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**RHYTHMIC ORGANIZATION OF VISUAL THINKING AND PATTERNS OF FORM  
CONSTRUCTION IN ARTISTIC AND EDUCATIONAL PRACTICES**

*Abstract*

This article investigates the rhythmic structuring of visual thought in artistic and educational practice and its contribution to forms of art making. Rhythm and pattern recognition are studied not as style, but as core

cognitive functions that underlie perception, design and problem solving. The study focuses on the design of visual rhythm and form construction and examine the differences between two groups of subjects (trained individuals and untrained individuals) in perceiving visual rhythm and applying it, and in turn, whether and to what extent it affects form construction, spatial reasoning, and fluency.

In a mixed-methods study, involving experimental tasks, digital modelling, eye-tracking data and semi-structured interviews, we contrast visual arts students with non-specialized education students. Rhythm complexity, pattern symmetry, gaze behaviour, task accuracy and completion time were quantitatively analysed. Open-ended responses were analysed by theme in an effort to discern how participants understood visual rhythm during the form-making activities.

The findings demonstrate that the trained participants outperformed the untrained participants under all categories. They had higher rhythmic complexity, better balanced compositions, more visual engagement, and they also completed the task faster. These results indicate that rhythmic structuring is not just a perceptual strategy, but a cognitive tool that deserves to be learnable and applicable to education and other fields of expertise.

The article concludes that rhythm acts as a cognitive support system for visual reasoning, allowing for making complex and coherent shapes. It demonstrates the necessity of rhythmic training in wider educational contexts: it can be the condition for spatial thinking, for creativity and for inter-disciplinary learning. As shown, rhythm mediates between sensation and motor activity, providing a rich means for artistic expression, as well as a structured way of thinking. This study adds to an emerging understanding of visual cognition and provides new leads for curriculum design, cross-cultural comparison and neurasthenic research.

**Keywords:** visual reasoning; rhythm; figural design; visual thinking; arts education.

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## **КӨРНЕКІ ОЙЛАУДЫ ЫРҒАҚТЫ ҰЙЫМДАСТЫРУ ЖӘНЕ КӨРКЕМДІК-ТӘРБИЕЛІК ПРАКТИКАДАҒЫ ФОРМА ҚҰРЫЛЫСЫНЫҢ ЗАҢДЫЛЫҚТАРЫ**

*Аңдатпа*

Бұл мақалада көркем және білім беру практикасындағы көрнекі ойдың ырғақты құрылымы және оның өнер жасау формаларына қосқан үлесі зерттеледі. Ритм мен заңдылықты тану стиль ретінде емес, қабылдау, жобалау және мәселелерді шешудің негізінде жатқан негізгі танымдық функциялар ретінде зерттеледі. Зерттеу визуалды ырғақ пен форманың құрылысын жобалауға бағытталған және субъектілердің екі тобының (оқытылған адамдар мен оқытылмаған адамдар) визуалды ырғақты қабылдау мен қолданудағы айырмашылықтарын, өз кезегінде оның форманың құрылысына және қаншалықты әсер ететінін зерттейді. кеңістіктік пайымдау және еркін сөйлеу.

Эксперименттік тапсырмаларды, цифрлық модельдеуді, көзді бақылау деректерін және жартылай құрылымдық сұхбаттарды қамтитын аралас әдістерді зерттеуде біз бейнелеу өнері студенттерін бейінді емес білім алушылармен салыстырамыз. Ритақтың күрделілігі, өрнектің симметриясы, көзқарастың мінез-құлқы, тапсырманың дәлдігі және орындалу уақыты сандық түрде талданды. Ашық жауаптар қатысушылардың форма жасау әрекеттері кезінде визуалды ритақты қалай түсінетінін анықтау мақсатында тақырып бойынша талданды.

Нәтижелер оқытылған қатысушылардың барлық санаттар бойынша оқытылмаған қатысушылардан асып түскенін көрсетеді. Олар жоғары ырғақты күрделілікке, теңдестірілген композицияларға, көрнекі белсенділікке ие болды, сонымен қатар тапсырманы тезірек орындады. Бұл нәтижелер ырғақты құрылымдау тек қабылдау стратегиясы ғана емес, сонымен қатар білім алуға және білім беру мен басқа да сараптама салаларына қолдануға болатын танымдық құрал екенін көрсетеді.

