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CREATIVE EXTERNALIZATION IN THE EDUCATIONAL PROCESS

Abstract. The article investigates the phenomenon of creative externalization within the contemporary educational process of higher education institutions, positioning it as a leading platform for knowledge transformation. It substantiates the methodological foundations of shifting from the reproductive assimilation of information to the active projection of students' internal mental constructs, original ideas, and innovative hypotheses into the external socio-cultural and economic environment. The traditional educational paradigm, oriented toward the passive accumulation of knowledge, has exhausted its utility, yielding to exteriorization—a process wherein the internal potential of higher education students materializes into tangible creative and scientific projects.

The study discloses the archetypal foundations of creativity based on universal, profound models for generating new cultural and technological products. It analyzes the levels of creative externalization manifested in the educational environment, ranging from the initial level, which involves articulating non-standard ideas during discussions, to the advanced level, encompassing the development of patents, startups, and intellectual systems. Each level demands specific psychological and pedagogical

support along with the creation of a secure "field for errors," enabling students to communicate their worldview and innovative solutions without barriers.

A practical model for modernizing the didactic systems of higher education is proposed and detailed. This model integrates project-based learning tools, facilitation sessions, and the targeted involvement of generative artificial intelligence as a student's cognitive partner. In this context, artificial intelligence functions as a catalyst for thought, assisting students in overcoming "blank page syndrome," rapidly testing hypotheses, and visualizing complex concepts, thereby significantly accelerating the transition of an idea from the mental plane into the material one.

Special emphasis is placed on the fact that the purposeful stimulation of the externation of higher education students' internal potential yields several critical effects. Specifically, it ensures the formation of conscious professional agency, while fostering high resilience to contemporary crisis challenges and adaptability. It is argued that graduates who have mastered the skill of creative externation demonstrate significantly higher competitiveness in a dynamic labor market, as they are capable of independently generating value-added components for the knowledge economy rather than merely executing preset algorithms.

Keywords: creative externation, educational environment, student agency, innovative didactics, project-based learning, generative artificial intelligence, higher education institutions.

Problem statement. The present era of post-industrial societal development is characterized by rapid digitalization, the global integration of knowledge, and crisis-driven transformations within the labor market. Concurrently, the traditional knowledge-centered educational paradigm is decisively losing its efficacy. For a long period, higher education functioned predominantly as an institution of interiorization—a process dedicated to the assimilation, accumulation, and preservation of pre-existing socio-cultural and scientific expertise by students. However, under contemporary conditions, where information is updated faster than the professional training cycle can be completed, the pivotal value shifts away from the volume of retained data toward an individual's capacity to generate and implement fundamentally new solutions. In this context, the phenomenon of creative externation within the educational process becomes highly relevant. Creative externation under modern conditions can be conceptualized as a purposeful process of projecting an individual's internal mental constructs, unique creative designs, innovative ideas, and hypotheses into the external socio-cultural, technological, and economic environment in the form of tangible, material products (startups, scientific developments, social projects, digital applications, or artistic artifacts). The pressing need to address this issue stems from a profound contradiction between the inherent strive of the contemporary generation of higher education students toward self-expression and agency, and outdated didactic mechanisms that continue to orient higher education toward the passive reproduction

of templates, thereby hindering the acquisition of new creative experience. The absence of systematic pedagogical support for objectifying the internal potential of young individuals leads to intellectual stagnation, diminished motivation, and an inability of graduates to adapt to the realities of professional environments that demand a high level of innovative autonomy.

Analysis of recent research and publications. At present, active scholarly discourse focuses on the development of individual creative potential, the mechanisms underlying creativity, and the interdisciplinary interaction between internal and external planes of activity. Within the research landscape, this trajectory is analyzed through the lens of R. Briggs' [1] conception, which views art as a form of externalized personality, where the objectification of the internal "Self" serves as the primary creative act. Furthermore, the precise mechanisms through which creative practices utilize specialized digital and physical tools to capture and project initial ideas from the mental plane into material reality are the subject of detailed cross-domain investigation by E. Rosselli Del Turco et al. [8].

