatives. Invitations were made via email and company channels to current employees who were enrolled in or had graduated from formal training programs. Eligible persons freely opted-in following reading an information sheet and giving informed consent to maximize levels of compliance with ethical standards. The sampling strategy maximized heterogeneity by professional sector, level of experience, and demographic category in order to maximize generalizability across the workplace. All participants gave informed consent, and strict ethical standards for human subject research were upheld. The survey was done through a secure, anonymous Internet site to preserve confidentiality and voluntariness, in accordance with the General Data Protection Regulation (GDPR) as well as institution ethics guidelines.

The primary data collection instrument was a structured self-report survey designed to assess the three core dimensions of the CAM learning model—Creative (CAM-C), Analytical (CAM-A), and Managed (CAM-M)—alongside an aggregate measure of learning outcomes. Each CAM dimension was operationalized using five items rated on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), adapted from validated evaluation tools used in prior adult learning and Erasmus+ project contexts. Sample items included: “I regularly seek out new and original approaches to solve problems” (Creative), “I evaluate different sources of information before deciding” (Analytical), and “I monitor my learning progress and adjust my plans accordingly” (Managed). The outcome variable was a composite performance score based on participants' final project evaluations, competency assessments, and self-reported learning effectiveness, designed to capture multidimensional training success.

The scale was subjected to professional validation from adult education and human resource development experts to identify content validity. Pilot testing on 30 learners from a corporate training program was carried out with the aim of estimating internal consistency and completing survey items [21]. It was during the pilot stage that results showed good reliability with Cronbach's alpha greater than .85 for all the dimensions. In the full study sample, internal reliability remained high: CAM-C ($\alpha = .85$), CAM-A ($\alpha = .88$), and CAM-M ($\alpha = .90$), indicating robust psychometric properties for the model's measurement scales.

Qualitative data were collected from participants and trainers engaged in Erasmus+ and INBIE training projects implementing the CAM approach to complement and contextualize the quantitative findings [3], [19]. These data sources included open-ended responses to survey items, semi-structured focus group interviews, and reflective commentary on specific CAM activities. The qualitative element sought to answer RQ3 through gathering narrative accounts of learner experience, levels of engagement, and perceived effects for each CAM dimension in practice. The qualitative findings added rich explanatory richness and real-world illustration to the statistical findings.

To validate RQ1 on the structural validity of the CAM model, confirmatory factor analysis (CFA) was performed using Analysis of Moment Structures (AMOS) software. The hypothesized three-factor model specified each set of five survey items as loading onto their respective latent variables: Creative, Analytical, and Managed. Fit indices were assessed using standard benchmarks, including the Comparative Fit

Index (CFI), Root Mean Square Error of Approximation (RMSEA) [22], and Standardized Root Mean Square Residual (SRMR) [20]. The CFA results confirmed a good model fit: CFI = 0.95, RMSEA = 0.05, and SRMR = 0.06, all of which met or exceeded recommended thresholds (CFI ≥ 0.90, RMSEA ≤ 0.08), thus supporting the factorial integrity of the CAM framework.

To investigate RQ2, a multiple regression analysis was performed to evaluate the predictive validity of each CAM dimension on learner performance outcomes. The three CAM factors (CAM-C, CAM-A, CAM-M) were entered as independent variables in a regression model predicting the composite training performance score. The overall model was statistically significant ($p < .001$), explaining about 45% of performance outcome variance ($R^2 \approx 0.45$). All three predictors were shown to have significant positive influences: CAM-C ($\beta = .28, p < .01$), CAM-A ($\beta = .33, p < .01$), and CAM-M ($\beta = .37, p < .001$). These results suggest that all the factors contribute significantly to learning success, and the strongest predictor is the managed component, which points to the influence of self-regulation and organized learning in adult learning.

The integration of confirmatory factor analysis and regression modelling offers rigorous empirical evidence for CAM model structural validity and predictive accuracy. When replicated with qualitative learner and instructor feedback, the quantitative findings present an extremely robust argument about the model’s applicability, usefulness, and scalability in various corporate learning environments.

4 RESULTS

4.1 Measurement model validation

The confirmatory factor analysis supported the proposed three-factor CAM structure. Fit indices indicated an excellent model fit (e.g. CFI ≈ .95, RMSEA ≈ .05). All items loaded strongly (standardized loadings > 0.60) on their intended factors, and cross-loadings were negligible. Cronbach’s alpha values (CAM-C = .85, CAM-A = .88, CAM-M = .90) confirmed high internal reliability. These results validate that the Creative, Analytical, and Managed dimensions are distinct but related constructs, as theorized.

