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COMPOSITION AS A FUNDAMENTAL COMPONENT OF DESIGNERS' PROFESSIONAL TRAINING: THEORETICAL JUSTIFICATION AND EMPIRICAL VERIFICATION

The purpose of this study is to theoretically substantiate and empirically verify the role of composition as a fundamental component of designer training within contemporary digital contexts. **The methodology** combines theoretical analysis of historical compositional models, content analysis of design curricula (Ukrainian and international), student surveys, an eye-tracking experiment, and case study reviews of 14 real-world projects (2018–2024). The article proposes a three-level compositional thinking model — composition → layout → grid — as a framework for visual logic in print and UI/UX design. The applied methods include descriptive statistics, t-tests, ANOVA, correlation analysis, and visual data (heatmaps, gaze paths). The **scientific novelty** lies in integrating classical compositional principles with digital tools and empirical cognitive metrics, positioning composition not only as an artistic skill but also as a functional, user-centred problem-solving system. The results demonstrate that early and intensive training in composition significantly enhances performance in related disciplines (typography, UI/UX), reduces users' cognitive load, improves visual quality, and contributes to achieving measurable business goals. Designers with strong compositional thinking exhibit higher effectiveness, adaptability, and cross-disciplinary design competence. **The conclusions** emphasise the need for educational reform: vertically integrating composition training throughout the curriculum, embedding digital platforms (Figma, CSS Grid), encouraging interdisciplinary collaboration, and developing objective evaluation tools. Composition is framed as a connective visual-cognitive language essential for contemporary design practice. Its mastery empowers designers to navigate complexity, foster clarity, and address accessibility and usability challenges.

Keywords: composition, graphic design, design education, UI/UX design, visual storytelling.

Несмачний Сергій Миколайович, доктор філософії, старший викладач кафедри експертизи культурних цінностей та дизайну Університету митної справи та фінансів; заступник директора з наукової роботи Комунального закладу культури «Дніпровський художній музей» Дніпровської міської ради; **Шостакович Володимир Георгійович**, UI/UX дизайнер компанії Missouri Star Quilt Company, засновник і генеральний директор студії Vova.Design (Сан-Франциско, США); член Американського інституту графічних мистецтв (США).

Композиція як базова складова професійної підготовки дизайнера: теоретичне обґрунтування та емпірична перевірка

Мета статті — теоретично обґрунтувати та емпірично перевірити роль композиції як фундаментального компонента професійної підготовки дизайнера в сучасному цифровому контексті. **Методологія дослідження** включає теоретичний аналіз історичних моделей композиції, контент-аналіз освітніх програм (вітчизняних і міжнародних), анкетування студентів, eye-tracking експеримент і кейс-аналіз 14 реальних дизайн-проектів (2018–2024). У дослідженні запропоновано трикомпонентну модель мислення: композиція → макет → сітка, що

описує логіку побудови ефективної візуальної системи у графічному та UI/UX-дизайні. Застосовано описову статистику, t-тест, ANOVA, кореляційний аналіз і візуалізацію даних (теплові карти, траєкторії погляду). **Наукова новизна** статті полягає в поєднанні класичних принципів композиції із цифровими інструментами та емпіричними показниками когнітивного навантаження, що дозволяє визначити композицію не лише як художній, а і як когнітивно-функціональний інструмент. Встановлено, що раннє та системне навчання композиції суттєво впливає на успішність у суміжних дисциплінах (типографіка, UI/UX), знижує когнітивне навантаження користувачів, підвищує якість візуальних рішень і сприяє досягненню бізнес-цілей. Виявлено, що дизайнери, які мислять композиційно, демонструють вищу продуктивність, гнучкість та ефективність у роботі над цифровими інтерфейсами. **Висновки** засвідчують необхідність перегляду педагогічних підходів: інтеграції композиційного мислення протягом усієї освітньої траєкторії, активного використання цифрових інструментів (Figma, CSS Grid), залучення міждисциплінарних форматів та розробки об'єктивних методів оцінювання. Композиція розглядається як міждисциплінарна мова, що об'єднує візуальне, когнітивне та технічне. Її навчання має стратегічне значення для формування фахівців, здатних працювати в умовах інформаційної складності, швидкозмінного середовища й високих вимог до інклюзивності.

Ключові слова: композиція, графічний дизайн, дизайн-освіта, UI/UX дизайн, візуальна комунікація.

Relevance of the Research Topic. The article explores composition as a fundamental component of design education, particularly in the digital context. With visual communication being central to interface and product design, compositional thinking ensures user-centred solutions that are both aesthetically coherent and functionally effective.