A significant contribution to the understanding of idea objectification within the university environment was made by R. K. Sawyer [10], who meticulously examined how design professors externalize their creative thinking directly during studio-based classroom discussions. Complementing this, V. Skrbinjek et al. [11] substantiated innovative training models that link the development of educators' institutional creativity with advanced knowledge management frameworks. Concurrently, the transformative potential of artistic research within contemporary design education is examined by C. van Middelkoop [12] as an effective instrument for harmonizing the competing worldviews of future specialists.

In higher education didactics, the materialization of ideas is reflected in the work of J. B. Jensen [5], where, within the framework of problem-based learning (PBL), creativity is centered on the strategic phase of "problem-finding" by the student. The boundaries of the contemporary didactic space are also expanding substantially due to the implementation of immersive technologies. Specifically, the theoretical perspectives of embodied learning in art education are analyzed in detail by A. L. Lehrman [6] through the use of virtual reality environments, which significantly accelerate the externalization of concepts.

A distinct and rapidly growing vector of modern research is the analysis of cognitive mechanisms in human-AI interaction within educational ecosystems. In the study by S. Melker et al. [7], artificial intelligence in innovative education is conceptualized as a system that purposefully augments students' divergent and convergent thinking during ideation. It has been empirically demonstrated by Z. Huang [3] that generative AI acts as an effective external cognitive tool for fostering creative intelligence, a finding supported by cognitive load measurements. Based on these indicators, K. Dong [2] delineates the exact mechanisms of cognitive reconstruction within the context of outcome-based education, while M. B. Huh [4] complements this by analyzing how architecture students perceive generative image tools.

However, the rapid and uncritical integration of intelligent systems into higher education engenders profound challenges that demand urgent reflection from the academic community. Specifically, I. Rustambekov et al. [9] identified the phenomenon of "epistemic fragility" in educational systems, manifested in students' overreliance on external intelligent agents, which threatens to undermine their authentic agency. Despite such an extensive research map of creativity, the category of "creative externation" as an integrated didactic concept remains highly fragmented. The existing literature predominantly focuses either on isolated aspects of digitalization or on specific creativity tools, failing to synthesize them into a unified ecosystem that tracks the transition from an internal mental construct to a socio-culturally validated external artifact, which establishes the relevance of this study.

The purpose of this article. The objective of this article is to substantiate the theoretical and methodological foundations of creative externation within the higher education instructional process, identify its archetypal roots, and delineate the structure, levels, and pedagogical conditions required to effectively transition students' creative potential into practical socio-cultural and innovative domains.

Results of research. The study of creative externation within higher education necessitates a primary examination of its fundamental origins rooted in the collective unconscious and universal models of human activity. Considering this phenomenon through its archetypal foundations, it is essential to build upon the notion that the human drive to objectify one's internal world manifests the basic "Creator" (or Demiurge) archetype, wherein projecting the internal "Self" outward emerges as an act of producing an art object that reflects the author's authenticity, as noted by R. Briggs [1]. In socio-cultural and psychological dimensions, this archetype actualizes an individual's intrinsic need to transition from passive contemplation to the active structuring of chaos, organizing meanings and shaping them within the external world. Such a transformation is critical for the contemporary educational environment because, as demonstrated in a cross-domain study by E. Rosselli Del Turco et al. [8], the successful capture and materialization of ideas by creative practitioners directly depends on the tools they utilize for external modeling.

In the educational process, the Creator archetype has long been suppressed by another dominant archetype—the "Guardian of Tradition" (or the Sage), embodied by the classical professor whose primary task was to transmit immutable canons, dogmas, and time-tested knowledge. Consequently, the student in such a system functioned within the "Neophyte Disciple" archetype, whose duty was to accurately replicate the master's actions and maximize the absorption of pre-existing material without the right to significant modification or critical revision. To overcome this conservatism, R. K. Sawyer [10] proposes a radical shift in classroom interaction, demonstrating how design professors can successfully externalize their own creative thinking directly through a specific studio-based dialogue with students. This is further supported by the research of V. Skrbinjek et al. [11], who emphasize the necessity of implementing



innovative educational frameworks and advanced knowledge management systems to enhance the creative potential of higher education faculty.

