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Dynamism in Sketch and Figure Drawing: Artistic and Illustrative Analysis of Volleyball Movements

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ABSTRACT

Works of art and scientific research are central to human behaviour. Leonardo Da Vinci's work on human anatomy explores in depth the interaction between art and science. Movement and dynamism in drawing and figure drawings make a significant contribution to the understanding of the human body and the development of sports movements in illustration. This paper explores the intersection of art, anatomy, and movement dynamics, focusing on the theoretical and practical investigations of figure and pattern drawings. The research employed descriptive analysis, creating detailed charcoal drawings and digital illustrations to capture the essence of movement. This work begins with the creation of pencil sketches of volleyball figures, and then using Adobe Illustrator CS6 program, these pencil drawings are arranged using a single diagonal line to organize the tonal values of movement with light and dark tones. Then, with a single light-coloured line on a monochromatic background, the movements are created in detail with the Adobe Photoshop program. Analyses the dynamism of movement in figure drawings with the elements of perspective, proportion and proportion, linear tonal values and contours, pose and movement and presents visual analysis. Findings demonstrate the effectiveness of combining traditional and digital techniques to represent the dynamism of sports movements, contributing to a deeper understanding of the relationship between art, anatomy, and movement. This interdisciplinary approach underscores the complexity and visual impact of pattern drawing, offering new insights into the study of movement and anatomy in art.

Keywords: Art, movement dynamics, figure drawing, pattern drawing

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INTRODUCTION

The concept of art and its activities are at the centre of human behaviour. Traces of artworks and artistic talent can be found in many areas from the first age of human existence to the present day. However, most of the research on drawing has focused on production and the permanence of drawings (Damon & Lerner, 2008). Visual arts have always existed within a certain protective shell throughout history. In ancient times, this protective shell had a mysterious or sacred quality. Additionally, this protective shell had a material aspect; it referred to the caves or physical spaces where art pieces were placed or stored. Initially, art had a separate existence from other aspects of life, and this separation was made to utilize art for specific purposes. Over time, the protective shell around art gained a social dimension and became part of the cultural sphere of the ruling classes (Berger, 2019). Art has played a central role in many interdisciplinary fields, influencing many disciplines and metaphors. Figure drawings, pattern and movement dynamism can provide a detailed expression of human anatomy and movement through patterns. These linear forms can be used as an important tool for understanding the anatomical structure and movements of the human body. In this context, Leonardo da Vinci's drawings and the techniques he used in the name of human anatomy and science offer an important perspective in the fields of art, anatomy and movement dynamics. Drawing, figure drawing and movement dynamism are important factors that create the form and integrity of objects. The lines that multiply with point units that provide movement and ratio-proportion in drawings constitute an important potential on the concept of pattern, i.e. sketches.

According to Unat (2012), Leonardo da Vinci conducted anatomy studies by comparing the anatomical structure of humans with the anatomical structures of various animals. Thus, by examining the wing and muscle anatomy and movements of birds while flying, he conducted much research on the possibility that humans could fly in a similar setup and live under the sea. As a result of these studies, he developed the ability of humans to fly and submarine projects.

Leonardo Da Vinci integrated the fields of art and anatomy in the name of science and was recognized as a genius in art history as an inventor, scientist, painter, sculptor, architect, engineer, philosopher and most importantly as an anatomist (Cumming, 2002, as cited in Akkaya & Akyürek, 2019). Leonardo's anatomically significant endeavours allowed him to clearly see his challenges in exploring new and important areas such as the vascular system and the abdomino-thoracic viscera. Detailed explorations of body parts as well as muscles, bones and nerves manifested themselves in the second phase of his anatomical studies in Florence between 1500-6. This was a period of scientific rather than artistic treatment of anatomy. Later, in the phase in which he tried to analyze the physiology and forces of the human body, he collaborated with Marcantonio della Torre, a professional anatomist. He incorporated physiology into his experimental principle by comparing the

