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POMEN KOMPLEKSNEGA MIŠLJENJA V PROCESU UČENJA ARHITEKTURNE KOMPOZICIJE

COMPLEX THINKING IN THE PROCESS OF LEARNING ARCHITECTURAL COMPOSITION

izvleček

V učnem procesu, katerega cilj je razvijanje kreativne ustvarjalnosti, ima osrednjo vlogo t. i. kompleksno mišljenje. To je pomembno tako za razumevanje procesa učenja kot za senzibilizacijo in intenziviranje posameznikovih kreativnih zmožnosti.

Z multidisciplinarnim pristopom, različnimi miselnimi strategijami in tehnikami kreiranja in reševanja problemov se pri posamezniku in skupini spodbujajo kreativnost, inovativnost, timsko sodelovanje in kritično mišljenje. V članku so predstavljeni štirje primeri procesa kreiranja inovativnih idej, prevedenih v kompleksne grafične kompozicije, ki predstavljajo kombinacijo arhitekturnih in likovnih vsebin, izkušenj, etične in estetske senzibilnosti, eksistencialnega zavedanja ter razvoja celostne osebnosti.

abstract

In the learning process which aim is developing original creativity, has its central role complex thinking. This is important for the sensibilisation and intensification of the individual creative abilities. Multidisciplinary approach, various mind strategies and techniques of creating and resolving problems encourage by the individual and the group creativity, innovation, teamwork and critical thinking. The article represents four examples of the process in which new creative ideas, translated into complex graphical compositions representing the combination of architectural and fine arts contents, experience, ethical and esthetical sensitivity, existential self-awareness and the holistic personal development, are born.

Uvod

Sodobna družba se nenehno spreminja in zahteva hitre odzive. Vpliv sodobne potrošniške, medijske in informacijske kulture, o kateri govori Juhani Pallasama (2012) kot o sodobnem manipulatorju človeškega uma, ki pozablja na etičnost in eksistencialna vprašanja, je potrebno spremeniti na vseh ravneh družbenega delovanja. Potrebno je poudariti pomen, prisotnost in neodvisnost izkustva. In prav arhitektura zahteva posebno vrsto mišljenja – utelešeno mišljenje skozi arhitekturni medij, ki se ne artikulira v estetski dovršenosti, temveč v globini in vznemirljivosti čustev in temelji na soočenju izkustva, spomina in identitete.

O spominu kot skrivnosti razpoloženja v arhitekturi govori tudi Peter Zumthor (2005): "Takšni spomini vsebujejo najglobljo arhitekturno izkušnjo, ki jo poznam. So rezervoarji arhitekturnih atmosfer in podob, ki sem jih raziskoval v svojem arhitekturnem delu."

Arhitektura in oblikovanje sta že nekaj let v procesu preobrazbe in se kritično oddaljujeta od formalističnega končnega izdelka brez identitete, etične in socialne komponente, kakršnega so narekovali prevladujoči ekonomsko-politični lobiji.

Arhitektura v vlogi brezčutne ikone, ki ji je bila dodeljena v 90., v svojo fizično pojavnost ni vključevala delovnih procesov, sodelovanja različnih dejavnikov, zavedanja in doživljanja. Danes se ta umika praksi t. i. participatorne arhitekture in metodologiji,

Introduction

Contemporary society is in a state of constant flux. This calls for quick reactions to change and adaptability. Juhani Pallasama (2012) refers to the contemporary media and information culture as "the modern manipulator of the human mind that forgets ethics and existential questions". It's effects need to be changed on all levels of social structure. Instead of consumerism the focus should be on meaning, presence and independence of experience. Architecture requires a specific complexity of thinking- a projection of thought into the architectural medium, that does not express itself in aesthetic perfection, but relies on depth and excitation of emotion. Its essence lies in the coming together of experience, memory and identity.

Another mention of memory as the secret to architectural atmosphere comes from Peter Zumthor (2005): "Memories like these contain the deepest architectural experiences that I know. They are reservoirs of the architectural atmosphere and images that I explore in my work as an architect."

In this way we encourage people to start thinking critically about contemporary production. "[…]if people were encouraged to build a table with their own hands…they would be able to understand the thinking behind it." (Enzo Mari, 1974)

This is why nowadays influential currators, architects, designers, profesors, media gurus, bloggers have an important role in

ki se je pojavila že v 70. in 80. letih v Skandinaviji, Ameriki, in Belgiji, in sicer kot nova paradigma v razmerju med arhitektom in naročnikom, kjer slednji postane del učnega in eksperimentalnega procesa. Enzo Mari s projektom Autoprogetazione posreduje metodo učenja self-design, kjer posameznik skozi lastno izkušnjo in vajo izboljša svoje razumevanje procesov oblikovanja. Uporabniku ponudi aktivno vlogo pri procesu ustvarjanja svojega lastnega pohištva in pravi: "[…] na ta način spodbudimo ljudi, da začnejo kritično razmišljati o sodobni produkciji. Če motiviramo ljudi, da si sami izdelajo mizo, bodo sposobni razumeti miselni proces, ki stoji za tem." (Enzo Mari, 1974)

Zato imajo danes vplivni kuratorji, arhitekti, oblikovalci, profesorji, medijski guruji, blogerji, pomembno vlogo pri posredovanju sporočil javnosti in lahko družbo spodbudijo k ustrezni refleksiji realnosti. Ozaveščena družba se zaveda svoje etične odgovornosti, se kritično odziva na posledice novih tehnoloških procesov in je odprta za drugačne rešitve.