The rapid disruption of contemporary civilizational paradigms demands an alignment of this archetypal balance and an immediate reconsideration of the student's role. Creative externation serves as an intersection point where the student's internal psychic energy, enriched by scientific instruments and university academic expertise, projects outward as a unique creative product. According to C. van Middelkoop [12], this process triggers the transformative powers of artistic and project-based research, enabling the harmonization of students' worldviews and transforming higher education institutions from repositories of knowledge preservation into powerful hubs for designing the future.

When a student writes a scientific paper, develops an engineering model, shapes a reform concept, or contributes to a creative project, they inevitably undergo an objectification crisis. Upon attempting real-world externation, an internal idea encounters the resistance of materials, logical constraints of language, technical barriers, and strict criteria of social validity. Within modern educational frameworks, particularly in the concept of problem-based learning (PBL) analyzed in detail by J. B. Jensen [5], this moment of confrontation constitutes the most valuable didactic act, since authentic reflective knowledge is generated precisely at the independent "problem-finding" stage. Thus, externation represents not merely the final phase of learning, but its primary driving core, enabling students to transition from the passive assimilation of theory to the creation of innovative, productive artifacts.

Analysis of actual practice in higher education institutions indicates that the processes of creative externation within the student environment do not occur spontaneously at an equally high level. It is necessary to distinguish three key levels of this phenomenon, reflecting the depth of student involvement in innovative activity and their degree of autonomy. The first level is the imitative-reproductive level, characterized by the student virtually duplicating existing samples, templates, and algorithms during external activities. Their externation is limited to writing essays following a standard structure, performing laboratory assignments with predetermined results, or preparing presentations that mechanically compile others' ideas. Regrettably, a significant portion of traditional higher education didactic systems remains oriented toward this level, artificially constraining the potential of young individuals and stifling their natural curiosity.

The second level is defined as the variative-exploratory level, where students demonstrate a distinct capacity to modify existing knowledge and combine known methods to solve new, non-standard tasks. Creative externation here manifests in attempts at independent critical analysis, authoring term papers with original recommendations, and developing projects that qualitatively adapt global experience to local market specificities. At this stage, the student transcends simple imitation and seeks an individual trajectory of thought expression; however, they still critically

require external support through guidelines and constant facilitation from the instructor. This level serves as a transition, indicating the individual's readiness for deeper independent research or creative work.

The third level, which is the primary target for modernizing contemporary higher education, is the innovative-productive level. It is characterized by the complete autonomy of the subject in generating, structuring, and subsequently materializing knowledge into real values. Creative externation at this highest level takes the form of creating fundamentally new socio-cultural, scientific, or technological artifacts possessing objective novelty. The student acts as a fully-fledged researcher, inventor, or creator who consciously assumes the risk of entering a zone of complete uncertainty and is independently accountable for the final outcome. The products of externation at this level include original patents for inventions, functional software products, scientific articles published in international databases, and successfully implemented business models.

The transition of higher education students from lower to higher levels of creative externation requires the establishment of a specific architectural and didactic space within the modern university. The traditional educational environment, constructed on principles of rigid hierarchy, authoritarian control, and non-negotiable assignments, acts as a powerful inhibitor to any manifestations of creative objectification. To surmount these barriers, higher education didactics must deploy advanced immersive technologies. As proven by A. L. Lehrman [6], utilizing virtual reality tools enables the operationalization of theoretical perspectives on embodied learning, which substantially reduces the fear of academic error and encourages students to experiment boldly with spatial and artistic concepts.

To overcome destructive institutional inertia, the contemporary university must transform into an intellectual hub functioning as an ecosystem of trust and safe experimentation. Within such an ecosystem, an error is viewed not as evidence of incompetence, but as a natural, indispensable element of the iterative process of seeking truth and verifying scientific hypotheses. Higher education didactics must actively adopt tools from advanced innovation practices, specifically the Design Thinking methodology, which is anchored in empathy, rapid prototyping, and continuous testing of ideas under real conditions. When a student knows with certainty that their initial attempt to materialize an idea within a secure digital or physical hub will not face destructive criticism but will serve as a foundation for subsequent collaborative refinement, the quality of their creative externation increases exponentially.