movements of the blood circulation with the flow of blood in the aorta and the flow of rivers in nature (Keele, 1964). By studying art and anatomy, he made many important sketches on movement, pattern and figure drawings. He made important contributions to the science of anatomy with the sketches he drew by combining the elements found in nature with the human body and physiology. From the scientific perspective of art, he made anatomical studies by drawing cadavers and live animal movements. These studies provided the mechanisms, proportions, balance principles and systematics of human and animal movements in his drawings. Therefore, art, sport and anatomy come together in a mutual interaction to understand the nature of the human body and to perform at the highest level. The conceptual integrity of the work of art is nourished by an interdisciplinary structure (medicine, history, astronomy, ecology, architecture, engineering, etc.) and in this case, it argues that the work can be a drawing or a pattern as a concept alone. Therefore, the classical conservative structure and technique of the concept of drawing overlaps with the different dynamics and content of today's art and takes on a synthesis structure that is not easy to define (Albayrak, 2012). Pattern and figure drawings can occur through sketches and the creation of anatomical structures while creating the dynamism of movement. This means that movement and pattern are an integral part of drawing and are made up of design elements such as color, texture, line, shape, space and movement. Pattern drawing animates movement through the combination of elements in figures and objects. In this context, movement and dynamism in pattern and figure drawings arise from the interaction of different elements used in the drawing process. Colors and textures, as well as lines and shapes, play a major role in emphasizing movement. Likewise, the use of space and positioning also determine the dynamic effect of a drawing. This introduction addresses the complexity and visual impact of pattern drawing and explains how the dynamism of pattern, figure and movement come together and the relationships between the created illustrations and design elements through sports movement patterns. The study will focus on how to analyse and understand this dynamism in pattern and figure drawings.

Dynamism of Movement in Pattern and Figure Drawings: Theoretical Investigations

Drawing is an art form that deals with specific subjects collectively through the art of drawing. In addition to the drawing of specific subjects such as landscapes or human figures, this branch of art has a more advanced level of analysis and there are texts that focus on a specific subject (e.g. a landscape or a human figure) while dealing with the art of drawing in more depth (Ching & Juroszek, 2010). Schön, on the other hand, argues that the concept of pattern is a model that constitutes the 'reflection-in-action' process of reasoning rules. He argues that designers first 'see' objects as a whole and then 'act'. Therefore, Goldschmidt states this concept in a clearer and more understandable way and argues that design reasoning consists of 'as seeing' and 'because of seeing' modalities (Do, Gross, Neiman & Zimring, 2000). Thus, in plastic arts, design elements with pattern,

form and integrity can create pattern and figure movements in themselves. According to Bulut (2003), pattern education is a complex process that expresses emotions by combining with the ability to see in an academic sense. In this context, drawing studies provide a concrete expression of concepts such as visual forms, depth, form and texture on the surface.

Drawing is considered a visual exercise and it is accepted that depth perception, the structure of form and the relationships between form lie at the basis of drawing (Avcı, 2014). Images of imagination constitute the visualization of objects that do not exist in the senses. Therefore, imagination creates associations with creative imagination through the reproductive imagination of data collected in visual memory, or creative imagination in its old usage, through the combination and reproduction of experiences (Ching & Juroszek, 2010). The objects that make up the design and visual elements can turn into a scope of imagination in which the concepts that exist in the human mind are transferred to the design as a whole. Different concepts and forms can form the pattern by transforming shape, line, texture and form elements through pattern forms through the act of “seeing” and transferring them to the two-dimensional surface.

Drawing is considered an active way of thinking for artists and is seen as a means of thinking by drawing. A design in the mind can often be transformed into a concrete form for the first time through drawing or developed through drawing studies (Avcı, 2014). Students think that the visual arts course is the subject that they emphasize the most to develop critical thinking. In addition, they think that the visual arts course develops reasoning and systematic thinking at the most affective level ((Öztürk, Peker, & Gökdaş, 2017). In the visual arts, pattern and proportion are important elements that enable objects or figures to be analyzed in depth and the images formed in visual memory to be transferred to the two-dimensional surface in a measured way. Characters and animation prototypes are often based on well-patterned figures. The measured application of design principles can contribute to the dynamic emergence of a figure.