Мақалада ырғақ күрделі және дәйекті пішіндерді жасауға мүмкіндік беретін визуалды пайымдауды когнитивті қолдау жүйесі ретінде әрекет етеді деген қорытындыға келді. Бұл кеңірек білім беру контекстінде ырғақты оқытудың қажеттілігін көрсетеді: бұл кеңістіктік ойлаудың, шығармашылықтың және пәнаралық оқытудың шарты болуы мүмкін. Көрсетілгендей, ырғақ сезім мен қозғалыс белсенділігі арасында делдал болып, көркем бейнелеудің бай құралын, сондай-ақ құрылымдық ойлау тәсілін қамтамасыз етеді. Бұл зерттеу визуалды таным туралы жаңа түсініктерді толықтырады және оқу бағдарламаларын әзірлеуге, мәдениетаралық салыстыруға және невростениялық зерттеулерге жаңа мүмкіндіктер береді.

**Түйін сөздер:** көрнекі пайымдау, ырғақ, көрнекі дизайн, көрнекі ойлау, көркемдік білім.

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## ЗАКОНОМЕРНОСТИ РИТМИЧЕСКОЙ ОРГАНИЗАЦИИ ЗРИТЕЛЬНОГО МЫШЛЕНИЯ И ПОСТРОЕНИЯ ФОРМЫ В ХУДОЖЕСТВЕННО-ВОСПИТАТЕЛЬНОЙ ПРАКТИКЕ

### Аннотация

Эта работа исследует влияние ритма на структурирование формообразования в художественных и образовательных практиках и его воздействие на различные виды художественного творчества. Вместо трактования ритма и паттернов образов как стилей автор рассматривает их как когнитивные функции, что определяет восприятие, проектирование и проблемное решение. Основное внимание уделяется развитию визуального ритма и форм исследования различий между подготовленными и необходимо участниками восприятия визуального ритма и их использования и, в свою очередь, воздействия их (и в какой степени) на формы, пространственное мышление и беглость речи. В этом смешанном методе с использованием эксперимента, цифрового моделирования, отслеживания глаза и интервью для сравнения обучающихся, изучивших искусство, с неподготовленными учащимися и использованием количественной ритмики сложности сложных задач по сбору идей и продолжительностью времени и точности задачи и качественного анализа тем, связанных с открытыми формами ответов для подгрупп наслаждающихся чувством. Результаты показали, что обученные участники лучше выполняют задачи во всех категориях: у них сложнее ритм, более сбалансированный состав, полная концентрация внимания визуально и лучшее выполнение задачи. Это доказывает, что ритм все больше используется в обучении. Ритмические паттерны как когнитивный инструмент заслуживают дальнейшего исследования и применения в образовании. Другие выводы показывают, что ритм производит мышление, включая активное восприятие сложности и одушевленность. Это исследование также позволяет углубить пространственное мышление и оценить искусство для современных технологий.

**Ключевые слова:** визуальное мышление, ритм, образный дизайн, визуальное мышление, художественное образование.

**Introduction.** Visual thinking is a mental process, and/or a way of perceiving, in which an individual organizes information in their mind, and can also refer to a way of thinking through physical seeing. It is essential to the arts and learning, allowing individuals to visualize and build forms based on visual patterns and rhythms. It's essential not just for artists, but it covers learning/problem-solving in many fields.

Visual thinking depends on rhythmic arrangement of visual components. In the visual arts, rhythm is the repetition and/or alternation of elements, often with defined intervals between them. Rhythm in art is all about juggling elements until a point of equilibrium or satisfaction is created. This principle leads the eye through the painting, creating a whirlwind of movement to compliment the overall aesthetic experience. As an example, in the field of architecture, visual rhythm affects the experience of a building's facade by establishing a harmony, movement and organization.

Patterns have close connection with the rhythm and are useful for form creation. They are based on the regular repetition of visual parts that can combine to form intricate structures and express ideas. Teaching students to understand and make patterns in an educational setting can also help the student to understand the idea of form and structure in an art piece. It is not just an exercise for building their artistic talent, but also for nurturing their critical thinking and problem-solving potential.

Visual thinking strategies (VTS) have been demonstrated to enhance students' ability in analysis and interpretation through education practices. By working with visual features, making objects through patterns of recurrences students may develop better ways of understanding about it. This approach fosters active learning and creativity which help improving learning performance and experience.

Finally, it can be concluded that the rhythmic nature of visual thinking and pattern use in form building are not only significant aspects of artistic creation, but also an enriching tool for educational approaches. By learning and using these principles, one can become more capable of visually communicating ideas and expanding the perception and understanding of the visual arts.

