

## **Artistic Development in Young Adults**

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The Role of Developmental Psychology in Education and Art Education

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### **ABSTRACT:**

*The content of this paper comprehend my interpretation of Developmental Psychology in Art Education, which consists of a visual narrative and an overall review of the literature about Artistic Development Theories. It also entails the comparisons, criticisms and discussion based on these theories from an early and contemporary view by various Artistic Development Theorists. It also discusses about the cultural and social impact on artistic development in young adults and the significance of constructivist approach in early adulthood in the light of Constructivist Theory, Vygotsky Theory and Gardner's Theory of Multiple Intelligence.*

*This paper also reflects upon my teaching strategies, my role as a teacher, significance of process work of my students and meaningful ideation for enriching knowledge and experience across the lifespan of early adulthood in art education.*

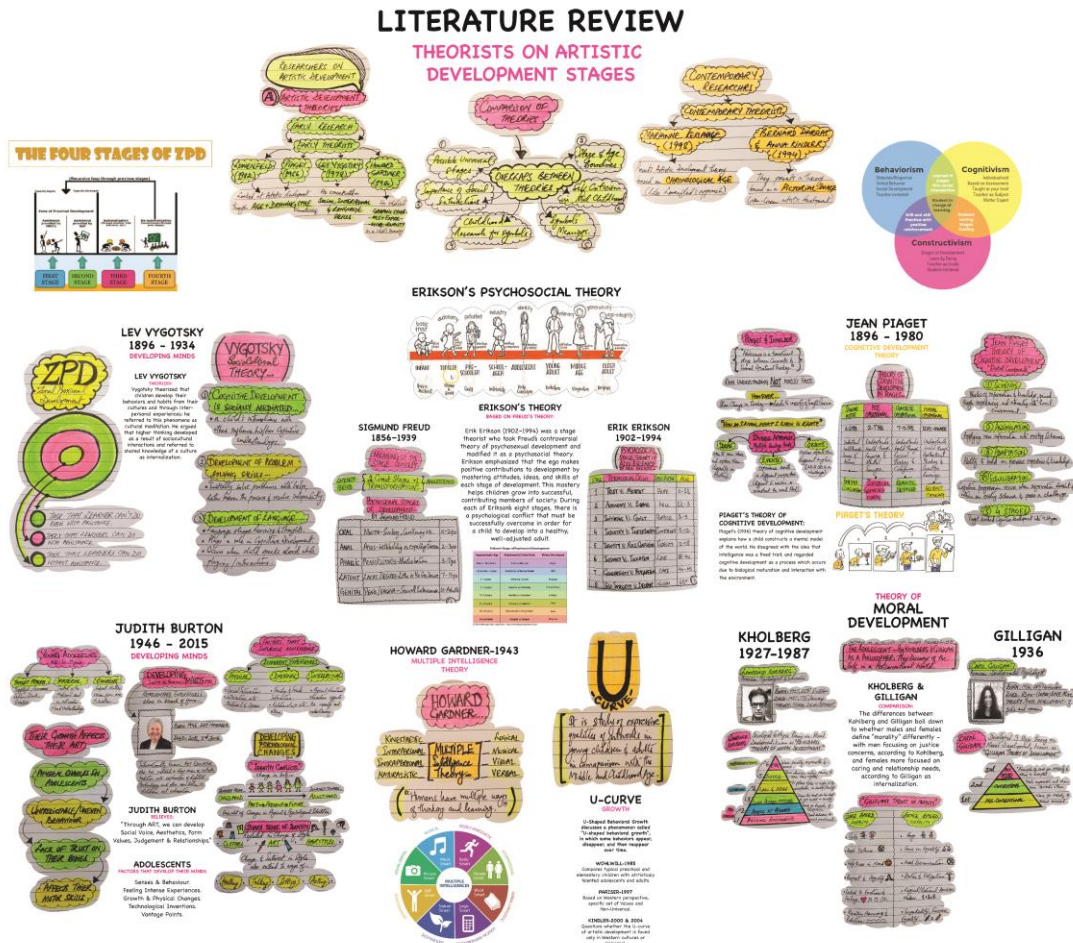


FIGURE 1 – Overview Artistic Development Theories

This Visual Narrative is of the reading shared with us during the course “A Review of Literature about Artistic Development Theories”, which is an overview of Artistic Developmental Theories, Comparisons and Criticism of the Theories and Cultural & Societal impact on Artistic Development & Children’s Art and creating Personal Connections.

**OVERVIEW:**

‘Developmental Psychology’ holds a significant role in Art Education through the lens of researches from the early and contemporary theorists. Studies on artistic development from 1920s to 1980s is grouped as the early views and the research conducted from 1990 to present day is grouped into contemporary views. There have been comparisons between the parallels, as well as criticism on these theories which mainly focused on the artistic development from childhood towards adolescence till adulthood. There was an interval during the time span from 1980s to 1990’s when no new researches were conducted on the artistic development in regards to learning theories.

Jean Piaget (1956), Lev Vygotsky (1978), Howard Gardner (1980) and Viktor Lowenfeld (1982) all these theorists who conducted their studies on artistic development are categorized as Early Theorists. Whereas, Bernard Darras & Anna Kindler (1994) and Marianne Kerlavage (1998) are grouped into Contemporary Theorists.

**EARLY THEORISTS:**

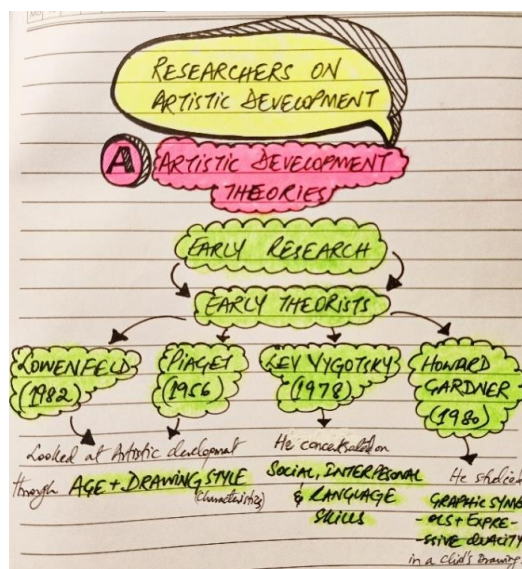


FIGURE 2 – Early Artistic Development Theorists

**Lowenfeld**, considered to be the ‘Father of Education’, “spent years collecting and studying thousands of children’s drawings in the 1940’s and 1950’s” (Smith, 1987). He observed and studied artistic development through Age & Drawing Characteristics. “Based on his research, he developed five stages of artistic development: Scribbling, Pre-schematic, Schematic, Dawning Realism, and Pseudo-Naturalistic” (Lowenfeld & Brittian, 1982).