In zakaj koncepti iz preteklosti ne vsebujejo tehnološke skušnjave? Zakaj sta Charels in Ray Eames verjela v tehnologijo? Zakaj njune stvaritve nepretrgoma zadovoljujejo fizične in mentalne potrebe ljudi še danes? Je odgovor fascinacija, strast, kompleksnost, odprtost, sodelovanje, vizionarstvo, eksperiment, motivacija?

Joseph Grime, sokurator lanskoletnega istanbulskega bienala oblikovanja je v intervjuju o razstavi Adhocracy (Ambient, 2012) poudaril, da ga ne zanima individualni pristop, temveč sodelovanje in mreženje. To mu je uspelo z odprto kuratorsko zasnovo in fluidnim prehajanjem med posameznimi disciplinami od umetnosti do oblikovanja, arhitekture in urbanizma, do politike in družbe.

Jan Boelen, belgijski kurator ljubljanskega BIO-a odpre platformo – testni poligon, na katerem šest mesecev preizkušajo in odkrivajo različne procese, ki nimajo predefinirane smeri razvoja in cilja. Vlogo velikih kreatorjev prepusti mreži različnih kreativnih posameznikov.

Podobne prakse odprtih platform in različnih oblik participatornosti so v zadnjih letih močno prisotne tudi v arhitekturi. Na razstavi Small Scale Big Change: New Architecture of Social Engagement v MOMI, New York (2010) so arhitekti Alejandro Aravena, Françies Kéré, Teddy Cruz, Rural Studio, Anna Heringer idr. predstavili različne pristope, ki združujejo arhitekturno prakso z metodologijo učenja procesov, ki nimajo le lokalnega pomena reševanja socialno ekonomskih problemov, temveč vpliv na širše globalno dogajanje. Pomembno je, da arhitektura tudi skozi učni proces ustvari polje kreativnih pristopov, ki spodbujajo eksperimentiranje, inovativnost, neodvisno eksistencialno izkustvo, sodelovanje in kompleksno mišljenje. S takim pristopom je možno spremeniti globalno mišljenje, spodbujati inovativnost in družbenokritično misel, o čemer govori tudi francoski filozof in sociolog Edgar Morin v knjigi Seven Complex Lessons in Education of the Future, kjer pravi: "Za artikulacijo in organzicijo, s katerima prepoznamo in razumemo probleme sveta, potrebujemo reformo v mišljenju. In ta reforma je paradigmatična in ne programirana. To je temeljno vprašanje za izobraževanje, ki se ukvarja s sposobnostmi organizacije znanja." Njegovi principi poučevanja reševanja problemov izhajajo iz konteksta, globalnosti, večdimenzionalnosti in kompleksnosti in ne iz navidezne univerzalnosti.

Teme današnjega poučevanja arhitekture morajo torej preseči strogo racionalno, tehnično in intelektualno mišljenje in se soočiti z izkušanjem

conveying messages to the public and can therefore encourage society towards an appropriate contemplation of reality.

A conscious society is aware of its ethical responsibilities, responds critically to the consequences of new technological advances and is open to divergent solutions.

Why don't past concepts mention the allure of technology? Why did Charles and Ray Eames place their trust in it? Why do their creations continue to satisfy people's physical and mental needs even today? Does the answer lie in fascination, passion, complexity? Perhaps openness, collaboration? Vision, experimentation and motivation?

Joseph Grime, the co-curator of last year's Istanbul design biennial, when interviewed about the Adhocracy exhibition (Ambient, 2012), emphasised that he is not interested in the individual approach, but cooperation and networking. He has succeeded in doing this by employing an open curator design and moving fluidly between disciplines, from art to design, architecture and urbanism, to politics and society.

Jan Boelen, the Belgian curator of Ljubljana BIO, set up a platform- a testing space, where for six months it was possible to test and explore different processes that had no predefined direction of development or goal. The role of great creators was left to a group of creative individuals.

In the last few years similar practices of open platforms and various forms of participation have made a noticeable appearance in architecture.

On the exhibition Small Scale Big Change: New Architecture of Social Engagement in MOMA, New York (2010), the architects Alejandro Aravena, Françies Kéré, Teddy Cruz, Rural Studio, Anna Heringer, et al. introduced various approaches that connect architectural practice with learning processes methodology, which are not just of local importance in solving socio economic problems, but affect wider global happenings.

It is important for architecture to open the field for creative approaches trough the learning process. This encourages experimentation, inovativeness, the independent existential experience, cooperation and complex thinking.

Approaching things in such a way makes it possible to engage thinking, inovativeness and socially critical thought on a global scale. The french philosopher and sociologist Edgar Morin: "To articulate and organize and thereby recognize and understand the problems of the world, we need a reform in thinking. And this reform is paradigmatic, not programmatic. It is the fundamental question in education, because it concerns our ability to organize knowledge."

The principles behind his teachings of problem solving originate in context, globality, multidimensionality and complexity, not apparent reality. The subject matter of contemporary architecture must therefore exceed the strictly rational, technical and intellectual thinking and immerse itself in the experiencing of physical space. As Zumthor (2005) says: "To experience architecture in a concrete way means to touch, see, hear, and smell it."