In pattern drawings, athlete movements and figures can create an aesthetic integrity when drawn anatomically correctly. In pattern and figure drawings, showing athlete movements in detail can more accurately reflect the anatomical structure of muscles and movements. This can make the drawings more realistic and impressive, transfer them to the paper in a more formal way, and offer the viewer a detailed perspective. According to Perin et al. (2018), the classification of sports visualizations according to the types of research contributions provides insights into how sports data can be better combined in the field of information visualization. For example, an open call could be made to encourage more interaction in existing research and the applicability of studies on the classification of sport visualization data could be increased.

METHODS

Within the scope of the research, a qualitative research approach was adopted. Qualitative research is typically conducted in natural settings and employs an inductive approach. Therefore, qualitative research does not view the whole as merely the sum of its parts. Instead, it generally seeks answers to “why” and “how” questions and provides explanations within the framework of variable control. In this context, methods such as case studies, content analysis, document analysis, and discourse analysis are frequently used in qualitative research. Qualitative research focuses on the social aspects of the world, seeking to understand why people behave the way they do in response to events and phenomena, the reasons behind attitudes and behaviors, how individuals and societies are influenced by each other and their surroundings, how cultures are formed and developed, and how social groups communicate. Consequently, the evaluation of reliability, accuracy, and validity in qualitative research is a very different and comprehensive process (Baltacı, 2019). As a research method, descriptive analysis was applied with the visual research method, one of the visual research techniques. Within the scope of this study, volleyball figure movements were examined by using pattern and figure drawing techniques to draw human figures, and in-depth visual analysis was carried out by determining the patterns with illustrations. The research is based on sampling. In this direction, a sample was formed by drawing volleyball player movements in sports. This sample includes the movements that constitute the focus of the research. Within the scope of this research, it presents how diagonal lines in figure drawings and pattern analysis can be used in drawing the pattern dynamics of athlete movements.

Collection of Data: Within the scope of the research, the data were first created through sketches and the drawings of patterns and figures were made using charcoal. Then, these prototypes were drawn with light-dark and linear methods within the framework of design elements and human movements were determined with diagonal lines within the scope of the pattern. These human movements were created in the context of pattern and figure drawing of volleyball athlete movements. Prototypes of volleyball player movements created from the sections taken from volleyball matches were determined. In order to examine how the obtained figure drawings can be created in the movement concepts on the pattern, the researcher made drawings with diagonal lines over the digitally drawn figure with the illustrator. The figures drawn with charcoal created the digital movement created with single lines in relation to the dynamics of movement in the digital environment. These prototypes were then processed with filters using Adobe Photoshop to create the effect of dynamism with effects such as poster edges and cross-hatching.

Analysis of the data: The method of data analysis was divided into two main parts within the framework of thematic analysis. The transformation of meanings into themes is defined as one of the few common skills required by many qualitative analysis approaches (Holloway & Todres, 2003: 347 cited in Braun, V. & Clarke, V., 2019). In this analysis, four of the movements were classified as offense and three as defense. The drawings were analyzed with Perspective, Ratio and Proportion, Linear Tonal Values and Contours, and Pose and Movement. In the findings section, charcoal drawings, illustrations and Dynamism of Movement on a Colored Ground were analyzed under the title. According to this arrangement, a data analysis was conducted in accordance with scientific and academic standards.

RESULTS

Charcoal Drawings

In the process of drawing patterns, a fundamentally important factor in the creation of drawings involves the line, one of the elements of composition. In its simplest definition, a pattern is a combination of lines formed by the combination of dots. Line is an abstract concept and is found in the external world not only on the edges of shapes, but also in the transitions of colors and the light-shadow relations of plans, that is, in the interior of the form. The formal properties, colors and light of objects are expressed in patterns not only by lines, but also by light-dark tonal values and spots (Avcı, 2014). In this research, pencil drawings were adopted as a basic tool for the detailed description of volleyball movements. Especially in the offensive movements (H1: Slam Dunk Drawing 1, H2: Slam Dunk Drawing 2, H3: Slam Dunk Drawing 3, H4: Slam Dunk Drawing 4), the direction of movement, scale and formal details of the drawings were determined in detail in terms of the body positions of the players and the moments of hitting the ball. The shading of the drawings through the use of shading and stain and the linear movements from dark to light allowed for a more detailed rendering of the drawings in charcoal. For example, the front parts of the lines emphasizing the direction of the movement and the athletes received more light, while the shadowed parts were expressed in darker tones. This approach provided a clearer and more visually impressive representation of the volleyball movements.