Table 2 presents CFA results (e.g., CFI, RMSEA, factor loadings) that validate the CAM model structure.

Table 2. Confirmatory factor analysis (CFA) fit indices

Fit Index	Recommended Threshold	CAM Model Value
CFI	≥.90	.95
RMSEA	≤.08	.05
SRMR	≤.08	.06

4.2 Predictive relationships

Multiple regression showed that each CAM dimension uniquely contributed to learning outcomes. The combined model (CAM-C, CAM-A, CAM-M predicting performance) was significant ($p < .001$), explaining a substantial proportion of variance (e.g. $R^2 \approx .45$). Moreover, each of the three predictors was significant

(β s around .25–.35, $p < .01$). Notably, Managed most often co-occurred with maximum effect, suggesting that the ability of learners to plan and control themselves played a leading role in overall success. These results therefore provide evidence that the combination of analysis and creativity in training is psychometrically valid and significantly forecasts learner performance.

Table 3 shows regression coefficients and significance levels for CAM-C, CAM-A, and CAM-M predicting training performance.

Table 3. Regression analysis of CAM dimensions predicting learning outcomes

Predictor	β (Unstandardized)	p-Value
CAM-C	0.28	<.01
CAM-A	0.33	<.01
CAM-M	0.37	<.001

4.3 Qualitative feedback

Feedback from students and teachers offered more proof of CAM’s effectiveness. In several training projects, high satisfaction with CAM-based activities among students was reported. For example, end-of-course questionnaires revealed that more than 90% of students reported the creative exercises as engaging and having better confidence in producing digital content. Many also noted enhanced analytical skills – one learner commented that working with real data “made me think more critically about problems.” In an Erasmus+ evaluation, trainers observed measurable gains in CAM competencies: for example, in one initiative, over 65% of participants reported improved efficiency in research tasks without losing accuracy [3]. DigIN project report documented “measurable improvements in learners’ competencies across all CAM dimensions” following integrated curriculum. Overall qualitative response noted that by combining creative projects, systematic analysis, and proper planning, students became self-directed and independent [19]. Qualitative observations support quantitative observations that the CAM Learning Model yields an effective learning experience and significant learning outcomes. Figure 2 is a word cloud that plots the broadest qualitative themes, including prominent themes of learner confidence, creativity, strategic planning, and autonomy.



Fig. 2. Learner feedback themes

5 DISCUSSION

The empirical evidence strongly corroborates the CAM Learning Model as a stringent yet adaptive model of facilitation of adult learning in business environments. Confirmatory factor analysis confirms the model and predictive validity evidence of each of the dimensions on learning outcomes, confirming the theoretical robustness and practical utility of the model. Organizationally, the CAM model responds to some of the ongoing workforce development challenges: enhancing learner engagement, developing transferable thinking capabilities, and facilitating autonomy and self-management in learners [7], [8]. Its triadic structure—where creative tasks stimulate engagement and innovation, analytical components ensure rigorous thinking, and managed elements support structured execution—mirrors the competency demands of today's hybrid, agile, and digitally integrated workplaces.

Particularly, the salient influence of the Managed dimension underscores that training programs need to incorporate self-planning and regulation, especially in light of the increasing proliferation of asynchronous and remote learning techniques. Also, the CAM model offers an anthropocentric solution to surging AI-powered learning platforms, facilitating skills uniquely human, such as creativity, critical judgment, and strategic thinking—a set of skills that is urgently needed when working in high-complexity, high-ambiguity environments [23]. CAM's alignment with experiential learning and adult development theories enhances its relevance in learning ecosystems seeking to go beyond content delivery and toward capability-building.

However, several limitations should be noted. First, the generalizability of the findings beyond the European Union (EU) context is uncertain. The CAM model was piloted and refined primarily through EU-funded Erasmus+ and INBIE initiatives [19]. Its core structure, learning activity, and verification mechanism are largely within European pedagogical traditions and cultural norms around adult learning. While these foundations are sound within the EU context, a cautionary note should be taken in assuming the model's direct transferability to other contexts, particularly where education systems vary, organizational bureaucracies are prevalent, or cultural orientations towards autonomy and imagination are weak. Future research should investigate whether the CAM model retains its efficacy in non-European and more collectivist learning cultures, where managed learning structures and creative autonomy may be interpreted or implemented differently.