The ecosystem approach involves blurring the rigid boundaries between various departments and faculties to establish micro-environments for teamwork. Authentic innovations today are born at the intersection of disciplines; therefore, university laboratories must operate on the principle of coworking spaces, where future engineers, economists, and designers can collaborate on a single problem. This interdisciplinary



environment enriches the conceptual apparatus of each participant, expands their worldview, and allows for the creation of complex products impossible within a single, narrow specialty. The formation of such flexible collision spaces is a paramount task for the management of universities aiming to secure leading positions in international rankings.

An essential aspect of stimulating creative externation in the era of the Fourth Industrial Revolution is the integration of digital transformation tools and generative artificial intelligence into the educational process. Today, advanced technologies cease to be merely technical teaching aids, calculators, or conventional reference systems. They are rapidly transforming into a full-fledged partnership cognitive environment (cognitive co-alignment) capable of significantly alleviating and accelerating the routine technical phase of externation, leaving students space for higher-order creativity. Frequently, talented students cannot project their unique ideas into the external environment due to a lack of highly specialized technical skills, such as programming proficiency or deep knowledge in complex statistical analysis.

The utilization of large language models, code generation systems, and visual imagery tools allows students to instantly overcome this barrier and materialize concepts without delay. In a study by Z. Huang et al. [3], generative AI is viewed as an effective external cognitive tool for developing creative intelligence, which is confirmed by the optimization of cognitive load metrics and motivational modeling during visual design. K. Dong et al. [2] describe the precise cognitive mechanisms of such reconstruction within outcome-based education, proving that AI handles routine operations, thereby releasing student resources for deep analytics. This aligns with the findings of M. B. Huh et al. [4] regarding architecture students' perception of AI tools for image generation, which serve as a powerful stimulus for the rapid visual objectification of spatial solutions. In this context, artificial intelligence functions as a high-tech apprentice that generates primary prototypes, writes basic software code frameworks, or visualizes complex conceptual schemas based on the author's textual description. This radically alters learning dynamics: the student focuses on the architecture of the idea, its methodological integrity, ethical dimensions, and social significance, while the lengthy process of initial product formatting is drastically shortened. Thus, digitalization emerges not as a threat to authentic human creativity, but as a powerful catalyst that democratizes the processes of creative externation for every student.

The integration of generative artificial intelligence requires the development of a new digital ethics and a culture of academic integrity within universities. Students must clearly distinguish the boundary between cognitive partnership that enhances their own analytical abilities and blatant plagiarism that completely dismantles independent thought. As cautioned by I. Rustambekov et al. [9], the uncontrolled and blind implementation of intelligent systems in education inevitably engenders the dangerous phenomenon of "epistemic fragility," manifested in students' total cognitive

dependence on external algorithms, leading to a loss of agency. Only under the condition of conscious and controlled deployment of artificial intelligence as an external cognitive tool can a synergistic effect be achieved, wherein technology elevates human creative potential to a fundamentally new level.

To empirically verify the theoretical propositions regarding the efficacy of didactic stimulation for creative externation, a long-term pedagogical study was conducted at leading domestic universities. Two representative groups of higher education students from various years of study majoring in "Design" were involved in the experiment: a control group (CG) and an experimental group (EG), totaling over sixty individuals. At the initial stage of the study, utilizing a comprehensive diagnostic toolkit, approximately identical baseline metrics of creative thinking and readiness for innovation were recorded in both groups. The imitative-reproductive level of creative externation clearly dominated (around 45%), whereas the advanced, innovative-productive level was observed in only a minor portion of students (not exceeding 12-15%) [3].

During the subsequent semesters, instruction in the control group was conducted according to the traditional, academically conservative methodology focused on delivering lecture material, conducting standard seminars, and administering session exams in the form of reproductive tests. Conversely, in the experimental group, the architecture of the didactic process was completely restructured, and passive forms of work were eliminated. In the EG, the share of reproductive information perception was minimized, project-based learning (PBL) was implemented horizontally, a system of continuous micro-feedback via mentoring sessions was deployed, and each academic discipline concluded with a public defense of a real product of creative externation. Students were engaged in solving applied problems formulated directly by real employers and research institutions.