In the process of architectural creating2 and learning a specific way of thinking combines vertical and lateral thinking. Their relationship as defined by Edward de Bono (2006): "Lateral thinking increases the effectiveness of vertical thinking. Vertical

fizičnega (prostora) oziroma, kot pravi Zumthor (2005): "Konkretno izkušanje arhitekture pomeni, da se jo je potrebno dotakniti, jo videti, slišati in vonjati."

V procesu arhitekturnega ustvarjanja2 in učenja specifičnega načina mišljenja se morata združiti vertikalno in lateralno mišljenje, katerih odnos definira Edward de Bono (2006): "Lateralno razmišljanje poveča učinkovitost vertikalnega. Vertikalno razvija ideje, ki jih lateralno generira," in nadaljuje: "konceptualno, intelektualno in geometrizirano povežemo s spontanostjo, senzualnostjo in taktilnostjo."

Pri tem ima zelo pomembno vlogo eksperiment, ki, kot pravi Beatrize Colomina (2012): "[...] je v drugi polovici 20. st. oblikoval arhitekturni diskurz in prakso." Raziskovalni projekt Radical pedagogies: action-reaction-interaction, predstavljen na 14. arhitekturnem bienalu, je morda odgovor, kako skozi serijo pedagoških eksperimentov oblikovati nove strategije in radikalne ideje.

Opredelitev problema in metoda

1. Opredelitev problema

V sedanji praksi pri poučevanju arhitekture in njenih kreativnih vsebin ni dovolj kompleksnega razmišljanja in zato niso doseženi željeni rezultati inovativnosti, čutnosti, kritičnega mišljenja, timskega dela.

2. Teza

Z uporabo multimedijskega pristopa, senzoričnega dojemanja prostora, vživljanja v prostor, spodbujanja domišljije, motivacijo in s pozicioniranjem ter aktivno participacijo posameznika v skupini se ustvari odprto polje za eksperimentiranje, ki širi meje kompleksnega dojemanja, izraznosti in komunikacije.

3. Metoda

Za boljšo motivacijo in razumevanje procesov kompleksnega mišljenja in problematike so v učnem procesu vaje zasnovane tako, da se stopenjsko razvijajo, nadgrajujejo in preverjajo razumevanje kreativnega procesa posameznika.

Vaje se izvajajo v zimskem semestru v štirinajstdnevnem ciklu.

Tematsko obravnavajo osnove arhitekturnega načrta (tloris, prerez, pogled, fasada, aksonometrija), njihovo grafično pojavnost in kompozicijo. V povezavi z osnovnimi likovnimi prvinami (točka, linija, oblika, barva, svetlo-temno) in likovnimi lastnostmi ter razumevanjem prostorskih dimenzij se ustvarjajo različne povezave in odnosi. Z uvajanjem različnih tehnik (odtis v grafitu, tekst, fotografija, origami, model, performans) in z različnimi miselnimi strategijami odvzemanja, dodajanja in spreminjanja informacij nastajajo kompozicije abstraktnih grafičnih zapisov z računalnikom. Z menjavo medijev, multidisciplinarnim pristopom, delom v skupini, pozicioniranjem posameznika v skupini, izkušanjem in doživljanjem se spodbuja mnogostransko procesiranje različnih informacij v kompleksno celoto.

Za izhodišče ima vsaka naloga citat različnih umetnikov, arhitektov, glasbenikov, performerjev, filozofov, matematikov. V miselnem procesu se posameznik izraža skozi skico, tekst, model, kolaž, fotografijo, video itn. Končna izvedba abstraktne grafične kompozicije je izvedena z računalnikom v različnih programih (AutoCAD, ArchiCAD, Adobe Illustrator, Photoshop, InDesign) na formatu B2.

thinking expands on the ideas that lateral thinking generates." Furthermore: "[...] we connect the conceptual, intellectual and geometrization with spontaneity, sensuality and tactility."

A vital part of this process is the experiment. As Beatrize Colomina (2012) states: "Pedagogical experiments played a crucial role in shaping architectural discourse and practice in the second half of the 20th century."

Perhaps the key to forming new strategies and radical ideas trough pegagogical experiments lies in Radical pedagogies: action-reaction-interaction, a research project exhibited on the 14th Venice Architecture Biennale.

Problem definition and the method

1. Problem definition

The current practice of teaching architecture and its creative contents is lacking in complex thinking, which does not produce the desired level of innovation, sensibility, critical thinking and team work.

2. Thesis

With the use of multimedia, a sensory perception and envisioning of space, the imagination, motivation, positioning and active participation of the individual inside the group, we create an open field for experimentation, that spreads the borders of complex awareness, expression and communication.

3. Method

In order to increase motivation, better the understanding of the processes of complex thought and the possible difficulties associated with them, the syllabus of practical lessons is designed in a way that enables gradual progress, further improves and tests the individual's understanding of the creative process.

The practical classes take place in the winter semester, per a two-week cycle.

Thematically they cover the starting points of architectural planning (floor plan, cross-section, view, facade, axonometric projection), their graphical form and composition. Connections and relationships are formed by combining basic artistic elements (point, line, form, colour, light-dark) with artistic qualities and understanding of spatial dimensions.