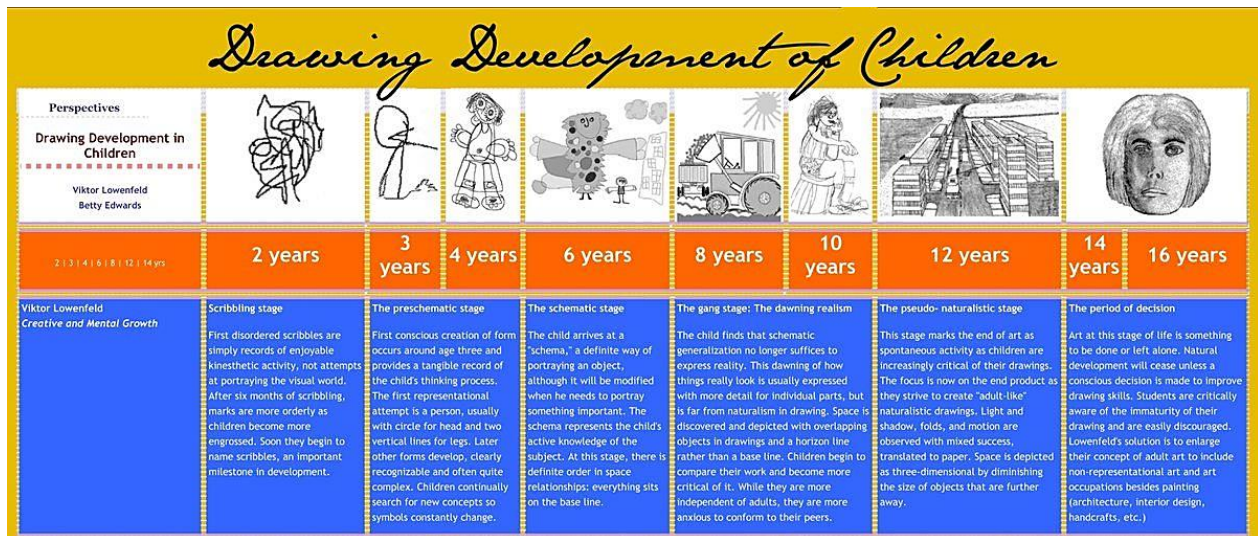


FIGURE 3 – Lowenfeld 5 Stages of Development

**Piaget** also conducted in-depth studies on the stages of artistic development of children through Age & the Characteristics of the Drawings. He also observed the cognitive development of his students and his own three children around the 1940’s and 1950’s. “He formulated stages that combined biology, cognition, and artistic development as indicators for growth” (Hardiman & Zernich, 1980). Over the passage of six decades studying child’s psychology, Piaget (1956) also developed four stages of Mental Development organized by Chronological Age:

1. Sensorimotor
2. Preoperational
3. Concrete Operations
4. Formal Operations

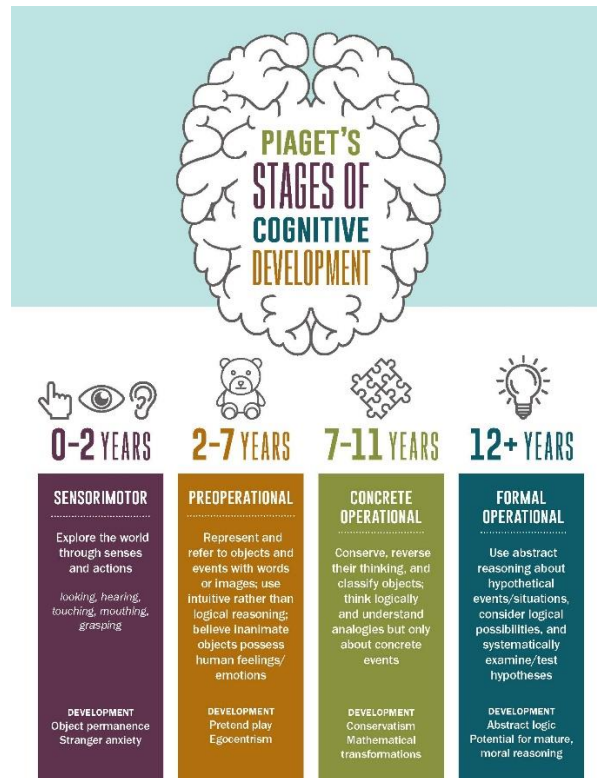


FIGURE 4 – Piaget's Cognitive Development Stages

**Vygotsky** on the other hand, concentrated on Social, Interpersonal & Language Skills in relation to learning and development during 1920's and early 1930's. "His work is formed on the basis of social constructivism which is the relationship between language and cognition" (Matthews, 2004). One of the most important contributions by Vygotsky was his study of ZPD - Zone of Proximal Development, which refers to the understanding that the connection between a learner's ability to learn and perform a task independently can only be possible through social interactions and guidance.



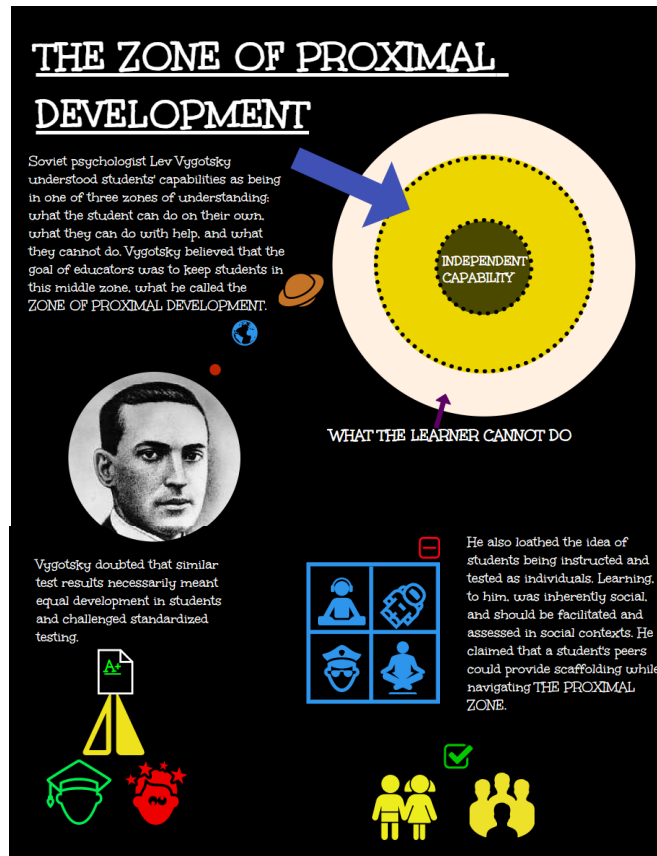


FIGURE 5 – Vygotsky's ZPD Theory

**Gardner's** biggest contribution to the field of psychology and education is his Theory of Multiple Intelligence, which stated that humans have many different ways of thinking and learning. Gardner has identified and described eight different kinds of intelligences which he believed that humans used to process information:

1. Logical Intelligence
2. Musical Intelligence
3. Visual - Spatial Intelligence
4. Linguistic -Verbal Intelligence
5. Bodily - Kinesthetic Intelligence
6. Interpersonal Intelligence
7. Intrapersonal Intelligence
8. Naturalistic Intelligence

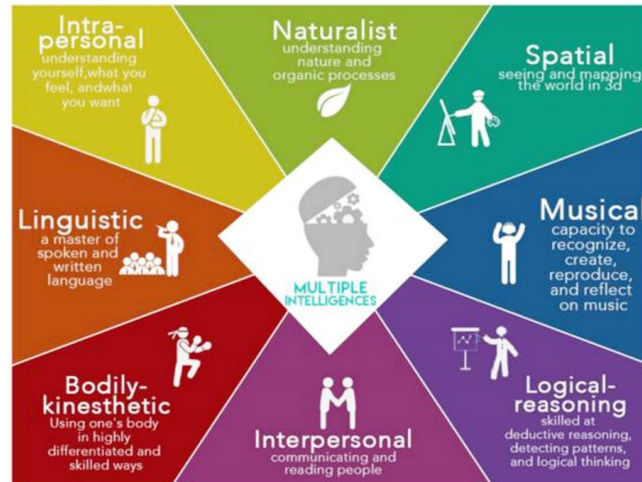


FIGURE 6 – Gardner’s Multiple Intelligence

In his other study, “Harvard Project Zero” (1967), he examines Graphic Symbols & Expressive quality in Children’s Drawings for Artistic Development studies. He also studied attributes like understanding, intelligence, deep thinking, creativity, and ethics in education as cognitive processes. The “U- curve” is another important development by Gardner in the field of education and psychology which studied the expressive qualities of the artwork in young children and adults in comparison with middle and childhood age.

After 1980s, there was very little research conducted on Artistic Development until the 1990s.

**CONTEMPORARY THEORISTS:**

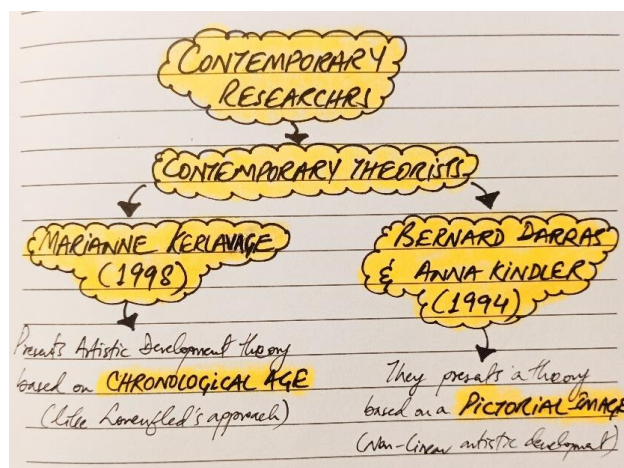


FIGURE 7 – Contemporary Artistic Development Theorists

**Bernard Darras and Anna Kindler** presented their study on Children’s Artistic Development based on Pictorial Imagery, which was an adoption of the Pierce’s Semiotic Theory (1955). They believed that “all pictorial representational activity shares communication potential.” (p. 148). To understand the pictorial imagery in children’s drawings, they suggested a map-like structure that illustrates an interactive, social environment and cultural aspects that lead to pictorial imagery. The model explained child’s artistic development in three stages:

1. Gestation
2. Birth
3. The Early Childhood Years

The important part of the model is five Iconocities, identifying relationship between signs and their meaning.

<b>ICONOCITIES</b> RELATIONSHIP BETWEEN SIGNS & MEANINGS BERNARD DARRAS AND ANNA KINDLER				
ICONOCITY 1	ICONOCITY 2	ICONOCITY 3	ICONOCITY 4	ICONOCITY 5
Beginning of Imagery/Pictures	Increased Regularity of Marks	Significance of Social Interaction	New Skill to identify, sort out and represent Symbols	Blend of Graphic Symbol Representations
		Mimicking Gestures and Sounds		
Understanding of Movements & Traces		Memorizing of Actions & Things	Significant Social Interactions	Unique Realm of Pictorial Imagery
		Attempts of Representation		

FIGURE 8 – ICONOCITIES by Darras & Kindler

“The model proposes that Artistic Development is propelled by two opposing forces of repulsion and attraction.” (Darras & Kindler, 1997).



**Marianne Kerlavage** developed a theory based on a holistic approach towards the studies of early theories on Artistic Development, which included “Viktor Lowenfeld (1982), Rhoda Kellogg (1970), Rudolf Arnheim (1979), Claire Golomb (1974), and Howard Gardner (1980).”