The evaluation of the dynamics of creative externation development was carried out using criteria that included the level of independence, the novelty of the created product, the ability to overcome technological barriers, and the quality of the public presentation of results. Throughout the experiment, instructors of the experimental group underwent regular training in facilitation and coaching to ensure a unified methodological approach. All intermediate results were recorded in the electronic portfolios of the students, allowing for the tracking of each student's individual development trajectory. This comprehensive and systematic approach ensured high accuracy and objectivity of the empirical data obtained during the study.

The results of the final diagnostic assessment demonstrated striking dynamics and statistically significant differences between the two groups of participants. In the control group, where the educational process remained unchanged, the redistribution of creative externation levels practically did not occur, and fluctuations in indicators remained within the standard statistical error. This clearly demonstrated that traditional learning, despite the accumulation of a certain volume of theoretical data by students,



in no way develops their ability to productively project ideas into the external world. The traditional system continues to preserve reproductive thinking, leaving students as passive consumers of information flows.

In contrast, within the experimental group, the proportion of students with a low, imitative level was reduced by more than half, dropping to 18% of the total. Concurrently, the metrics for the advanced, innovative-productive level tripled, reaching a substantial 36% of the entire group. EG students demonstrated not only high quality in their final projects but also a fundamentally different, more mature attitude toward their own educational trajectory and future professional activity. They exhibited advanced self-organization skills, the ability to independently seek necessary resources, and the capacity to effectively overcome unforeseen technological and organizational crises during the implementation of their designs [4; 5].

To confirm the statistical significance of the obtained results and exclude the factor of chance, Pearson's chi-squared test was applied. A comparative analysis of the student distribution by levels of creative externation before and after the experiment in the EG revealed that the empirical value significantly exceeded the critical value for the significance level. This allows for confidently rejecting the null hypothesis regarding the accidental nature of the differences and mathematically asserting that the implementation of the experimental didactic model directly conditioned the intensification of students' knowledge objectification processes. The calculations confirm the stability of the developed methodology and the possibility of its scaling to other higher education institutions (Table 1).

Table 1.

Analytical data of creative externation level dynamics

Student Group	Imitative-Reproductive Level (Before / After)	Variational-Exploratory Level (Before / After)	Innovative-Productive Level (Before / After)
Control Group (CG)	45% / 44%	41% / 42%	14% / 14%
Experimental Group (EG)	45% / 18%	42% / 46%	13% / 36%

The large-scale implementation of the concept of creative externation into the broad practice of higher education inevitably encounters a series of serious organizational, institutional, and didactic challenges. First and foremost, the transition to productive didactics necessitates a comprehensive restructuring of the academic achievement evaluation system, which is currently overly archaic. The existing criteria,

oriented toward verifying the accurate reproduction of pre-existing knowledge, are completely unsuited for evaluating the products of creative externation. By its very nature, a creative product is unique; therefore, its assessment must rely on comprehensive criteria of openness and protection against perceptual distortions, as conceptualized by R. Briggs [1].

There is an urgent need to develop multi-criteria matrices (rubrics) that evaluate not only the final outcome but also the complex process of its creation. These rubrics should encompass indicators such as originality of design, depth of risk analysis, level of team interaction, iterative flexibility, and the author's ability to provide a reasoned defense of their decisions before independent experts. Such an evaluation framework closely aligns with real-world business conditions, where the viability of an idea is validated by its practical value and market demand. Implementing these matrices will ensure that the grading process becomes transparent, objective, and highly motivating for students.

A second substantial challenge lies in the necessity for a large-scale transformation of the professional consciousness of the faculty, who frequently exhibit institutional conservatism. For many experienced educators, relinquishing the role of the sole bearer of truth and transitioning to the position of a mentor, facilitator, or coach is a complex psychological process that requires dismantling habitual hierarchical stereotypes. Within the framework of creative externation, an instructor must be prepared for the possibility that a student, in the process of developing an innovative project, may venture into a domain of knowledge where the instructor lacks comprehensive expertise. This demands a high level of personal maturity, openness to novelty, and the capacity for continuous learning alongside students, thereby establishing collaborative innovative partnerships.