By using different techniques (graphite print, text, photography, origami, models, performance) and mental calculations of adding to, substracting and changing of information, we create abstract computer compositions.

Changing media, applying a multidisciplinary approach, group work, positioning the individual inside the group, trying out and experiencing encourages a multifaceted processing of information into a complex whole.

The starting point of every assignment are quotes from artists, architects, musicians, performers, philosophers, mathematicians. In mental processing every individual expresses themselves trough a sketch, text, model, collage, photography, video, etc. The final instalment of a graphic composition is then made by using computer programes, such as AutoCAD, ArchiCad, Adobe Illustrator, Photoshop and InDesign, in B2 format.

Učenje kot proces

V nadaljevanju so predstavljeni štirje primeri abstraktnih grafičnih kompozicij, ki so rezultat procesa kompleksnega mišljenja. Prevod racionalnotehničnega pojma arhitekturnega načrta njegovih materialnih lastnosti v abstraktni jezik likovnih prvin in likovnih spremenljivk se v kontekstu prostora realizira kot platforma kreativnega procesiranja različnih informacij in njihovih medsebojnih odnosov.

Kombinacije odnosov posameznih likovnih prvin in njihovih lastnosti v kontekstu prostora s svojo natančno geometrijo pripomorejo k razumevanju procesa poteka postopka kreiranja inovativnih idej. Nastale abstraktne grafične kompozicije predstavljajo kombinacijo strokovnega znanja, izkušenj, etično in estetsko senzibilnost, eksistencialno zavedanje in razvoj celostne osebnosti.

1. Taktilno mišljenje

S taktilnim mišljenjem se spodbuja senzorična občutljivost za prostor in se odpira nov pogled na soočenje z razlikami v doživljanju, obnašanju, zaznavanju, interpretaciji in procesiranju informacij. Intuitivno opazovanje prostora, definiranje teksture in raziskovanje njenih lastnosti, ki jih lahko občutimo in vidimo, se s pogledom skozi fotoaparat in odtisom na papir popolnoma spremeni. Prevod v abstraktni linijski zapis iz črk ustvarja grafične kompozicije senzoričnih in dinamičnih zaznav.

"Ko 'Ego' pride v neznano deželo in mesto, sprva vse doživlja s telesom: z vonjem in okusom, z nogami, če se ne omeji na ogled mesta z avtom. Doživlja s sluhom, z zaznavanjem zvokov, glasov, njihovih lastnosti. S pogledom: prišleka preplavi dogajanje, ga bode v oči. Prostor zaznavamo, živimo in proizvajamo s telesom." (Henri Lefebvre, 2013)

2. Iluzija prostora

Eksperimentiranje in razumevanje transformacij dvodimenzionalnega prostora v tridimenzionalni prostor in obratno ter ustvarjanje optičnih iluzij tridimenzionalnega prostora z natančnimi, matematično definiranimi sistemi (origami), ki se artikulirajo v odnosih med različnimi materiali v jeziku likovnih spremenljivk in njihovih povezav. Z intuitivnim izkustvenim raziskovanjem in ustvarjanjem se doseže razumevanje posameznih faz procesa, čiste geometrije, kontrasta in odnosov med različnimi lastnostmi (teorem štirih barv), ki vodi skozi eksperiment dodajanja in spreminjanja informacij do harmonično urejene popolne kompozicije.

"Oko lahko potuje po površini, tako kot se giblje po naravi. Mora čutiti božanje in pomirjenost, izkušati trenja in prelome, drsenje in valovanje. V enem trenutku ne vidi več ničesar, a že v naslednjem se zdi, da je platno ponovno polno vizualnih dogajanj." (Bridget Louise Riley)

3. Metamorfoze prostora

Raziskovanje neznanega teritorija in načrtovalni proces ustvarjata novo mentalno informacijsko shemo urbanega in arhitekturnega miselnega procesa. Z vmeščanjem različnih kompozicij volumnov v mentalni urbani prostor in s prehajanjem med različnimi merili

Learning as a process

Next I will present four examples of abstract graphic compositions that are the result of the process of complex thinking. The translation of a rational-technical concept of an architectural plan and its material properties into the abstract language of the elements and principles of art, becomes realized in the context of space as a platform for creative processing of different information and their respective relationships.

Combining separate artistic elements and their characteristics in the context of space with its precise geometry helps with understanding of the proces that brings about the creation of innovative ideas. The resulting abstract graphic compositions represent a coming together of expertise, experience, ethical and aesthetic sensibilities, existential awareness and personality development.

1. Tactile thinking

Tactile thinking encourages sensory sensitivity in space and opens up a new perspective for confronting differences in experiencing, behaviour, perception, interpretation and processing of information. Our intuitive perception of space, the way we define texture and explore its properties, are subject to change when viewing them trough a camera or transfering them onto paper. Translating letters into abstract linear recordings creates graphical compositions out of sensory and dynamic perceptions.

"When 'Ego' arrives in an unknown country or city, he first experiences it through every part of his body - through his senses of smell and taste, as (provided he does not limit this by remaining in his car) through his legs and feet. His hearing picks up the noises and the quality of the voices; his eyes are assailed by new impressions. For it is by means of the body that space is perceived, lived - and produced." (Henri Lefebvre, 1991)

2. The illusion of space

Experimenting and understanding the transformation of a two-dimensional space into three dimensions and vice versa, along with creating optical illusions in three-dimensional space by employing precise, mathematically defined systems (origami). These are articulated in the relationships between various materials using the language of artistic variables.