Kerlavage presented Artistic Development Theory based on Chronological Age order. She developed Six Developmental Stages based on the child’s age:

1. Mark Making
2. Early Symbol Making
3. Symbol Making
4. Emerging Expertise
5. Artistic Challenges
6. Artistic Thinking

6 DEVELOPMENTAL STAGES					
BASED ON CHILD’S AGE					
Marianne Kerlavage & Others					
2-4 Years:	4-7 Years:	7-9 Years:	9-11 Years:	11-13 Years:	14-17 Years:
<b>SCRIBBLING</b> (Lowenfeld), <b>PRE-REPRESENTATIONAL</b> (Burton), & <b>MARK-MAKING</b> (Kerlavage)	<b>PRE-SCHEMATIC</b> (Lowenfeld), <b>FIRST VISUAL SYMBOLS</b> (Burton), & <b>EARLY SYMBOL MAKING</b> (Kerlavage)	<b>SCHEMATIC</b> (Lowenfeld), <b>VISUAL EVENTS</b> (Burton), & <b>SYMBOL MAKING</b> (Kerlavage)	<b>DAWNING REALISM</b> (Lowenfeld), <b>REPRESENTING EXPERTISE</b> (Burton), & <b>EMERGING EXPERTISE</b> (Kerlavage)	<b>THE AGE OF REASON</b> (Lowenfeld), <b>IDEAS IN SEARCH OF FORMS</b> (Burton), & <b>ARTISTIC CHALLENGES</b> (Kerlavage).	<b>THE PERIOD OF DECISION</b> (Lowenfeld), <b>MORE IDEAS IN SEARCH OF FORMS</b> (Burton), & <b>ARTISTIC THINKING</b> (Kerlavage)
Kinesthetic activity	Early understanding of symbols	Art for communication	Art as a creative outlet	Ideas in search of form	Art motivated by meaning
Includes: mandalas, slash marks, bang dots, and open shapes.	Includes: Nature, filling the paper, floating shapes	Includes: facial features, improved representation of figure	Includes: details, clothing to identify, receding space, world-making	Includes: proportions, three-dimensional space, realistic colors	Includes: inspiration by emotions, social issues, and improving skill
Transition: closed shapes	Transition: tadpole people	Transition: baseline (actual or implied)	Transition: considered use of design principles	Transition: understanding of materials	Transition: personal voice

FIGURE 9 – 6 Developmental Stages by Kerlavage & Others

## COMPARISONS & CRITICISM:

Erik Erikson, Jerome Bruner, Judith M. Burton, Sharan B. Merriam, Lawrence Kohlberg and Rosemary S. Caffarella are the Modern Theorists who further studied the Early and Contemporary Theories and have compared, criticized and have further comprehend these theories for multiple reasons according to their findings. The overlaps and similarities that exist between the artistic development theories include: *Possible Universal Stages, Stage and Age Boundaries, Importance of Social Interactions, Self-Criticism in Middle Childhood, and The Childhood Search for Symbols and their Meanings.*

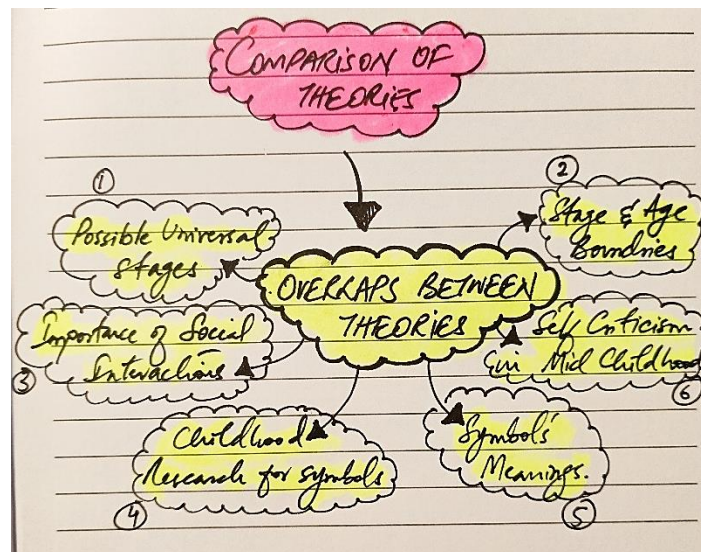


FIGURE 10 – Comparison of Artistic Development Theories

Researchers critically analyzed Howard's U-Curve of Development, various aspects of Piaget, Lowenfeld, and Kerlavage's stage theories, but mainly the criticism was raised that these theories failed to cover the unique distinction between cultures and the fact that all children throughout the world experience and go through different cultural and social exposures.

TABLE 11-1 Comparison of Major Developmental Theories				
DEVELOPMENTAL STAGE/AGE	FREUD (PSYCHOSEXUAL DEVELOPMENT)	ERIKSON (PSYCHOSOCIAL DEVELOPMENT)	PIAGET (COGNITIVE/ MORAL DEVELOPMENT)	KOHLBERG (DEVELOPMENT OF MORAL REASONING)
Infancy (birth to 18 months)	Oral stage	Trust vs. mistrust Ability to trust others	Sensorimotor period Progress from reflex activity to simple repetitive actions	
Early childhood/toddler (18 months to 3 years)	Anal stage	Autonomy vs. shame and doubt Self-control and independence	Preoperational period—thinking using symbols Egocentric	Preconventional level Punishment-obedience orientation
Preschool (3-5 years)	Phallic stage	Initiative vs. guilt Highly imaginative	Use of symbols Egocentric	Preconventional level Premoral Instrumental orientation
Middle childhood (6-12 years)	Latent stage	Industry vs. inferiority Engaged in tasks and activities	Concrete operations period Logical thinking	Conventional level Good boy–nice girl orientation
Adolescence (12-19 years)	Genital stage	Identity vs. role confusion Sexual maturity, “Who am I?”	Formal operations period Abstract thinking	Postconventional level Social contract orientation

FIGURE 10.1 – Comparison of Artistic Development Theories

My overall understanding of the reading content “The Review of Literature about Artistic Development” is the realization of the stages of development in an individual’s life which underpass so many changes which are grounded and shaped by external factors and how important it is to understand these stages of development from different lenses of the early, contemporary and modern theorists. Having an understanding of these theories is not only important if you have a background in the field of psychology but it is equally important to the professionals from the educational field.

This course content has helped me to understand and create a better understanding of what the thought process and development has been behind an artwork of children of all age groups. It also brings more clarity while looking at the design works of my students as now I can view it through the lens of different theorists and their study on Artistic Development specifically in Young Adulthood.

I further studied my student’s works produced in one of the courses I teach at Indus Valley School of Art and Architecture which is “Visual Communication Design” Studio course in the department of Communication Design.

This course looks into the Elements and Principles of Design and their application in Graphics and Design practices. The students in their 2<sup>nd</sup> year in Communication Design Department at IVS covers Basic Design course in their 1<sup>st</sup> year which is the Foundation Year programme, but here they specifically learn to approach Design in-depth from a communication point of view and develop critical and analytical skills in the field of Design.

Their Design Studio functions as a ‘making’ space where the students engage, learn and explore problem solving methodologies about design methods and processes. The course introduces students to various theories, specially focused on all the aspects of Graphic Design that deals with visual communication through projects based on Compositions / Layouts, Graphics and Typography to cope with the concerns which are aesthetic, functional, creative, innovative and culturally driven.