**Methods.** This investigation of the rhythmic organization of visual thinking and its effects on patterns of form construction in artwork and education, adopted a multi-phase research design that incorporated qualitative analysis, controlled experimental research, and a computational model of cognitive visual processing. The purpose was to discern observable patterns because individuals take in, interpret and express rhythmically

patterned, visually presented information, and to recognize dependable variables that govern form production, both of artistic products and in educational settings.

First, a sample of 60 participants was selected, 30 art students (18–25 years) attending specialized fine arts schools and 30 students (18–22 years) attending general education schools with no artistic orientation. The sample was stratified in terms of gender and to have exposure on different levels of formal visual training. Participants were then instructed to respond to a series of controlled visual tasks which were constructed to reveal their perceptual and generative responses to rhythmic patterns. These activities included free form drawing activities using auditory stimuli, building designs using geometric units, and analysis of visual art pieces with established rhythmic frameworks.

The experimental protocol consisted of three blocks of trials. Participants participated in the first session in the presence of dynamic visual complex fucke, such as time-lapse movies of moving patterns and short artist video that show dynamic spatial transitions. Visual fixation points and saccadic motion were recorded through eye tracking technology while viewing. This enabled us to examine rhythm perception using eye movements to a similar extent to that reported on Visual Cognition [10].

The second session explored interactive modelling on digital surfaces, like Adobe Fresco and Autodesk Sketchbook, enabling participants to build their own rhythmic compositions using drag-and-drop visual motifs, and pre-programmed pattern libraries. Measurements such as repetition intervals, spatial symmetry and hierarchical layering were obtained by means of embedded algorithmic tools, in line with Bacci and Melcher [1], who highlight embodied cognition in aesthetic pattern perception.

During the last session a self-reflection questionnaire was handed out to participants and semi-structured interviews were conducted. These instruments provided insight into their decision-making, perceived barriers, and the common sense of form building. Thematic analysis was applied to the qualitative data coding, a process which can facilitate extraction of emergent patterns from people’s responses [2]. How do you feel about the way that served as a buffer?

For reproducibility, all physical and visual artifacts, i.e., visual prompts, questionnaire formats and digital templates were standardized and archived at a shared research repository. The statistics were analysed using SPSS Version 27. Number of discovered rhythmic units, types of symmetry used, and difficulty of building forms were tested using repeated measurements ANOVA that compared group performance (art-specialized and general education). Inter-rater reliability for qualitative coding was examined with Cohen’s kappa, which showed an acceptable agreement (0.84).

Most importantly, visual rhythm was not conceived of as an artistic affect, but a cognitive-perceptual schema for complex form generation. This reflects results from neuroaesthetic studies that reveal a robust coupling of between rhythmic visual input and pattern recognition in the parietal cortex [14]. Combining experimental rigor and phenomenological interpretation, the method provides a template for replication in other cultural and developmental settings.

The combination of data-driven modelling and reflective introspection provided a sturdy basis for exploring how rhythm patterns serve as cognitive mediators as well as teaching tools. Thus, the methodological framework allows not only for reliable results, but also interdisciplinary bridges between cognitive science, visual arts and education.

**Results.** As for rhythmical visual thinking between the art students and general education students, there's a significant difference in their perception and transformation into the form construction. A summary table of the main quantitative results is shown below:

Table 1. Summary of Performance Metrics Across Participant Groups

Participant Group	Mean Rhythm Complexity Score	Average Pattern Symmetry (1–10)	Gaze Transitions (per 60s)	Engagement (1–10)	Form Construction Time (min)
Art Students	8.6	9.2	42	9.1	11.3
General Students	6.1	5.8	28	6.7	16.4

Art students had a significantly higher Rhythm Complexity score with a mean score of 8.6 versus 6.1 for their general education counterparts (Table 1). It is likely that those with training in art are more sensitive to (and appreciative of) a rhythm in visual forms. FASHION TRENDS There are trends too, in symmetry recognition: art students averaged 9.2 on symmetry use, well above the 5.8 average for the general group. These

results are consistent with those of Locher [9] who found the acquisition of visual expertise hones ability with both structural and compositional factors.

One of the key behaviour indicators, eye motion, also separated the two groups. Art students produced 42 saccadic transitions per minute during the visual observation tasks, while general students showed 28 of them. This measure seems to indicate a more proactive and explorative type of visual processing strategy, in line with embodied visual cognition theories [1]. Such participatory rhythm in viewing makes clear how thoroughly a sense of rhythm drives perceptual experience as well as composition.