With intuitive experiencing and exploring creativity we come to know every phase of the proces, from pure geometry, contrast and relationships between different characteristics (the four color theorem). They guide us trough the experimentation of adding and changing of information until we produce a harmoniously perfect composition.

"The eye can travel over the surface in a way parallel to the way it moves over nature. It should feel caressed and soothed, experience frictions and ruptures, glide and drift. One moment, there will be nothing to look at and the next second the canvas seems to refill, to be crowded with visual events." (Bridget Louise Riley)

ustvarjamo različne plasti urbanih mrež in vzorcev, ki z nenehno redefinicijo spreminjajo kompozicijo in spodbujajo kreativno mišljenje in prostorske zaznave. Nastale mentalne kompozicije so kreacije posameznikovega zaznavnega procesa, ki dovoljujejo odmik od realnosti in možnost vživljanja v različne prostorske scenarije.

"Mesto za uporabnike ni lepa fasada, ampak cona pogajanj, sestavljena iz mrež in sistemov [...] Arhitekti morajo svoje načrtovanje in oblikovanje nadomestiti s povezovanjem in interaktivnostjo na številnih ravneh in skozi številne plasti. Razumeti morajo, da morajo biti stavbe naseljene in raščene, [...] da mora arhitektura uspevati [...] Mesto mora rasti tako v njegovi vidni nematerialnosti kot v njegovi nevidni konstrukciji." (Roy Ascott, 1995)

"Mi uporabljamo besedo metabolizem v njenem širšem pomenu, ki vključuje rast in metamorfoze. Biološki metabolizem se nanaša na spremembe in izmenjave substanc znotraj živega organizma. Urejamo odnose med prepletajočimi se tokovi informacijskih

3. The metamorphosis of space

The exploration of an unknown territory and the process of planning bring about a new mental information scheme of the urban and architectural thinking process. By inserting various compositions of volumes into the mental urban space and making use of different scales we bring forth different layers of urban networks and patterns. Their composition is in a state of constant change caused by redefinition. This encourages creative thought and spatial awareness. The emerging mental compositions are the product of the individual's perception, which allows for a withdrawal from reality and visualizing oneself into different spatial scenarios.

"To its everyday users, a city is not just a pretty facade. It's a zone of negotiation made up of a multitude of networks and systems. [...] Instead planning and designing must apply connectivity and interaction to four quite different zones [...]
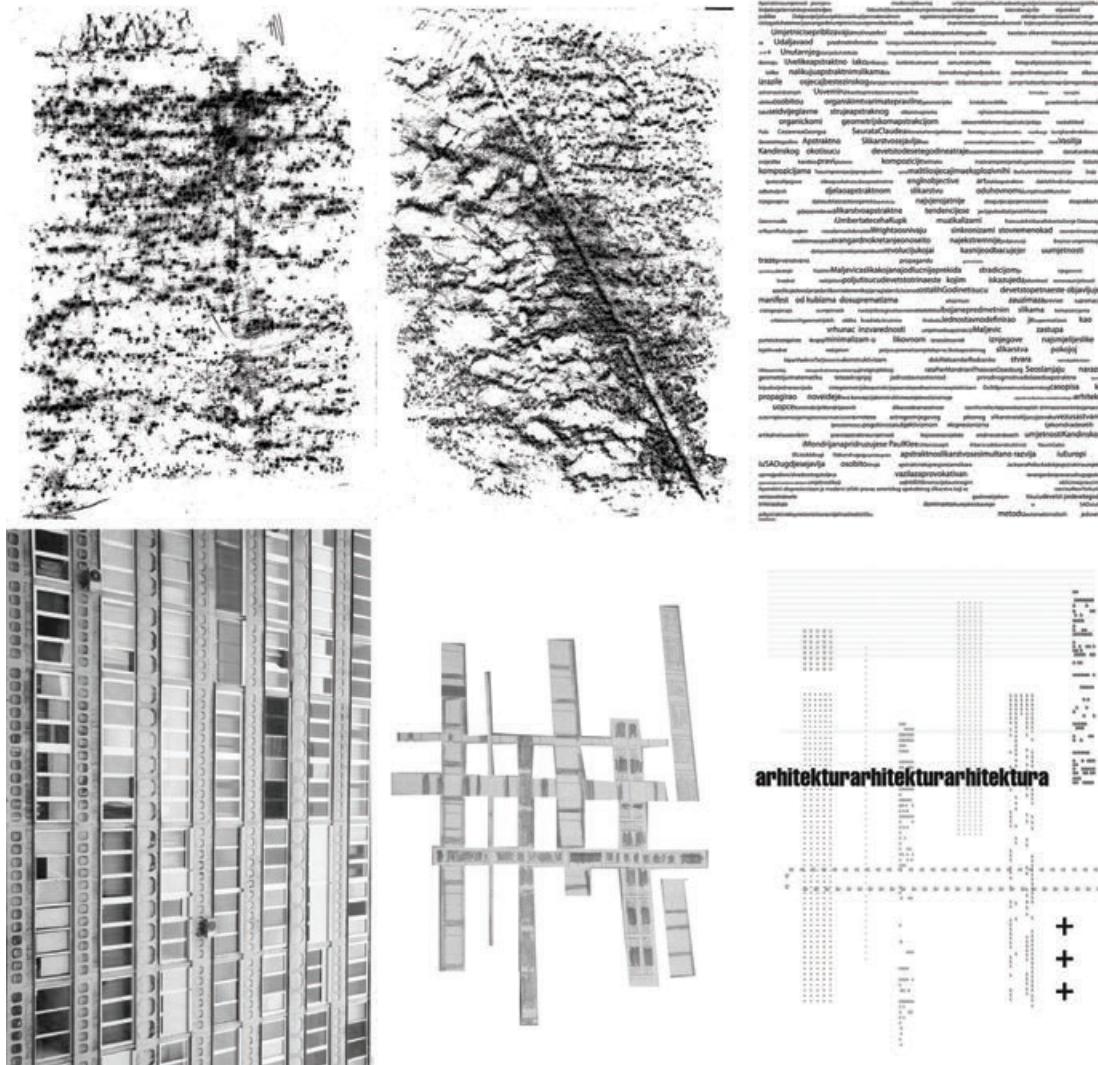
Slika 1: Vidno in taktilno izkustvo vodi do kompleksnega procesa čutne artikulacije, prevedene v abstraktno kompozicijo teksture iz črk. Natipkana kompozicija omogoča 3 variacije na temo: velikost črk, smer in poudarjene/nepoudarjene linije. Poudarjeno je intenzivno eksistencialno izkustvo različnih senzoričnih zaznav. (Zgoraj: Karla Ritoša, spodaj: Ana Skobe, Predstavitvene tehnike 1, 2013/14)