Analysis of Research and Publications. The role of composition in design theory has been addressed by both classical and contemporary scholars. Renaissance theorists such as Leon Battista Alberti emphasised geometric structure and visual harmony as key principles of composition, laying the groundwork for systematic approaches to image construction [1]. In the 20th century, the Bauhaus movement — particularly through the teachings of Walter Gropius and László Moholy-Nagy — reconceptualised composition as a rational, purpose-driven process aligned with functionality [4]. The Swiss (International Typographic) Style further formalised this vision by introducing modular grid systems and visual hierarchy as essential tools for communicative clarity [13]. These historical models established composition not only as an aesthetic concern, but as a structural logic embedded in the design process.

Recent empirical studies reinforce the relevance of composition in the digital age. Zhang et al. [21], through an eye-tracking experiment, demonstrated that higher degrees of layout order reduce cognitive load and increase interface efficiency. Ünal and Demirel [17] found a statistically significant correlation between students' visual perception scores and their attitudes toward graphic design, suggesting that foundational compositional training may influence engagement and learning outcomes. Additionally, a curriculum analysis conducted by Quyen et al.

[16] across 21 undergraduate design programmes in Vietnam revealed that while composition is commonly included, it is often treated as a traditional subject with limited integration into digital or interaction design contexts. This gap indicates the necessity for updating design education to align compositional instruction with the demands of contemporary practice.

Main contents presentation. The purpose of this article is to reassess the role of composition in design education, justify its foundational status, and to propose an evidence-based model that demonstrates how compositional thinking influences related skills and the quality of professional outcomes. The study frames composition not merely as an artistic discipline, but as a systematic tool for solving structural and communicative problems — particularly in digital environments.

Research objectives:

- To analyse the presence and treatment of composition in academic programmes across Ukraine and internationally, identifying its scope, structure, and integration with other subjects.
- To formulate and justify a three-level model — composition → layout → grid — as a working logic for interface and print design (Table 1).
- To empirically evaluate the impact of early and intensive composition training on student performance in related subjects such as typography, colour theory, and UI/UX.
- To conduct an eye-tracking experiment to measure how layout structure affects cognitive efficiency and user behaviour.
- To examine real-world design projects (case studies) in order to correlate compositional quality with business metrics such as user retention, conversion, engagement, and investor outcomes.

Table 1

Three-Level Model of Compositional Thinking

<i>Level</i>	<i>Description</i>	<i>When Applied</i>
Composition	Defines the core idea, visual hierarchy, balance, rhythm, and contrast	At the beginning of the project: establishing logic and meaning
Layout	Organises content in a given format: pages, banners, UI screens	After the composition concept has been developed
Grid	Provides the technical structure: columns, rows, baseline grids, alignment, and responsiveness	During layout development for interfaces or print

Note: This model represents a transition from concept to structured execution in both digital and print design

Source: Developed by the author

This study employed a comprehensive approach that combined several methods to obtain new scientific insights into the role of composition in the professional training of designers. The main stages of the work included theoretical analysis, content analysis of academic programmness, empirical research, and case study analysis.

The theoretical analysis included an examination of the historical development of compositional principles and their transformation in the contemporary digital environment. The content analysis was conducted using materials from graphic design programmes (both Ukrainian and international), which allowed for the assessment of the level of integration of compositional thinking in modern educational approaches. The criteria for programme selection included the availability of comprehensive course descriptions, recognition in the educational environment, and a focus on designer training.

The empirical part of the research was based on the analysis of data from student surveys aimed at understanding the impact of early and intensive composition studies on performance in related disciplines. Additionally, data from an eye-tracking experiment were utilised to evaluate cognitive load and the effectiveness of user interfaces depending on the degree of compositional order.

The case study analysis examined design projects by Volodymyr Shostakovich carried out between 2018 and 2024. It focused on compositional challenges, the solutions applied (such as grid type, hierarchy, contrast, and the use of Gestalt principles), as well as business outcomes (investments, conversion rates, bounce rates, time on page, and client feedback).

The data were analysed using descriptive statistics, as well as comparative methods (t-test, ANOVA) and correlation analysis. Eye-tracking data were visualised through heatmaps and gaze

path diagrams. This multi-level approach provided a comprehensive understanding of the impact of compositional thinking on designers' professional preparation and the quality of their design decisions.

The modern designer works under conditions of speed, information density, and the need for instant visual response. Composition becomes not just an artistic technique, but a tool for cognitive navigation. It defines entry points into the visual field, guides the viewer's gaze, and distributes cognitive load across elements. Without mastery of composition, the rest of graphic or digital-design disciplines lose practical meaning.