Beyond purely pedagogical and psychological aspects, fostering creative externation processes within higher education carries a powerful state-building and economic dimension. Nations strategically betting on the development of a knowledge economy view universities not merely as vocational training institutions, but as pivotal elements of the national innovation system. Stimulating students' creative externation allows for transforming the flow of theses and term papers—which in traditional systems accumulate for years on departmental shelves as wastepaper—into a potent driver for community and regional development. Student projects oriented toward resolving actual, pressing challenges of specific enterprises, social groups, or municipalities are capable of generating real economic and social impacts while the author is still studying.

This ensures the organic integration of higher education into the overall state modernization strategy, wherein every graduate enters the labor market possessing a ready professional portfolio rather than just a paper diploma. The presence of implemented innovations serves as the finest validation of a young specialist's high



qualifications and subjective maturity before potential employers. Moreover, this approach stimulates the growth of youth entrepreneurship and job creation by launching student startups directly within university business incubators. Consequently, the state receives active creators of economic goods rather than merely credentialed job seekers.

Furthermore, the long-term effect of creative externation manifests in the formation of a resilient professional agency, which acts as the core factor of a specialist's viability in today's volatile world. A graduate who has completed the full cycle from the inception of an internal mental model to its materialization, market, or social validation acquires psychological immunity to crisis phenomena. Such an individual ceases to be a passive executor of external instructions (algorithms that will be fully automated by artificial intelligence in the coming years) and transforms into an active agent of change capable of independently designing jobs and generating new economic niches. This lays a solid foundation for cultivating a competitive nation within the global socio-cultural landscape.

An additional institutional constraint is the rigidity of the regulatory framework governing higher education, which stifles faculty initiative. Contemporary higher education standards and curricula, detailed down to fixed hours and rigid content modules, substantially restrict the flexibility of the educational track. Creative externation demands the delinearization of learning—specifically, the capacity to rapidly adjust pacing, engage external stakeholders mid-semester, and reallocate ECTS credits in favor of practical project work. Without granting universities genuine academic and managerial autonomy, attempts to introduce innovative-productive models risk remaining localized experiments of individual enthusiastic instructors without achieving a systemic, nationwide scale.

A.1.A.1 Conclusions. In summary, creative externation emerges as a paramount vector for the strategic development of contemporary higher education in an era of global civilizational challenges. The transition from passive absorption and reproduction of pre-existing knowledge to the active, purposeful materialization of students' internal creative potential represents the only viable path to surmounting the systemic crisis of higher education. The conducted research confirms that creative externation serves as the foundational and most relevant mechanism for knowledge transformation within modern universities.

Moving toward innovative-productive frameworks requires a radical restructuring of the educational environment, revisions of the regulatory base, and upgrades to university material and technical infrastructure. It demands a decisive departure from the repressive grading paradigm in favor of an ecosystem of trust, the establishment of a "secure field for errors," and the broad integration of generative artificial intelligence as a student's cognitive partner.

It has been empirically proven that the purposeful implementation of project-oriented didactics and facilitative support ensures a statistically significant increase in

the proportion of students exhibiting an advanced level of creative objectification (from 12–15% to 36%). The obtained mathematical and pedagogical data confirm the viability of the proposed model and its high efficiency compared to traditional lecture-seminar formats. Experimental group students demonstrated a qualitatively higher level of motivation, a well-formed professional agency, and readiness to solve complex interdisciplinary problems.

Prospects for future research in this direction lie in the development of standardized instruments and metrics to quantify the quality of socio-cultural and technological artifacts generated by students. Another critical trajectory involves examining the mechanisms for transferring student innovations from university laboratories directly into the real sector of national and global economies. Special future attention should also be dedicated to investigating the psychological aspects of the long-term impact of creative externation on graduates' career trajectories during the first five years following their graduation from higher education institutions.

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