Figure 1: Visual and tactile experience leads to complex process of sensual articulation, translated into abstract composition of lettered texture. Typed composition enables three variations on the topic: letter dimension, direction and bolded/not bolded lines. The intensive existential experience of varied sensorial perceptions is stressed here. (Above: Karla Ritoša, below: Ana Skobe, Representational techniques 1, 2013/2014)

vzorcev ljudi, stvari in energije (energijski metabolizem) in prostorskimi enotami ločenih servisnih in bivalnih celic glede na različne metabolične ritme (materialni metabolizem). Sistem rasti, ki vključuje količinsko širjenje, se pokaže kot metamorfoza v celotni obliki sistema. (Kisho Kurokawa, 1996)

4. Interakcija – mentalno fizična izkušnja v prostoru in času

Preskok iz mentalnega abstraktnega prostora v fizični realni prostor pomeni ustvarjanje odnosov in odzivnost na spremembe v realnem prostoru in času. S pozicioniranjem posameznika v prostor in z izmenjavo vlog performerja in opazovalca se omogoči razumevanje posameznikovih potencialov, čustvene zrelosti in kritičnega mišljenja ter je pomembno za spodbujanje in razvijanje njegove individualne kreativnosti in razumevanje prostora. V procesu sodeluje celotna skupina s kritiko, vprašanji in odgovori. S tem se krepi motivacija timskega sodelovanja.

It will only be with the understanding that buildings must be planted and grown that architecture will flourish [..] The new city, both in its visible immateriality and its invisible construction, will grow into a fruitful reality only if it is seeded with imagination and vision." (Roy Ascott, 1995)
"We use the word metabolism in the widest sense, which includes growth and metamorphosis. Biological metabolism pertains to changes and exchange of substance within living organisms. We manage relations between intertwined flows of himan information patterns, things and energy (energy metabolism) and spatial units of separated service and living cells with respect to differing rhythms of metabolism (material metabolism). Systems of growth that include expansion of quantity show themselves as metamorphosis within the whole form of the system." (Kisho Kurokawa, 1996)
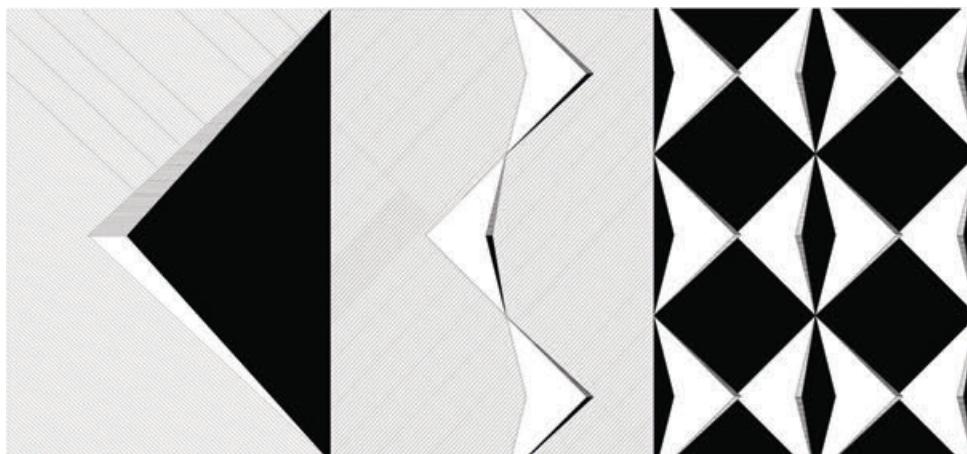
Slika 2: V origami tehniki prepogibamo papir (10x10) in konstruiramo kompleksne 3D modele. Novonastala dvodimenzionalna kompozicija osnovnega modela, ki je sestavljena iz geometrije črt, oblik in čistih matematičnih razmerij postane izhodišče za nadaljnjo kompozicijo na velikem formatu. Z enostavnimi in kompleksnimi odnosi med barvo, obliko, ploskvijo in prostorom ustvarjamo novo kompleksno kompozicijo in optično iluzijo tridimenzionalnega prostora. (Zgoraj: Dan Mrevlje Natlačen, spodaj Ana Skobe, Predstavitvene tehnike 1, 2013/14)