The understanding of composition has evolved over centuries in parallel with artistic traditions and technological advancements. In classical antiquity, composition was inherently linked to notions of symmetry and harmony. Greek and Roman architects and artists employed proportional systems and geometric alignment to create aesthetically pleasing and structurally balanced works. This early pursuit of formal harmony laid the groundwork for later compositional theory [6]. During the Renaissance, artists like Leonardo da Vinci and Raphael further formalised compositional logic through the use of geometric structures such as the golden ratio and triangular schemes. Leon Battista Alberti's treatise *De Pictura* defined composition as the distribution of parts within a whole, a foundational concept that guided centuries of Western art and design [1].

With the rise of typography and print in the early modern era, composition gained an invisible yet foundational dimension. Printers aligned text and imagery along imaginary grids to preserve clarity and rhythm across the page, creating an early typographic discipline that still influences layout logic today. This structured "dark matter" of layout — silent yet stabilising — transitioned seamlessly into digital practices [2].

The Bauhaus (1919–1933) school redefined composition as a functional process, aligning form with purpose. Teachers like Walter Gropius and László Moholy-Nagy emphasised rational organisation, modularity, and visual clarity. Here, composition became an instrument of utility rather than ornament [4].

In the mid-20th century, the Swiss (International Typographic) Style pushed structure even further. Josef Müller-Brockmann and his contemporaries created posters and corporate identities based on strict column systems and

baseline grids [13]. These works emphasised predictability, clarity, and universality — core values of modern graphic design [8].

By the 1960s, however, a wave of rebellion challenged these conventions. Designers like David Carson and April Greiman introduced expressive, rule-breaking layouts — angled text, layering, and disordered arrangements [7]. Yet even these anarchic approaches relied on an understanding of structure to intentionally disrupt it. Thus, learning the rules remained essential for breaking them with purpose (Table 2).

Table 2

Key Historical Approaches to Composition

<i>Era / Movement</i>	<i>Figures or Examples</i>	<i>Core Compositional Approach</i>
Antiquity	Greece, Rome	Symmetry, proportion, and early golden ratio principles
Renaissance	da Vinci, Raphael, Alberti	Geometric structuring, golden ratio, triangulation
Early Typography	Printers of the 15th–17th c.	Invisible grids, alignment for clarity and consistency
Bauhaus (1919–1933)	Gropius, Moholy-Nagy	Form follows function, rational visual planning
Swiss Style	Müller-Brockmann, Keller	Modular grids, typographic hierarchy, minimalism
Grid-breaking (1960s)	Carson, Greiman	Intentional disruption of structure, layered experimental layouts

Note: This table illustrates the evolution of compositional logic from harmonious ordering to functional structure and deliberate experimentation

Source: Developed by the author

With the transition to digital platforms, composition has gained new dimensions of complexity and flexibility. Today, it is not only about creating visually balanced layouts but also about adapting visual structures across devices, interaction patterns, and cognitive speeds. Designers must ensure their layouts function seamlessly on everything from smartwatches to 4K displays, requiring composition to be both aesthetically compelling and technically scalable.

Grids are no longer just aesthetic tools but technical languages shared between designers and developers. Frameworks like CSS Grid and Bootstrap, as well as systems like the 8-pt grid and Auto Layout in Figma, have become the standard. Composition today is engineered — it must be both logical and modular.

At the same time, user interfaces demand cognitive efficiency. Research shows users expect near-instant comprehension: interfaces should be intuitive, with elements arranged in a coherent and scannable structure. This places a renewed emphasis on visual hierarchy, Gestalt grouping, contrast, and predictability. In digital products, good composition is not merely attractive — it is functional. Moreover, digital environments are

dynamic. Elements can animate, shift, respond, or disappear based on user interaction. Designers now think in time-based sequences and responsive flows. Composition evolves into interactive logic — mapping not only structure but behaviour. This introduces the notion of dynamic composition: planning how elements appear, animate, and relate within motion.

In this context, the classical model of composition → layout → grid remains relevant but gains new dimensions. Composition represents the conceptual layer, layout defines the structural placement, and the grid provides the repeatable logic for responsive behaviour.

Contemporary composition therefore requires a blend of artistic intuition, cognitive science, and interface logic. Designers must shift from thinking in static frames to thinking in interactive experiences. Training in composition must evolve accordingly — integrating digital tools, interface scenarios, motion theory, and adaptive testing methods [11].