My area of study and stage of analysis revolves around Early Adulthood or Young Adults, whose age group is roughly between 18-20 years. The design works studied further are from the students when they were in their 2<sup>nd</sup> year – 3<sup>rd</sup> semester of undergraduate level in Communication Design department.

I believe that ‘Process’ plays an integral role in developing a pool of knowledge and experiences on the basis of which the students build up new meanings and understandings of their surroundings and the world. Hence, I aim to study the process and the final works of my students where I will be analyzing the works through the lens of *Constructivist Theory*, *Vygotsky Theory* and *Gardner’s Theory of Multiple Intelligence* in order to understand my student’s methods, strategies and planning to reach their final outcome, which eventually becomes a part of process itself for further learnings to come in future.

I will not be studying any one specific student in particular, but compare 3-4 student's work with different ideas on one concept and maybe also pick 1-2 from both genders to understand *Piaget's Cognitive Development and Inquiry Based Learning* in a better way.

### **SUPPORTIVE EVIDENCES**

By keeping in mind these selected visual evidences from my undergraduate Visual Communication Design course, I have compared the works through the lens of different theorists mentioned above, to study and explore that how their prior experiences and knowledge in Multiple Intelligence and Social & Cultural context, affect the growth and work process of young adults and help them conceive the diverse concepts and shape their working styles.

The works have been identified from one of their assignments called "Color Exploration & Compositions" where the students had to identify and apply their prior knowledge on "Color Theory" covered in the first part of the assignment. Second part of the assignment was based on events that we celebrate in our culture which are heavily associated with colors and traditions.

The students started their work from researching and collecting data and relevant graphical symbols to work with and move ahead with their designs, however, they were not allowed to use any typography in this assignment due to the colors and symbols used in the design being self-explanatory of the event the package was designed for.



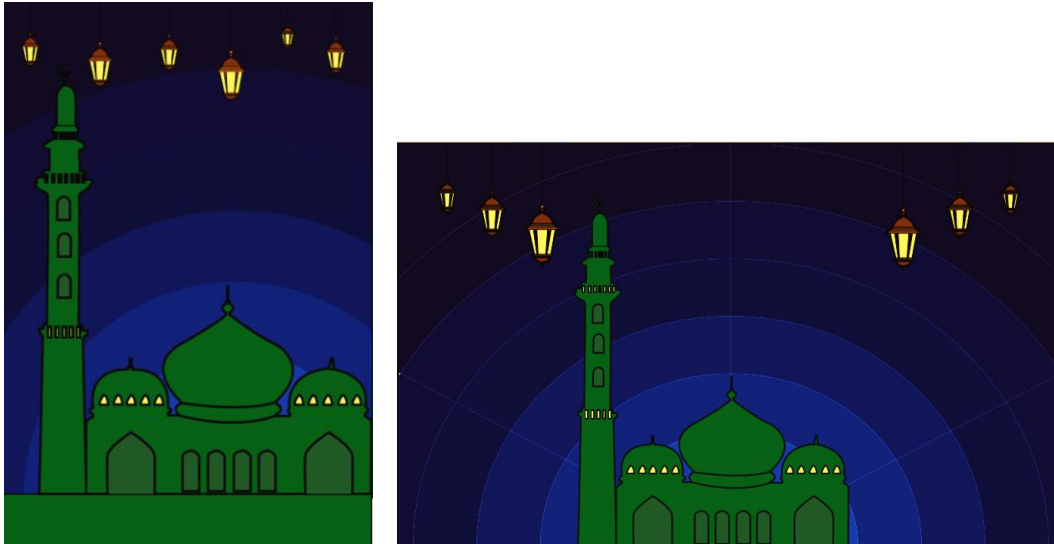


FIGURE 11 – Safa Fareed – Depicting Eid Milad-un-Nabi at Night

In Fig.11, Safa decided to work with the theme of Eid Milad-un-Nabi and decided to conduct questions with the target audience of their preconceived notions of the various colors they associated with that theme. Based on that research she formulated a design to create package design for a box and after reviewing and recording similar responses, she executed a design which consisted of the Holy Prophet's mosque and the color green as the focal point of her composition. This helped her link color in accordance with various themes and to understand the human centered approach to design as well. Her process related well with Constructivist and Vygotsky social and interpersonal skills.



FIGURE 12 – Abdul Fawad – Depicting Eid Milad-un-Nabi at Sunset

In Fig.12, Fawad explored colors are associated with certain things and how the human eye reads it can be used to communicate about something just by visuals. He used a very strong graphical element which represents Masjid-e-Nabwi, a very strong symbol that is associated with Holy Prophet (pbuh), which falls under Gardner’s Theory of Multiple Intelligence & his focus of study on the use of Graphical Symbols and Expressive Qualities of Drawings/Designs.

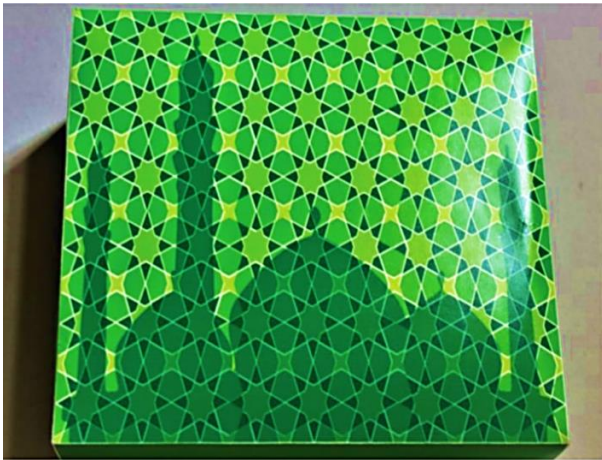


FIGURE 13 – Ayesha Wahid (*print*)  
Depicting Eid Milad-un-Nabi  
in a Celebratory way

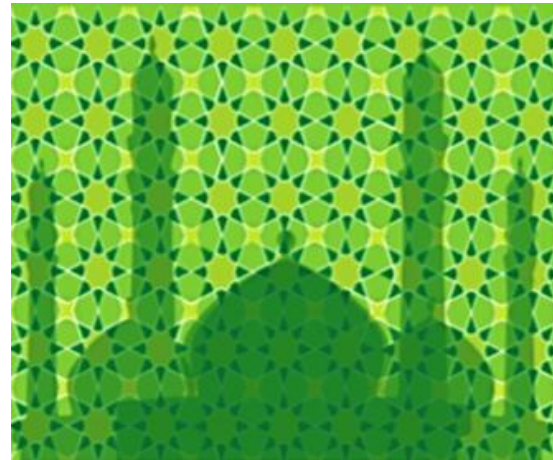


FIGURE 13.1 – Ayesha Wahid (*digital*)  
Depicting Eid Milad-un-Nabi  
in a Celebratory way

In Fig. 13 and 13.1, Ayesha tried to understand the perception and association of colors by using monochromatic color scheme with one complementary color and integrated Masjid-e-Nabwi as one of the most common symbolic representation of this event. She defines that, “I have used monochromatic color scheme since subtle colors tend to bring unity/harmony and uplifts spirituality towards religion. Moreover, repetition is used to create a pattern on packaging and I have tried to play with the opacity of the mosque vector to create depth.” It is interesting to see the use of geometrical patterns in her design which talks about how she understands and make connections of this event with Islamic geometrical patterns.