Figure 2: We are folding the paper in origami technique and constructing complex 3D models. New two-dimensional composition of the basic model, combined from line geometry, shapes and pure mathematical proportions, becomes the starting point for further composition in the large format. With simple and complex relations between colour, shape, surface and space we are creating new complex composition in optical illusion of the three-dimensional space. (Above: Dan Mrevlje Natlačen, below: Ana Skobe, Representational techniques 1, 2013/2014)
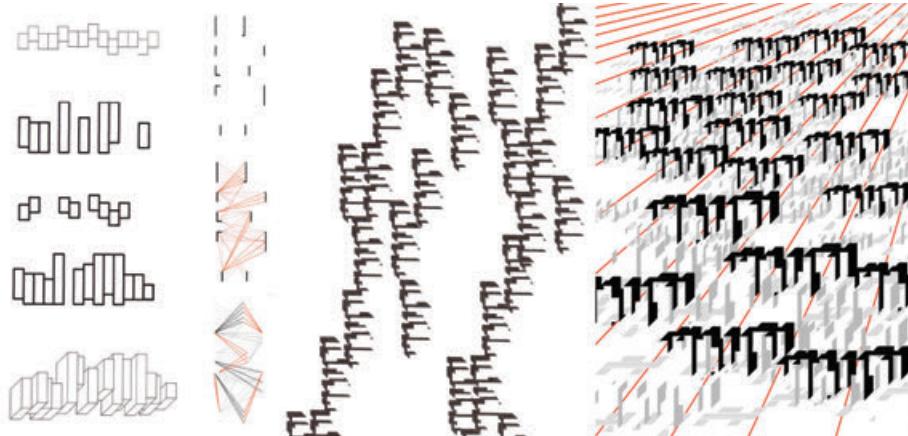
Slika 3: Z modelom se ustvari kompozicija volumnov v različnih oblikah (I, L, U, T, H). Sestavljanje in nalaganje volumnov tvori horizontalno kompozicijo - niz, ki ima določene odprte in zaprte površine. V kontekstu urbanega prostora ustvarjamo kompozicijo, sestavljeno iz mrež, horizontalnih volumnov, tlorisov in pogledov. (Ana Skobe, Predstavitvene tehnike 1, 2013/14)

Figure 3: With the model the composition of volumes in different shapes is created (I, L, U, T, H). The horizontal composition based on assembling and loading volumes - a set of open and closed surfaces. In the context of urban space the composition is created by consisting the networks of horizontal volumes, plans and views. (Ana Skobe, Representational techniques 1, 2013/14)

Slika 4: Performans pomeni vzpostavitev interaktivnega odnosa z obiskovalcem, ki ponuja aktivno fizično in mentalno izkušnjo in izraža um ter senzibilnost posameznika.(Ana Skobe, Predstavitvene tehnike 1, 2013/14)
Figure 4: The performance includes the creation of an interactive relationship between artist and the public. It is some kind of an active physical and mental experience and express the mind and sensibility of the individual. (Ana Skobe, Representational techniques 1, 2013/14)

"Kaj je performans? Je neke vrste mentalni in fizični konstrukt, pri katerem umetnik stopi pred publiko. Performans ni gledališče, ni nekaj kar bi se naučil in potem odigral vlogo nekoga drugega. Je predvsem neposreden prenos energije [...] Več je publike, boljši je performans, več energije potuje skozi prostor." (Marina Abramović, 2002)

Zaključek

Pri razvijanju ustvarjalnega mišljenja v arhitekturi se skozi proces nalog ugotovi, da se z različnimi pristopi, mediji, tehnikami in s kombinacijo vertikalnega in lateralnega mišljenja razvija komplementarno mišljenje in dojemanje ter reševanje zahtev kompleksnosti grafične kompozicije in njenih vsebin. Pri tem ima velik pomen proces kreiranja spremenljivk in razvoj različnih miselnih strategij za reševanje njihovih medsebojnih odnosov. S takim pedagoškim pristopom se pri posamezniku spodbuja razumevanje kompleksnega mišljenja, motivacija in strast, ki sta ključni komponenti ustvarjalnosti in timskega sodelovanja.
Multidisciplinarni pristop, prepletanje arhitekture z različnimi disciplinami, od sodobne likovne umetnosti, grafičnega oblikovanja do filma, informatike, matematike, sociologije, filozofije itn., ponuja odprt, konstruktiven dialog in širi meje v prostoru, času, izraznosti in senzoričnem dojemanju.
Z dvosmerno komunikacijo študent – profesor in z individualno-skupinskim pristopom, kjer je vsak posameznik v skupini javno pozicioniran, se doseže konstruktiven dialog in razumevanje potenciala ali pomanjkljivosti posameznika in skupine. V procesu sodeluje celotna skupina s kritiko, vprašanji in odgovori. Tak način omogoča boljše razumevanje razvoja posameznikove osebnosti, njegove kreativnosti, inovativnosti, čustvene inteligence in kritičnega mišljenja ter hkrati motivira posameznika, da doseže pričakovane rezultate – razumevanje procesa kompleksnega mišljenja.