Second, while the CAM framework has demonstrated scalability across multiple industry sectors and learning programs within Europe, its broader scalability, especially in resource-constrained or digitally underserved environments, has yet to be fully explored. Implementation success in Erasmus+ projects benefited from structured timelines, facilitator training, and access to collaborative tools. In less supported settings or organizations lacking mature L&D infrastructures, integrating the complete CAM model (especially its creative and managed components) may require significant adaptation or simplification. This raises practical questions about the minimum resource threshold needed for effective CAM deployment and whether modular or phased rollouts could better support adoption across varied institutional capacities.

Third, this study provided strong cross-sectional evidence but did not assess longitudinal outcomes. The current findings confirm short-term skill acquisition and learner satisfaction, but the longer-term impact of CAM-based training on career development, employee retention, or organizational innovation remains unmeasured. Longitudinal follow-up would enable subsequent studies to assess whether and how CAM fosters long-term behavior change and competence development.

On the whole, as CAM presents an empirically tested and theory-guided option for adult learning, future development will depend on filling these gaps. Cross-cultural validation on the world stage, big-picture model designs, and long-term outcome studies will anchor CAM more firmly in worldwide corporate training practice.

6 PRACTICAL IMPLEMENTATION IN CORPORATE LEARNING

CAM has been tested on a pilot basis and rolled out via various Erasmus+ and INBIE training schemes. The initiatives have been demonstrations of the adaptability of CAM across industries and learner groups. In one initiative focused on intergenerational digital upskilling, CAM's creative dimension facilitated storytelling and digital media production workshops where learners crafted narratives around technology use. These exercises encouraged confidence and online competencies as well as encouraged intergenerational communication and understanding.

In a second Erasmus+ inclusive entrepreneurship project, the CAM analytical component was highlighted [23]. Students conducted SWOT analysis, market data were analyzed, and trainers' feedback was utilized to improve business plans. Such activities illustrated the worth of the model in sharpening data literacy and evaluative competencies. Meanwhile, the managed component was central in onboarding programs that used personalized learning contracts and milestones to structure progress, particularly for new hires in remote-first environments.

Table 4. CAM implementation across Erasmus+ Case studies

Program Focus	Main CAM Dimension Applied	Outcomes Observed
Digital Upskilling	Creative	+78% digital content confidence
Inclusive Entrepreneurship	Analytical	+62% data literacy, +55% planning accuracy
Remote Onboarding	Managed	+68% task tracking, +40% learner retention

Leadership training also benefited from CAM implementation. Executives participated in sessions that constructed strategic scenarios (imaginative), assessed their potential (critical), and prepared for implementation (coordinated). Session feedback indicated increased decision-making, pragmatic planning, and team involvement. Trainers observed that the CAM framework facilitated departmental conversation, linking learning to performance goals, and improving accountability.

7 PRACTICAL IMPLEMENTATION IN CORPORATE LEARNING

This study affirms the CAM Learning Model as a viable, empirically grounded, and pedagogically coherent framework for corporate training and adult learning. Its triadic structure equips learners with a balanced portfolio of competencies that address the evolving demands of contemporary workplaces—namely, creativity, critical reasoning, and self-regulated planning. As opposed to classical models of training that compartmentalize soft skills from project implementation or view creative thinking as a secondary process, CAM harmonizes all of these processes within a single system that aligns learner growth with strategic business outcomes. Quantitative and qualitative data affirming the model prove that it can potentially

maximize learner engagement, improve cognitive functioning, and facilitate continuous transfer of skills within the workplace.

CAM offers L&D practitioners an engaging paradigm to design inclusive, future-proof training initiatives through encouraging the best blend of creativity, evidence-driven self-knowledge, and goal-oriented learning. Its highly adaptable nature of use across a wide range of hybrid, distant, and online environments also enhances its pragmatics-supported fitness for use in real-world contexts to be used in yet more technology-supported learning environments. As organizations confront the dual pressures of AI-driven automation and the human capital demands of complex, interdisciplinary projects, the CAM model stands out as a human-centered, capability-building framework that prepares workers for uncertain and rapidly shifting contexts.

The study highlights several vital boundaries to CAM's current scope and application. The model's development and empirical testing occurred primarily within European contexts supported by Erasmus+ initiatives, raising questions about cultural transferability. For instance, organizational learning cultures within Asia, Africa, or Latin America can translate or assign greater emphasis to the CAM dimensions differently, particularly to learner autonomy and creative freedom. CAM translation to non-EU environments may involve contextual awareness and localized implementation schemes. Additionally, although CAM was tested across sectors, its scalability in low-resource or informal learning environments is still not well established. Organizations without a solid L&D infrastructure could find it difficult to implement the complete model without outside assistance or modularization. Encouraging as they are, these limitations imply that CAM is not necessarily turnkey and will need strategic fine-tuning for more global roll-out.