**OBSERVATION:**

While studying the designs under the theme of **Eid Milad-un-Nabi**, I noticed and could clearly see the difference between the kind of symbols and color schemes they have used to represent the event. The topic was similar for all but the outcome is fairly different from each other. One has depicted the event at the night, one during the time of sunset or day and one has shown it as a celebratory event. On the other hand, all have used the Holy mosque of Prophet Muhammad (pbuh) but the representation in all are very different. Both the female students have drawn a whole structure of the mosque and the male student has just shown the main dome and the minar, which clearly tells the difference between how much attention to detail a male and a female would give while drawing/designing an artwork.

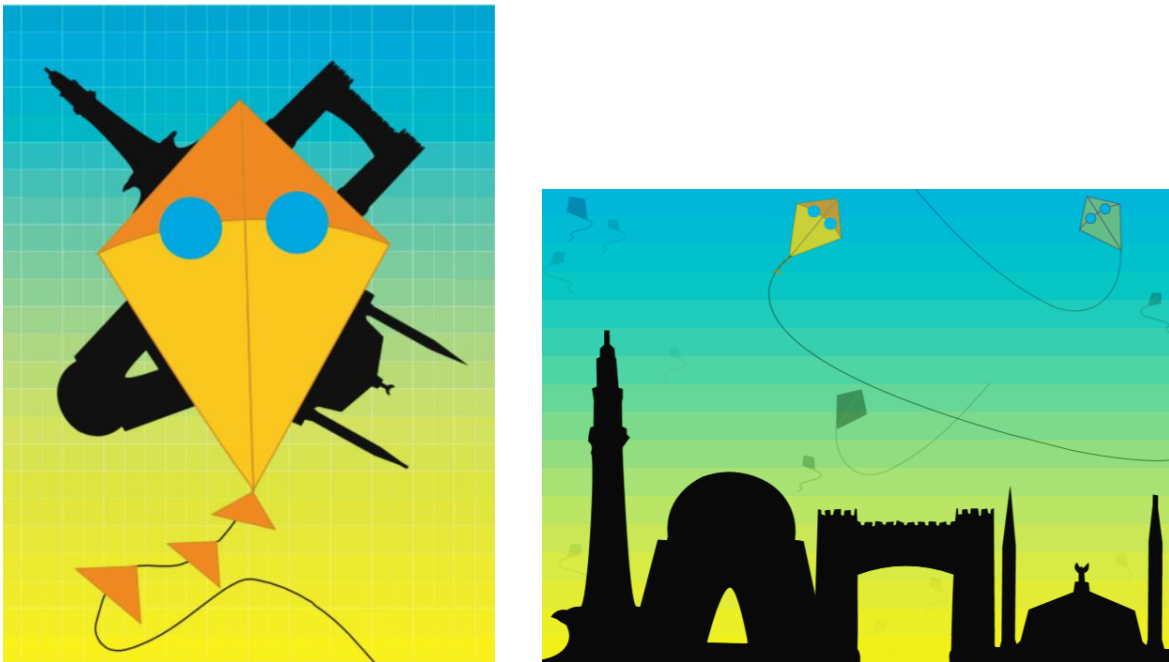


FIGURE 14 – Muhammad Danish  
Depicting Basant at Sunset



FIGURE 14.1 – Muhammad Danish  
Depicting Basant at Sunset



FIGURE 15 – Ali Raza Mehdi  
Depicting Basant at Morning

In Fig.14, 14.1 & Fig.15 Danish and Ali both are working on the same theme of Basant. They both have used graphical symbols which strongly represents the cultural and social context of this event which mainly associates with Punjab, Lahore. Both of them faced difficulty in

showing the movement in the composition through colors, especially the radial background, which is present in both the designs. But it is interesting to see the different use of color pallet for the sky which connects to the Piaget's Cognitive Development of how each individual perceives their experiences, surroundings and prior learnings in a different manner. It is also notable to see the difference in the graphical symbols which in both designs represent the monuments of Pakistan and the architectural structures identified with Lahore which falls under the Theory of Multiple Intelligence by Gardner.



FIGURE 16 – Radia Durrani  
Depicting Basant at Night

In Fig.16, Radia also chose the event of Basant as her theme to start off with this project. During her process she noticed how a specific color scheme could make or break any composition and how a particular composition looked better in one color scheme and will have a totally different impact and meaning if you apply some other color pallet. For her it was all about choosing the right combination which may prove to be aesthetically pleasing. The color scheme she used also brought a lot of circular movement to her composition and gave it a radiant feel which makes



your eye travel from the focal point to the edges very smoothly. Apart from her main focus on the use of color, she used silhouette of Minar-e-Pakistan and Badshahi Mosque as her main graphical symbols to create a skyline of Lahore city to represent her memories from her childhood to depict the event as she remembered it. In her reflection she stated, “I chose basant and designed the sky as many shapes filled with the tints and tones of red yellow and orange. My initial idea was to remove the strokes of the shapes in the sky in order to give a smooth transition but I noticed how some shapes complimented the shape of a kite going with my theme.”

### **OBSERVATION:**

After observing the outcomes of my students design works on the theme of **Basant**, I noticed one similarity which is the attention to details in the works of my female students if compared to the male students, which links well with Piaget’s Theory of Cognitive Development’s fourth stage Formal Operational where the thinking is more abstract and based on hypothetical thinking. The depiction of sky specifically in Fig.6 is very abstract and imaginative. However, Fig.4 graphical symbols are realistic but they are composed in a more minimalistic approach. Fig.5, the architectural building is very close to a realistic architectural structures of Old Lahore.