4. Interaction- a mental and physical experience in space time

Leaping from the mentally abstract space into space inhabited by physical reality means establishing relationships and interacting in real space and time. By assigning a position to the individual inside the group, while at the same time switching between the roles of performer and observer, we encourage better understanding of their potential, emotional maturity and critical thinking. All of these are important for the development of creativity and spatial awareness. The whole group participates in the proces with critical discourse, questioning and answering. In this way we strengthen the incentive for group cooperation.
"First of all: what is performance? Performance is some kind of mental and physical construction in which an artist steps in, in front of the public. Performance is not a theatre piece, is not something that you learn and then act, playing somebody else. It's more like a direct transmission of energy...The more the public, the better the performance gets, the more energy is passing through the space." (Abramović, 2002)

Conclusion

While cultivating creative thinking in architecture we realize through the process of assignments that with the use of different approaches, media, techniques and by combining vertical and lateral thinking, we evolve the complex thinking and perception necessary for solving the demands for complexity of graphical compositions and their contents.
In this the importance lies on the proces of creating variables and the development of various strategies of thinking in order to interpret their reciprocal relationships. This kind of pedagogical approach encourages the understanding of complex thinking, motivation and passion, which are key components of creativity and team cooperation.
A multidisciplinary approach, intertwining architecture with other disciplines, from contemporary visual art, graphic design, to film, informatics, mathermatics, sociology, philosophy, etc. sets up the groundworks for an open, constructive dialogue and widens the boundaries of space, time, expression and sensory perception.
Setting up two-way communication between student-professor and with individual-group approach, where each person is openly positioned, we set up the groundworks for constructive dialogue and understanding the potentials and weaknesses pertaining to the individual or group.
Constructive dialogue and an awareness of the individual's or group's potentials and weaknesses are explored by positioning the individual inside the group.
The whole group is a part of the process by participating in critical discourse, questioning and answering. This enables a better understanding of the individual's development of personality, his creativity, inovativeness, emotional intelligence, critical thinking while at the same time motivates them to reach the envisioned result – understanding the process of complex thinking.

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Notes

1. Termin kompleksno mišljenje je definiral Edgar Morin, francoski sociolog in filozof, kot nelinearno mišljenje, ki temelji na pojmih moderne evolucije in samoorganizacije sistemov, ki izhajajo iz načel transdisciplinatnosti, celovitosti in usmerjenosti na človeka. Njegova dela so pomemben prispevek k reformi izobraževanja.

   Kompleksno mišljenje (sopomenka celostno mišljenje) omogoča zelo razvita žarkasto razpredena živčna mreža, ki povezuje in razumeva vse stvari, pojave in dogajanja kot medsebojno povezane dele celote. Zahteva celostno osebnost in vse dele osebnosti: telesni, čustveni, umski, duhovni, človekovo naravnanost, osebne lastnosti, delovanje in odnose. (Vid Pečjak in Milan Štrukelj, 2013)

2. Ustvarjalnost je miselni proces ustvarjanja novih idej in povezovanje njihovih medsebojnih odnosov v celoto. Obstajajo številne definicije ustvarjalnosti. Pomemebna je Guilfordova teorija ustvarjalnosti oziroma divergentnega mišljenja kot osnove ustvarjalnega mišljenja in Torranceova teorija, ki pojmuje ustvarjalnost kot lastnost posameznika. Joy Paul Guilford v svoji teoriji ustvarjalnega mišljenja razlikuje med konvergentnim in divergentnim mišljenjem. Divergentno mišljenje pokriva ustvarjalnost v kombinaciji s konvergentnim mišljenjem.

Notes

1. *The term complex thinking was first defined by Edgar Morin, the french sociologist and philosopher. It is a type of non-linear thinking, based on the notions of the modern theory of evolution and self-organization of complex systems. These principles are transdisciplinary, holistic and humanistically oriented. Edgar Morin's works are an important contribution towards the reform of education.*
   Complex thinking (synonym: integral thinking) is enabled by a highly evolved neural network, spreading radially to connect and understand every single occurence as part of an interconnected whole. It demands an integrated personality and all of its components: the physical, emotional, mental, spiritual, human orientation, personality traits, interaction and relationships.
   (Vid Pečjak in Milan Štrukelj, 2013)

2. *Creativity is the mental process of forming new ideas and integrating their reciprocal relationships into a complex whole. There are many definitions of creativity, of which I will only touch upon two. Torrance's theory regards creativity as a personality trait. Joy Paul Guilford's theory of creativity differentiates between divergent and convergent thinking. Divergent thinking is the basis for creative thinking. As part of the creative process it is typically used in a free-flowing manner, generating and evaluating creative ideas. These are then processed using convergent thinking, often resulting in a single best answer.*

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