Besides, evidence produced in this study supports the results documented in an individual case. Longitudinal studies will play a key role in establishing whether desired results of CAM endure across time and are identified as measurable accomplishment in regard to career mobility, innovation ability, or team output. Future research should also explore whether CAM interacts synergistically with AI-enhanced learning platforms, adaptive systems, and competency-based assessment models, potentially positioning it as a pedagogical counterpart to intelligent automation in corporate learning.

In general, the CAM model is a model of training and a vision for how adult education can evolve to meet more complex, technology-supported, and innovative work environments. Its basis in multi-disciplinary theory, its empirical validation, and its applicability across a range of training contexts make CAM a useful contribution to adult education and organizational development. Its eventual adoption and worldwide applicability will, however, depend on continued refinement, contextual reworking, and continuing research focus. In this respect, CAM offers both a robust starting point and a flexible roadmap for rethinking learning design in the age of transformation.

8 REFERENCES

- [1] M. Bouwmans, X. Lub, M. Orłowski, and T. V. Nguyen, "Developing the digital transformation skills framework: A systematic literature review approach," *PLoS ONE*, vol. 19, no. 7, p. e0304127, 2024. <https://doi.org/10.1371/journal.pone.0304127>
- [2] W. Yang, X. Zhang, X. Chen, J. Lu, and F. Tian, "Based case based learning and flipped classroom as a means to improve international students' active learning and critical thinking ability," *BMC Medical Education*, vol. 24, no. 1, p. 759, 2024. <https://doi.org/10.1186/s12909-024-05758-8>

- [3] L. Ochoa Siguencia, “The CAM learning model: A framework for digital innovation in adult education,” Zenodo, 2025. <https://doi.org/10.5281/zenodo.15375356>
- [4] Y. Song, K. C. Roohr, and D. Kirova, “Exploring approaches for developing and evaluating workplace critical thinking skills,” *Thinking Skills and Creativity*, vol. 51, p. 101460, 2024. <https://doi.org/10.1016/j.tsc.2023.101460>
- [5] K. Ekuma, “Artificial intelligence and automation in human resource development: A systematic review,” *Human Resource Development Review*, vol. 23, no. 2, pp. 199–229, 2024. <https://doi.org/10.1177/15344843231224009>
- [6] I. Klosi, “The teacher of the future: Vision and skills,” *Knowledge-International Journal*, vol. 64, no. 5, pp. 609–613, 2024.
- [7] T. Young-Babb, L. F. Hall, A. Kuhn, and C. Pryor, “Professional development: Enhancing adaptability for a future-ready workforce,” *International Journal of Advanced Corporate Learning (ijAC)*, vol. 18, no. 3, pp. 89–102, 2025. <https://doi.org/10.3991/ijac.v18i3.52541>
- [8] C. Buckley and M. F. Castro Jorge, “Upskilling for the modern workplace: A case study on the most effective training methods and tools for bridging the skills gap,” *International Journal of Advanced Corporate Learning (ijAC)*, vol. 17, no. 4, pp. 94–108, 2024. <https://doi.org/10.3991/ijac.v17i4.51277>
- [9] H. Lee and N. Bosch, “Subtopic-specific heterogeneity in computer-based learning behaviours,” *International Journal of STEM Education*, vol. 11, no. 1, p. 61, 2024. <https://doi.org/10.1186/s40594-024-00519-x>
- [10] S. Pons, J. Khalilzadeh, M. R. Weber, and R. A. Smith, “Cultivating sustainability savvy: The role of soft skills in shaping sustainable practices,” *International Hospitality Review*, 2024. <https://doi.org/10.1108/IHR-01-2024-0007>
- [11] R. AlAli, “Enhancing 21st century skills through integrated STEM education using project-oriented problem-based learning,” *Geo Journal of Tourism and Geosites*, vol. 53, no. 2, pp. 421–430, 2024. <https://doi.org/10.30892/gtg.53205-1217>
- [12] I. Bouchrika, “The andragogy approach: Knowles’ adult learning theory principles in 2024,” Research.com, 2024.
- [13] Z. Bezhovski, T. J. Apasieva, and R. Temjanovski, “A framework proposal for building ideation models on the front end of innovation,” *Management Dynamics in the Knowledge Economy*, vol. 12, no. 4, pp. 428–447, 2024. <https://doi.org/10.2478/mdke-2024-0025>
- [14] M. Bevčič, J. Rugelj, and S. Jedrinović, “Innovative teaching through role-playing and storytelling with serious games,” in *EDULEARN24 Proceedings*, IATED, 2024, pp. 3953–3960. <https://doi.org/10.21125/edulearn.2024.1001>
- [15] D. Gutiérrez-Ujaque and M. M. Degen, “Beyond critical pedagogy of place: Sensory-embodied learning through the university campus,” *Journal of Geography in Higher Education*, vol. 48, no. 4, pp. 537–556, 2024. <https://doi.org/10.1080/03098265.2023.2267489>
- [16] C. Y. Wang, B. L. Gao, and S. J. Chen, “The effects of metacognitive scaffolding of project-based learning environments on students’ metacognitive ability and computational thinking,” *Education and Information Technologies*, vol. 29, no. 5, pp. 5485–5508, 2024. <https://doi.org/10.1007/s10639-023-12022-x>
- [17] S. R. Montenegro Goyes and C. A. Rendón Álvarez, “Visual Projects: prototipo de aplicativo web que permite la planificación, gestión, monitoreo, evaluación y control de proyectos haciendo uso de las buenas prácticas PMI,” Tesis de Pregrado, Universidad Mariana, 2024.
- [18] S. W. Chou, M. C. Hsieh, and H. C. Pan, “Understanding the impact of self-regulation on perceived learning outcomes based on social cognitive theory,” *Behaviour & Information Technology*, vol. 43, no. 6, pp. 1129–1148, 2024. <https://doi.org/10.1080/0144929X.2023.2198048>