The difference in all three approaches is quite evident and again how they have perceived and imagined one event and concept in such different aspects. Their choices of colors and style of graphical symbols hold very different characteristics, which is self-explanatory of the choices young adults make at their age group.

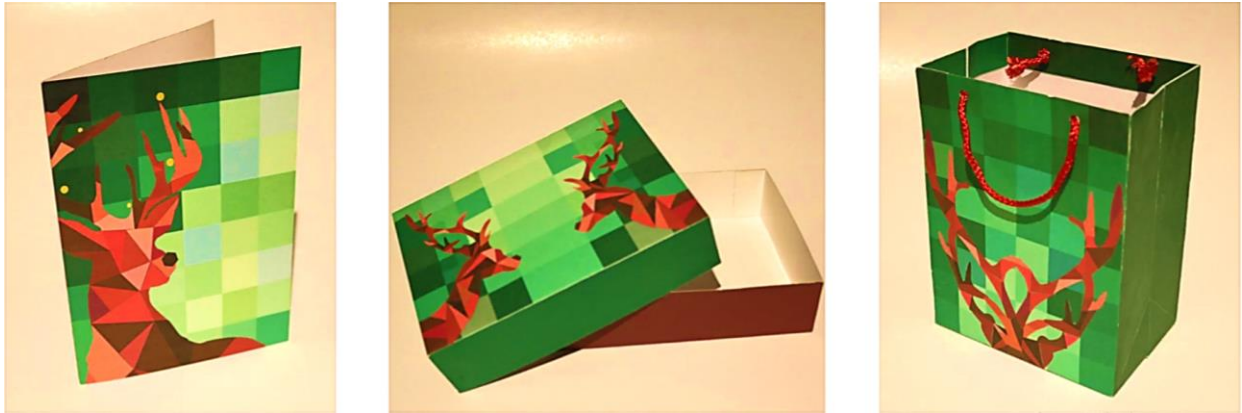


FIGURE 17 – Irhah Arshad  
Depicting the Christmas Event

In Fig.17, Irhah decided to work with only one graphical element that represents Christmas, a Reindeer. She has used the color scheme and symbol in different ways in all the three compositions to break the monotony yet maintained the continuity in her packaging design.

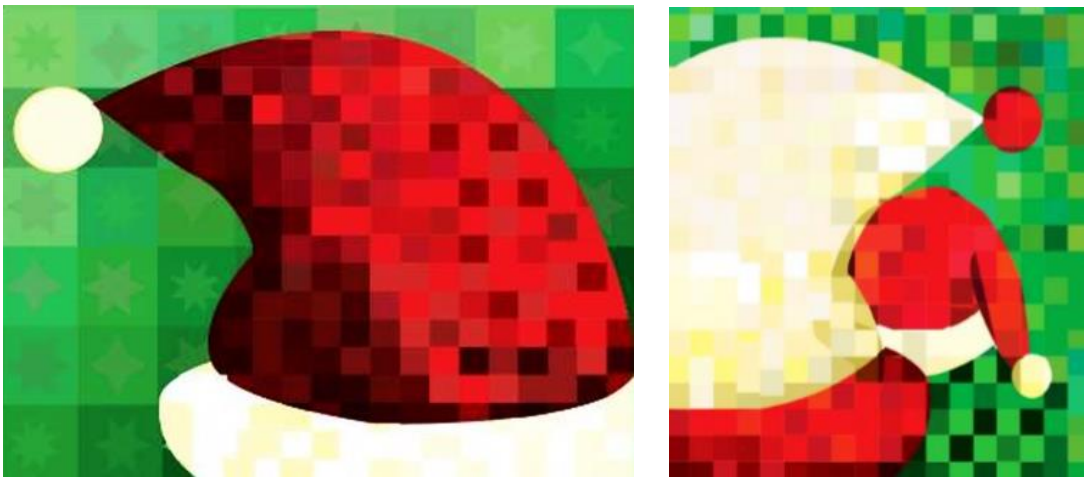


FIGURE 18 – Mahnoor Farooqi  
Depicting the Christmas Event

In Fig.18, Mahnoor's target audience were children as during the process, she collected data through her research and surveys that children of 7-12 yrs. of age are the most excited during Christmas and associate this event with Santa Claus, which connected to the third stage of Piaget's Cognitive Development, Concrete Operational, where the children understand the world

through logical and realistic details. The iconic color scheme for Christmas was used but much brighter hues and repetition of the Santa's cap was used to show continuity.

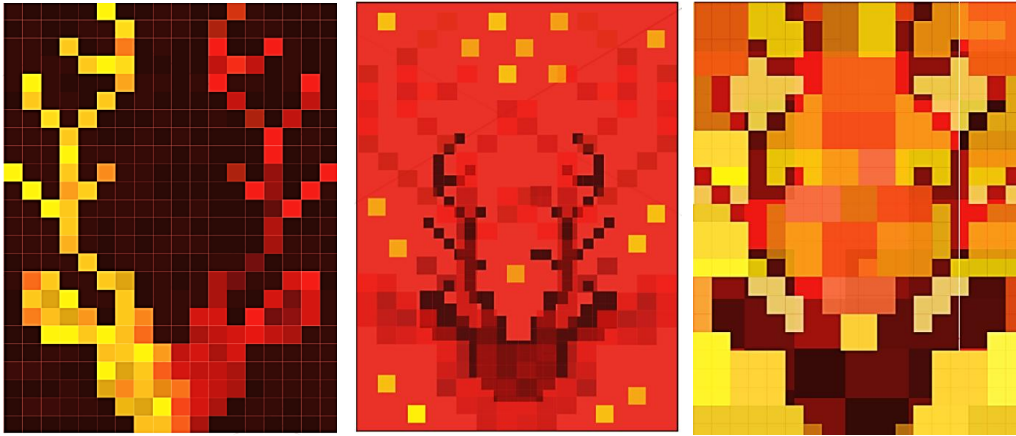


FIGURE 19 – Maheen Arif  
Depicting the Christmas Event

Maheen, as shown in Fig.19, has also used one graphical element to represent Christmas, in which only the head and the antlers of a deer constructed by using pixel technique to use color which was the requirement of this assignment. She has created movement working with tints and shades of red and yellow (warm color scheme), and focused just on the head and antlers of a Reindeer. Her approach is also similar to the one shown in Fig.8 but here the target audience were adults.