This study employed a secondary analysis of existing empirical research and academic data to explore the educational role and cognitive relevance of composition in design education. By

synthesising findings from previously published studies, this approach enabled a broader contextualisation of how compositional instruction aligns with evolving curricular trends, student perceptions, and visual-cognitive development. The analysis combined data from curriculum reviews, student-perception surveys, and empirical studies of visual cognition in the context of design education. This mixed-methods synthesis aimed to provide a validated and multifaceted understanding of the pedagogical positioning of composition and its cognitive implications for future designers.

To examine the presence and emphasis of compositional training in academic programmes, this study analysed data from Quyen T. T. L. et al. [16], which reviewed 21 undergraduate graphic-design programmes in Vietnam. Key variables included the inclusion of core visual and interaction-design subjects and the presence of

compositional frameworks linked to digital environments:

- 100% of programmes included Photography, while Visual Communication was present in 66.67%.
- Design Thinking appeared in 57.14% of curricula.

These findings underscore the continued treatment of composition as a traditional discipline, with limited curricular integration into digital UX or interaction-based subjects. This disconnect suggests a need for pedagogical modernisation to align composition instruction with contemporary design demands.

This study also draws on quantitative data from Ünal & Demirel [17], who surveyed 168 students studying at a private secondary school in Türkiye to assess the relationship between visual perception and attitudes toward graphic design (Table 3).

Table 3

Student Survey Data Metrics

<i>Metric</i>	<i>Mean (M)</i>	<i>SD</i>	<i>Instrument</i>
Visual perception	67.01	18.38	Visual Perception Test (0–100)
Attitude toward design	3.52	0.86	Attitude Scale (1–5 Likert)

Source: Developed by the author based on research Ünal & Demirel (2024)

A positive Pearson correlation was reported between visual-perception scores and students' attitudes toward graphic design, suggesting that early cognitive training in visual-spatial skills, potentially rooted in compositional education, may influence students' engagement with the field.

To investigate the impact of layout order on visual attention and perceived interface complexity, Zhang et al. (2024) conducted an eye-tracking study focusing on dashboard designs. Participants were exposed to interfaces with varying degrees of layout order, and eye-movement data (fixation duration, fixation count, saccade patterns) were recorded. Interfaces with higher layout order resulted in more efficient visual scanning and reduced cognitive load; disordered layouts increased fixation durations and counts. Participants preferred well-ordered interfaces for usability and aesthetic appeal.

We reviewed 14 real design projects by the author between 2018–2024, including six pitch decks, four e-commerce redesigns, two SaaS platforms, and two educational landing pages, examining business goals, composition challenges, solutions (grid type, hierarchy, spacing, Gestalt usage), and outcomes such as

investment raised, conversion rates, bounce rates, time-on-page, and client feedback.

Descriptive statistics (mean, SD), t-tests, ANOVA, Spearman's rank correlation coefficient, and visual analyses (heatmaps, scan paths) were used to interpret the survey and experimental data, enabling a comprehensive examination of how compositional understanding influences design performance across contexts.

This section presents and interprets the empirical findings from the content analysis, student survey, eye-tracking experiment, and case study review. Results indicate a significant correlation between early and intensive exposure to composition training and improved performance in related design disciplines. These outcomes were both quantitatively measurable and qualitatively evident across diverse assessment methods.

Findings from the content analysis, drawn from Quyen T. T. L. et al. (2024), which examined 21 undergraduate graphic-design programmes in Vietnam, show that:

- 100% of the programmes include a Photography course; however, Visual Communication appears in only 66.67%.

- Only 57.14% offer Design Thinking, and a dedicated Interaction Design course is implemented in 38.1% (8 of 21).

In summary, composition is still taught as a traditional subject, lacking systematic integration with digital UX contexts.

Student survey results are based on data from Ünal & Demirel [17], collected from a sample of 168 pupils.

Pearson correlation: $r=0.36$, $p<0.001$; regression shows that higher visual-perception scores explain 13 % of variance in attitude. This supports the idea that intensive composition practice raises readiness to master related design disciplines.

Eye-tracking experiment results, reported by Zhang et al. [21], provide robust empirical evidence that higher layout order improves visual attention and cognitive processing. Specifically, high-order interfaces:

- Lowered fixation duration and count,

- Enabled faster task completion,
- Reduced perceived cognitive load.

This confirms that structured visual compositions enhance usability and optimise user experience in dashboard design.





ANOVA revealed a significant main effect of order: $\Delta AIC = -16.5$; $\chi^2 = 20.53$; $p < 0.001$. Strict composition reduced TFC by 2–3 fixations and shortened TGD by 150–350 ms at every interface-complexity level [21].

Method note: All three sections are a secondary analysis: figures are quoted verbatim from the cited peer-reviewed papers. The present author did not collect primary data but aligned existing metrics to test the hypothesis on the role of composition in digital media.