This effect created by charcoal techniques at the sketching stage represents the first stage of the figure and allows the character's diagonal and linear movements to be determined with a single line at the next stage. This demonstrates the effective use of pencil drawings to capture the dynamism and flow of movement. These academic findings emphasize the importance of pencil drawings to provide a detailed and thorough drawing of volleyball movements. Drawings of volleyball offensive and defensive movements were created by starting with pencil sketches. In the drawings made by the researcher, pencil sketches, which are the first stage of athlete movements, were created in detail. Especially the direction of certain movements such as (H1: Dunk Drawing 1, H4: Dunk Drawing 4), the ton value of the lines and the formal features of the movement were examined in detail by the researcher.

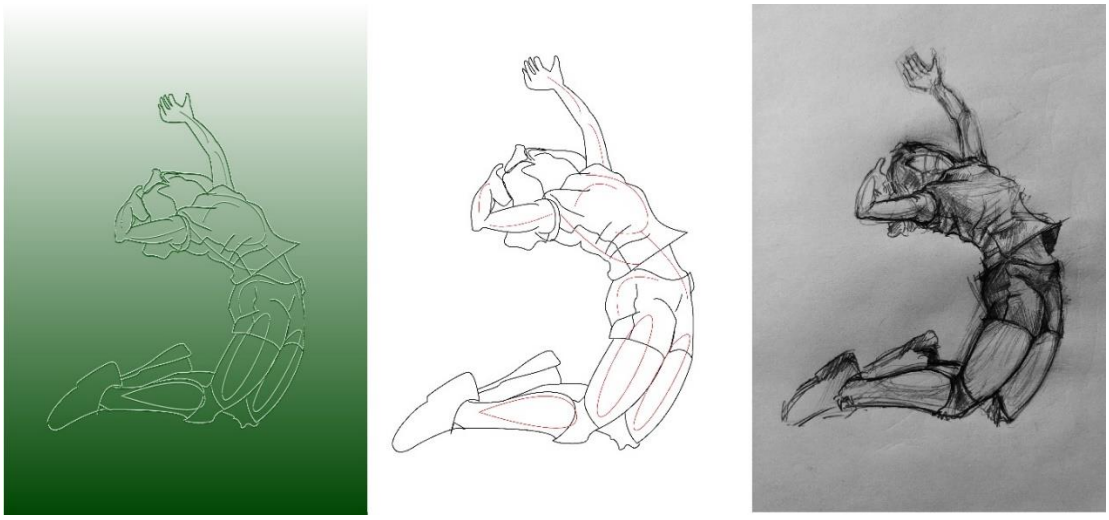
The patterns were defined by the detailed rendering of volleyball defense movements in charcoal drawings (S1: Defense Drawing 1, S2: Defense Drawing 2 and S3: Defense Drawing 3.) The light-oriented aspects of the lines were expressed in lighter tones, while the shadowy parts were expressed in darker tones. The characteristic expression of the lines in charcoal is created in detail with the combination of light and dark tones, stains, lines and dots.

Illustration

Researchers Çeken, Çiçekli and Ersan (2018) state that illustrations are frequently used in graphic design and digital art fields. They emphasize that this process is important in order to effectively depict the message to be conveyed. They state that digital illustrations should go through a serious design process as a graphic design language.
It is also stated that illustrations are created based on pencil drawings to represent volleyball movements in a stylized way. The details of the movements that occur during offense and defense are expressed linearly using linear tonal values. The direction of the movements and the formal texture of the figures are arranged diagonally in a single line. With a clearer and more detailed expression of movement in the illustration, the dynamism and flow of movement is created with a general linear approach. For example, the high jump and the moment of a player's dunk are expressed more abstractly in the illustrations. These movements are more limited compared to pencil drawings, although they express the essential features more clearly with a single line.