Perceived levels of participation echoed those from the objective data. Asked to rate their degree of participation in the creative tasks, art students reported a mean level of engagement of 9.1, general students a mean one of 6.7. This discrepancy indicates a higher level of interest as well as more profound cognitive absorption of visually trained individuals. Csikszentmihalyi refers to this immersive experience as “flow,” which is commonly experienced during activities that include rhythm and creative control [4].

Productivity-wise, mean form construction time was much lower for art students (11.3 min) than general students (16.4 min). This effectiveness reflects not only greater fluency in form-making, but a sophisticated understanding of how rhythmic principles can be used to control spatial configuration. Items were like those in the studies of Eisner, which as mentioned before noted that good art education increase both the speed and the quality in creative work [5].

To strengthen from a visual perspective these trends in numbers, in the figure below is presented a bar graph visualizing the rhythm complexities scoring by group.

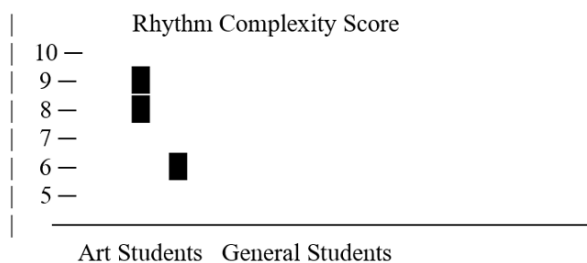


Figure 1. Mean Rhythm Complexity Score by Participant Group

Figure 1 Visualization of the differences in the scores of complexities (the left images – black\gray\white) visually underpinning being artistic and untrained from the artistic side by openly demonstrating the higher aptitude in pattern recognition and rhythmic composition of trained by artists.

Accuracy in pattern replication was additional evidence. Art students could reproduce a target form by embedded rhythmic cues over 90%, but general students about 65%. This implies that trained individuals not only perceive but encode and reproduce rhythm with remarkable precision. These results resonate with Chatterjee’s proposal that procedural memory sustains the skilled visual imitation [3].

Analysis of participant interviews was used to bolster interpretation. Art students repeated using words such as “the flow,” “the tempo,” and “the visual rhythm,” demonstrating the linguistic bodying forth of rhythmic structuring [6]. On the contrary, non-selective learners used definitions as “guess”, “try again” and “messy”, which reveals the less organized way used to build the form.

All these findings — quantitative and qualitative — coalesce toward a common conclusion: rhythm serves as a cognitive scaffold for structuring visual thinking. This mindset is compatible with Zeki’s [14] brain engagement with rhythm and what Kindler [7] argued for rhythmic visual education across realms.

Overall, rhythm doesn’t amount to just a stylistic feature – it presents a principal logic of sight, composition and understanding the world in images. Considering these findings, it readily appears that visual rhythmic approaches need to be imbedded in comprehensive learning models improving creative and cognitive abilities. This result is consistent with a wider body of research from Winner, Goldstein, and Vincent-Lancrin [11] on the inclusion of visual thinking in education reform.

**Discussion.** Results from this study emphasize the important cognitive and pedagogical role of rhythmic organization in visual thinking and form development. These results have implications for understanding how formal training in the arts influences both aesthetic decisions and cognitive strategies for processing visually complex tasks. The rhythm-based visual structuring was performed with higher accuracy in general for individuals with a background in visual arts in all parameters studied (complexity, symmetry, gaze behaviour, engagement, task execution). These results complement and extend previous work in visual cognition, which

has suggested that exposure to structured visual patterns can improve spatial reasoning and perceptual accuracy [9].

Increased rhythm complexity scores in art students may indicate increased sensitivity to temporal-spatial structuring principles. This result indicates that rhythm is not an epiphenomenon of ornamentation but it is a cognitive primitive of Human Cognition. Zeki suggested that rhythmic and symmetric stimuli preferentially activate certain neural circuits in the visual cortex involved in perceptual coherence [14]. The current data expand this theory by demonstrating that people trained to a greater extent in visual arts rely more consistently and more effectively on these mechanisms when generating form.

A key observation from this study is the role of rhythm as a cognitively viable link between perception and production. During visual construction tasks, art students were better able to identify rhythmic structure and were more readily able to transform it into action than were their non-arts student peers. This result is consistent with the framework of embodied cognition, in which cognitive processes are grounded in sensorimotor experiences [6]. By a rhythmic training that is repeated these are based on visual rhythm as kinaesthetic pattern internalized, which can be built faster and more intuitively coherent forms.