### **OBSERVATIONS:**

In this particular theme, the approach towards choosing a single graphical symbol to represent is evident in all three designs but they have specifically worked around different target audience and represented that through colors and the style of symbols created, which is mostly the core objective for a design jobs. However, the colors are used differently but mainly revolve around different color schemes that are associated with the Christmas event.

After studying all these examples under the light of Artistic Development Theories, I was able to observe that how individuals of the same age group and working with similar concepts can produce such different outcomes based on their prior knowledge and experiences, even under certain limitations which they all had to follow to fulfill the objectives of the assignment which was to understand the use and importance of colors by using them in cultural context and by keeping the target audience in mind as few of the main objectives. During their process they all had to conduct individual research which falls under Vygotsky's and Piaget's Cognitive Theory of Development where they use their social, interpersonal and language skills to communicate and collect data.

### **TEACHING STRATEGIES & ROLE:**

After understanding the different theories on Artistic Development based on my student's work, I can very well reflect on my teaching practice and strategies which I can reinforce and adapt to make my strategies better for my students.

Inquiry-Based Learning is something that we, at undergraduate level practice during the process of understanding a problem and resolving it till its final outcome. Being from the designing field it is important for us to interact and directly connect with the problem/task, it is highly important for us to communicate in order to clarify the core problem which is the second step of Inquiry based learning. Questioning and Designing are the next 2 steps of IBL, where to bring out the ideas from my students, I facilitate them by putting forward relevant questions that helps them identify their concepts on a deeper level, which leads to the production of their final designs through collaboration. Inquiry Based learning is based on diverse understandings that is why the first step is highly important to understand your students on individual levels rather than a

holistic approach. These steps are equally useful for a teacher while interacting with her students and students to deal with any task given at higher education level.

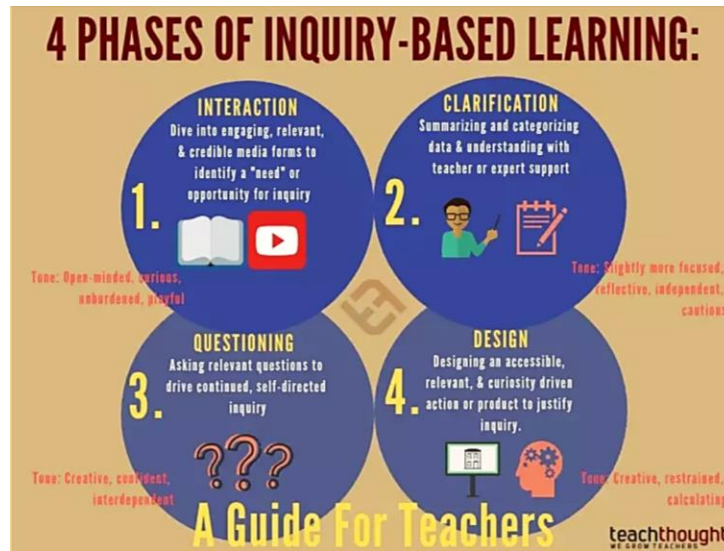


FIGURE 20 – Phases of Inquiry Based Learning

According to Constructivist Theory, a learner builds upon their past experiences and use their existing learnings to build their new knowledge on, which I strongly believe as an individual because that is how I feel I have learnt. I used to unconsciously apply this in my class by leading a student centered class where often a project is introduced and I ask my students to collaboratively decide on how they want to approach this task and often decide their final outcomes as well. Which the students enjoy tremendously.

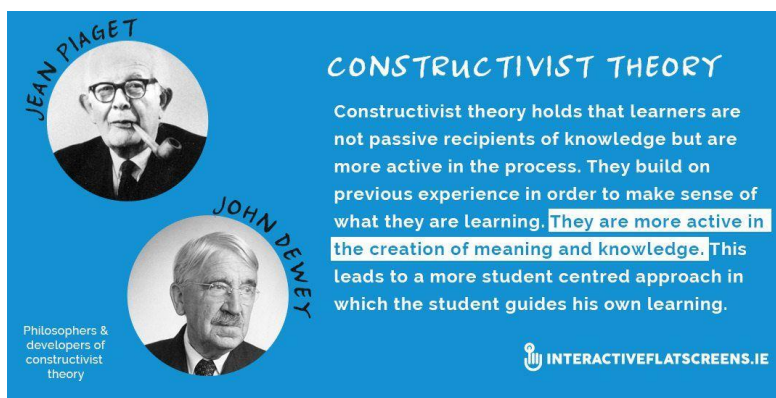


FIGURE 21 – Constructivist Theory



**CONCLUSION:**

Since we are living in a world full of visual references and experience multiple cultural and societal exposures at the same time, the significance of Visual culture is immense, which is another, growing aspect in an individual's artistic development, Increased usage and exposure of digital media, gaming, television, billboards etc. often blends multiple visual information in one's mind and are repeated frequently, resulting in creating a pool of knowledge that is used when solving problems in education and eventually reflect in their visual representations. They are heavily influenced by the society and its cultural aspects which helps them decipher their own understanding of the society and environment around them. Apart from understanding the dynamics of a teacher student relation in a formal educational system during this course, my intention has been to find effective learning and teaching methods in art and design education to improve myself as a teacher and my teaching strategies in order to understand my students better than before and facilitate them in the right manner.

### *References*

FIGURE 1 – Visual Narrative, Course Work

FIGURE 2 – Visual Narrative, Course Work

FIGURE 3 – <https://i.pinimg.com/originals/5d/55/6c/5d556c9afc5caa736540dd5a264dfe41.jpg>

FIGURE 4 – <https://www.pinterest.com/pin/527976756309480542/>

FIGURE 5 – <https://venngage.net/p/147980/zone-of-proximal-development>

FIGURE 6 – <https://www.pinterest.com/pin/443463894540348972/>

FIGURE 7– Visual Narrative, Course Work

FIGURE 8 – Content from <http://laurieemyers.weebly.com/artistic-development.html>

FIGURE 9 – Content from <https://stagesofartisticdevelopment.weebly.com/stages-of-development.html>

FIGURE 10 – Visual Narrative, Course Work

FIGURE 10.1 – <https://biology-forums.com/index.php?action=gallery;sa=view;id=19869>

FIGURE 11–19, IVS Student’s Work Constructivist Theory

FIGURE 20 – <https://www.teachthought.com/pedagogy/4-phases-inquiry-based-learning-guide-teachers/>

FIGURE 21 – <https://interactiveflatscreens.ie/ict-constructivism-the-building-blocks-of-learning-in-the-21st-century/>