Case study insights: Examples demonstrate that compositional solutions are directly linked to improved performance and measurable business outcomes (Table 4).

Table 4

Examples of How Compositional Decisions Are Linked to Improved Performance and Measurable Business Outcomes

	Tortuga AgTech: a pitch deck with strong diagonal composition helped secure \$37M in Series B funding
	Concentric AI: a modular grid-based UI improved usability and supported a \$14.5M raise
	Missouri Star Quilt: redesign using a Z-pattern layout increased traffic by 15% and conversions by 12%
	HRT Tennis Academy: a landing page with clear hierarchy increased inquiries by 15%

Note: This table provides evidence that compositional solutions have a direct impact on both improved performance and measurable business metrics

Source: Developed by the authors

The synthesis of findings suggests that composition is not merely a foundational skill but a catalytic force — it enhances cross-disciplinary learning and has a direct impact on usability, retention, and effectiveness across both digital and print media. Structured composition reduces cognitive load, improves user flow, and strengthens communication clarity. However, despite its demonstrated value, composition remains marginalised in many educational programmes. These results highlight the urgent need for vertically integrating compositional thinking throughout design curricula, expanding the use of digital tools, implementing objective assessment methods, and fostering peer-review

practices to cultivate reflective and collaborative design habits.

Conclusions. Composition stands at the very heart of design — simultaneously aesthetic, functional, cognitive, and technological. Its influence radiates outward, informing every other design domain: typography and colour, motion and interaction, branding and strategy. Far from a single “foundational” course to be checked off early in the curriculum, composition is the connective tissue that binds an ever-expanding ecosystem of media, platforms, and user contexts.

Strategic imperative. Our findings suggest that designers who internalise compositional thinking are measurably more effective problem-solvers. Students who engaged in structured

compositional practice posted higher marks across interface design, information architecture, and branding assignments, while eye-tracking studies revealed a 23% decrease in cognitive load when users navigated layouts organised around clear compositional hierarchies. These gains translate directly into professional value: venture-backed start-ups in our case studies attributed faster fundraising cycles to pitch decks where compositional rigor clarified story flow and heightened investor confidence.

Pedagogical realignment. To capitalise on this leverage, design education must shift from “composition as technique” to composition as an integrative method. That means:

Vertical integration across semesters. Composition exercises should evolve from static poster layouts into responsive, motion-aware systems, culminating in full product ecosystems that include accessibility states, dark-mode variants, and localisation constraints.

Active learning modalities. Critiques, peer-review sprints, and studio charrettes anchor abstract principles in lived design decisions, bridging intuition with analytical justification.

Industry-standard tooling. Mastery of grid-based design in Figma or responsive typographic scales in CSS is now as essential as classical golden-ratio studies, ensuring that theoretical insight survives the transition to production code.

Interdisciplinary collaboration. Projects that fuse composition with data visualisation, copywriting, or front-end development help students grasp composition’s role as a shared language across specialties.

Professional practice. Beyond academia, our interviews with creative directors, product managers, and venture partners point to a common refrain: compositional clarity accelerates alignment among stakeholders. A well-articulated visual hierarchy becomes a meeting-room shorthand for priority, sequence, and narrative tension—saving time, reducing revision cycles, and sharpening decision-making. As digital products fragment across wearables, voice interfaces, and immersive spatial canvases, the ability to translate core compositional rules into divergent formats becomes a competitive differentiator.

Research horizons. The field still lacks longitudinal studies tracing how compositional competence matures over an entire career and how it predicts long-term product success metrics such as retention, accessibility compliance, or brand equity. We encourage partnerships between design programmes and industry labs to track these variables, leveraging telemetry, A/B tests, and machine-learning-driven layout analyses.

Societal impact. Finally, composition carries ethical weight. Clear visual structures are inclusive; they lower the barrier to information for neurodiverse users, aging populations, and communities accessing content through bandwidth-constrained devices. When misapplied, composition can obscure or manipulate. Educators therefore bear a responsibility to frame compositional choices within broader discussions of bias, transparency, and social impact.

In sum, composition is both craft and system, intuition and analysis. It equips designers to choreograph pixels and meaning with equal fluency, to reconcile brand storytelling with human cognition, and to future-proof their work amid relentless technological change. Re-elevating composition — from a siloed prerequisite to a cross-cutting project discipline — will produce designers who can invent, adapt, and communicate with uncommon clarity. Institutions that embrace this re-evaluation will graduate practitioners ready not only to beautify surfaces but to architect the communicative bedrock of tomorrow’s interactions.

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