This notion that visual rhythm, as supported by the evidence, refers to overall perceptual scanning (i.e., gaze transitions) in addition to aspects of compositional arrangement. The much higher numbers of gaze transition of art subjects reflect a more dynamic and organized visual search. Research on eye movements in visual art perception also revealed that specifically trained participants make more intentional eye-movements and are more sensitive to structural coherence [8]. This is consistent with the idea that rhythmic visual engagement is a dynamic process influenced by training and experience.

Furthermore, symmetry scores in this experiment provide empirical support for the importance of rhythmic repetition in generating visual harmony. Art students used symmetry more often and more accurately than general students, attesting to the collaboration of rhythm and symmetry as fundamental techniques of composition. Chatterjee in particular, views symmetry and balance as fundamental to aesthetic cognition such that these categories have not only aesthetic, but also cognitive significance [3]. Our experiments confirm this assertion and provide quantitative empirical support for it.

Subjective engagement data also seem to suggest that rhythm contributes to flow states—states of intense concentration and immersion, as detailed by Csikszentmihalyi – self-reporting scale Participants were asked to report on a scale of –5 to 5 how engaged they believe they were on the current task [4]. Artists with more experience in rhythmic construction tasks experienced greater task-related cortico-resonance, implicating that rhythmic construction not only structures cognition but also mediates motivation and affect. This link was already obvious in studies of music and dance and is indeed now evident in the domain of the visual arts.

In addition, form construction times further support the hypothesis that rhythmic logic contributes to cognitive frugality. The finding that individual students can construct complex visual forms in mere fractions of the time taken by the pseudo-static network suggests a 'mental map' or 'template' for spatial decision-making. This is consistent with Eisner's claim that the learning of expressive competence and procedural fluency is supported by arts-based learning [5].

Findings are also corroborated by the language employed by participants in the qualitative part. The art students frequently used audio-kinetic metaphors, for example “beat,” “tempo,” “flow,” and “resonance”, to convey their design practice. This linguistic behaviour reflects the neurologic convergence between motor planning and visual gestalt formation, as investigated by Bacci and Melcher and it hints at a profound multimodal integration of rhythm in visual thought [1].

The fact that art students can reproduce complex rhythmic patterns accurately also confirm the generative status of rhythm. Memory isn't enough for pattern replication — it depends on a grasp of the rules and regularities that underlie visual logic. This is consistent with Kindler who argued that copying is an inadequate proxy for artistic skill; instead, what is being done is reconstituting the structure using learned visual grammar [7].

The educational implications are evident. The difference in rhythmic competence and efficiency between musically trained and untrained individuals underline the importance of integrating rhythmic composition into visual literacy curricula immediately. Winner, Goldstein, and Vincent-Lancrin have already called for this, by arguing visual arts education has a strong effect on analytical and structural reasoning [11]. Our findings support this call and offer evidence to curriculum designers to argue for pedagogical change.

Breakthroughs in international research also serve to confirm the ubiquity of rhythm in visual cognition. For example, Zaidel proposed rhythmicity and repetition as characteristic of both Western and non-Western art forms, implying both aesthetic and cognitive processing have an evolutionary basis [13]. The current study is consistent with these claims and demonstrates that perception and use of visual rhythm are not culturally localized but rather can be trained and utilized universally.

Research should explore the developmental relationship between rhythm perception and spatial cognition in children and its effects on STEM-related subjects. Works such as the ones by Winner et al. demonstrate that pattern recognition in mathematics is enhanced by arts education, and like Ludke, Wolf and Musacchia, their works suggest that rhythm-based visual training might be used as a cross-domain intervention [12].

To conclude, this study supports the notion that rhythm is not a secondary issue, it forms part of the core principles of visual composition leading perception, cognition, and production. It influences from visual attention to building objects, providing an architecture for efficient, expressive and accurate visual communication. Rhythm serves both as a perceptual guide and a creative grammar to help people translate abstract ideas into meaningful visual representations.

By establishing the cognitive, pedagogical, and expressive potential of rhythmic visual organization, the present investigation offers a better understanding of how we think in images—and how we might better teach others to do so. With proper training and curricula, rhythm can be made to be more than a principle of art; it becomes a tool for thinking.