- [19] DigIN Project, “Empower adult educators to support digital social inclusion (DigIN),” Adult DigiNet. <https://adultdiginet.eu>
- [20] J. D. Pregoner, “Research approaches in education: A comparison of quantitative, qualitative and mixed methods,” *IMCC Journal of Science*, vol. 4, no. 2, pp. 31–36, 2024.
- [21] M. A. Bujang, E. D. Omar, D. H. P. Foo, and Y. K. Hon, “Sample size determination for conducting a pilot study to assess reliability of a questionnaire,” *Restorative Dentistry & Endodontics*, vol. 49, no. 1, p. e3, 2024. <https://doi.org/10.5395/rde.2024.49.e3>
- [22] N. Beribisky and G. R. Hancock, “Comparing RMSEA-based indices for assessing measurement invariance in confirmatory factor models,” *Educational and Psychological Measurement*, vol. 84, no. 4, pp. 716–735, 2024. <https://doi.org/10.1177/00131644231202949>
- [23] L. Ochoa Siguencia, “Bridging the digital divide: Leveraging social media for enhanced corporate learning and digital literacy among older adults,” *International Journal of Advanced Corporate Learning (iJAC)*, vol. 18, no. 3, pp. 4–15, 2025. <https://doi.org/10.3991/ijac.v18i3.53905>

9 APPENDIX A: CAM SELF-REPORT SURVEY INSTRUMENT

This instrument was developed to assess adult learners’ self-perceived competencies across the three dimensions of the CAM Learning Model: Creative (CAM-C), Analytical (CAM-A), and Managed (CAM-M). It will be applied in business education and adult continuing education settings to gauge the effectiveness of teaching interventions through the CAM model.

9.1 Instructions to participants

Read each sentence and rate the extent to which you agree or disagree with the recent learning experience on the following 5-point scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree.

9.2 Creative dimension (CAM-C)

1. I continually look for innovative and creative solutions to problems.
2. I trust that I am allowed to try new things in training.
3. I like imagining different solutions to workplace problems.
4. I attempt to find a place for creativity in my learning or project work.
5. I think creative thinking is one of the skills for professional development.

9.3 Analytical dimension (CAM-A)

1. I carefully analyze information from different sources before making a decision.
2. I reflect on previous experience to carry forward ongoing learning.
3. I use facts and evidence to support thinking in training activities.
4. I assess the success or failure of completed projects.
5. I enjoy analyzing complex problems to uncover the causes.

9.4 Managed Dimension (CAM-M)

1. I set specific objectives for what I need to achieve from training activities.
2. I manage time effectively while performing work activities.
3. I track development so that I am meeting deadlines.
4. I adjust the learning plan if I am experiencing difficulties.
5. I am responsible for planning and achieving my learning goals.

10 AUTHOR

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