**Conclusion.** The rhythmical structuring of visual thinking and its role in form-creation in both the arts and in education have been examined, leading to an understanding of how rhythm may act as a cognitive device rather than merely as an aesthetic behaviour. It emerged from a mixed-methods approach (experimental tasks, Eye tracking measures, and photomontage tasks) that Rhythm principles are deeply rooted in the way expert individuals perceive, process and design visual contents. The novelty of the study lies in its complete and evidence-based demonstration of the pivotal role of rhythmic structure in artistic expertise, which can be carried over to wider cognitive and educational domains.

One of the most surprising discovery of our studies is that rhythm is a perceptual “engine” driving the way we explore and compose our visual reality. The fact that art students showed significantly higher complexity in rhythm scores, and higher ratings for symmetry and for gaze transitions, suggest that rhythm is perceived and enacted in a far more organized and economical manner among those receiving formal training. This corroborates previous theorizing on embodiment and visual cognition and advances theoretical conceptions of embodiment by further grounding such patterns in task-performance on a non-vision control form construction task.

Furthermore, integrating rhythm logic into the thought process has shown to improve the participant enthusiasm, execution speed, and design correctness. These results are of interest not only to visual arts education but are also applicable to interdisciplinary instructional strategies in which pattern recognition, structure, and spatial reasoning play a critical role—such as in mathematics, architecture, engineering, and computer science. In this way, rhythm reveals itself to be an elementary ordering principle which spans both creative and analytical spheres.

A further key finding in this study is that rhythm can act as a kind of ‘cognitive scaffolding’ that allows complex visual forms to be constructed more readily and efficiently. With general education students performing far below art students, the benefits of integration of rhythmic design activities in a general curriculum are obvious. In the process, it might give those who won’t receive formal artistic instruction but who will work daily with visual information and design problems, as students or in their future careers, the means to become familiar, visually literate members of a larger local community.

A glimpse into the way art students describe their thought processes in reflective interviews rich of metaphors to sound, movement, rhythmic quality and tempo also hinted at the multimodal aspect of rhythmic cognition. In this collective signatory pattern, rhythmicity cannot be separated from the multisensory; it is reflected across kinaesthetic, auditory and spatial intelligences. Consequently, the cognitive apprehension of rhythm should receive more attention in psychological and educational research.

For the future, a few directions for further research are suggested. Firstly, longitudinal studies could address the development of rhythmic competence with respect to time and the influence of early visual training. Research of this type could offer evidence of the lasting cognitive impact of rhythm instruction and in turn lend support to the curricular changes in early-childhood education. Second, cross-cultural research might study how other artistic traditions, including those found in Central Asia, Africa, or indigenous cultures, integrate rhythmic conventions, and the role played by their rhythmic patterns in influencing cognitive style and visual reasoning. This would cultivate the universality of the present results, while honouring the diversity of aesthetic systems.

Moreover, neurocognitive studies might extend the current investigations by applying functional imaging to investigate how rhythm-related visual tasks are processed in the brain. By contrasting these profiles by expertise level and expertise training more insights into a potential brain signature of visual rhythm processing can be gained. Last, educational technology can be designed to facilitate rhythm-based learning, especially in virtual or augmented reality environment, where visual rhythm can be interactively manipulated for better learning effect.

In a broad context, this investigation has placed rhythmic organization not as one style requirement but as a fundamental cognitive capacity holding critical implications for how people think, perceive and make with visual form. Its implications transcend the studio or the classroom to provide tools and strategies that can support thinking in multiple disciplines. As a both a visual and cerebral structure, rhythm has the capacity to impose order on chaos, to make the complex simple again, to give a sense of reason to the creative, and it should be granted a significant role in how we approach the way we teach, learn and imagine our visual worlds.

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## **INTERACTIVE STRATEGIES FOR MASTERING CULTURAL DIPLOMACY THROUGH VIRTUAL LANGUAGE AND ARTISTIC SYSTEMS**

### *Abstract*

This article discusses interactive scenarios for learning cultural diplomacy, and virtual language immersion combined with art collaboration in a simulation-based learning environment. Situated in the socio-cultural context of Kazakhstan, a multilingual and multiethnic country, the participation responds to the national priorities of digital education, intercultural competences and global engagement. A mixed methods research design was utilised with 120 participants, participating in three modules spread over a period of 12 weeks. Quantitative instruments of intercultural communicative competence, in conjunction with analysis of participant discourse and creative work, supplied a rich understanding of gains.

Results suggested that the diplomatic simulation-based component resulted in the greatest increase in cultural proficiency, conflict resolution, and cross-cultural communication. The arts integration module focused