Dynamism of Movement on Colourful Ground

A background created from light to dark tones on a coloured background creates a visually striking effect where colours and patterns are used to emphasize the dynamism of movement. Fast movements and energetic strokes, especially in attacking movements and during the game, are vividly represented when drawn in light tones on a coloured background. Illustrations created on a green background emphasize the dynamism of movement more clearly and in detail. The compositional principles of emphasis and rhythm more clearly determine the direction of the pattern. Although the direction of the movements, linear speed and tonal value ranges are not clear, the direction and balance of the movement are clearly expressed with the same line tones. The figure on the coloured ground in H2 evokes a more still and hovering effect. Similarly, in the dunk drawing in H1, the figure balances in the air while creating the dynamism of movement.
Thematic Coding
Offensive Movements
H1: Slam Dunk Drawing 1
H2: Slam Dunk Drawing 2
H3: Slam Dunk Drawing 3
H4: Slam Dunk Drawing 4
Defence Drawing
S1: Defence Drawing 1
S2: Defence Drawing 2
S3: Defence Drawing 3



H1: Slam Dunk Drawing 1

Perspective: Perspective: The figure is drawn as seen from the side. This drawing was used as a basic exercise to develop the researcher's understanding of human anatomy and movement.
Proportion and Proportion: Proportions are exaggerated, emphasizing the dynamism of movement through the curvature of the back and the wide extension of the limbs.
Linear Tonal Values and Contours: In order to emphasize the direction of movement and dynamism in the drawing, the drawing is switched from pencil drawing to illustration and then dynamism is emphasized by using a single color line on a colored background. In the second illustration drawing, red lines are used to emphasize the flow of the pose and underline the structure and important lines of movement.
Pose and Movement: The figure makes a leaping movement with one leg curled under the body and the other leg extended backwards. The torso is bent backwards and the arms indicate an enthusiastic and powerful movement emphasizing the dunking motion.

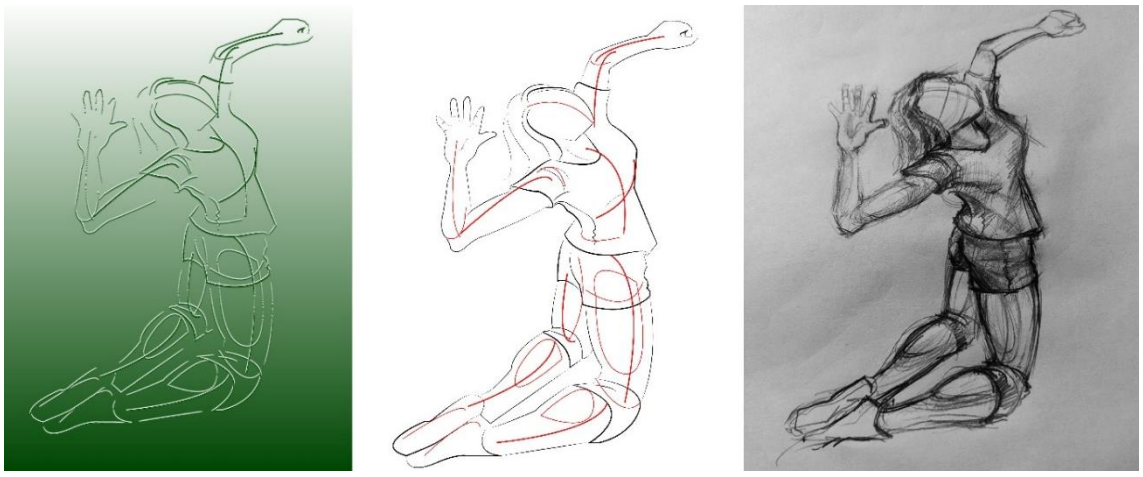
H2: Slam Dunk Drawing 2

Perspective: The figure is drawn in a frontal position, with the body facing to the left. This drawing was used as a basic exercise for the researcher to analyses the concepts of human anatomy and movement in order to understand the slight rise upwards from the ground.

Proportion and Proportion: In the proportion measurements, while the figure performs the classical dunking movement, the body is balanced on the left foot and the right arm is fixed backwards. The body is organized in a proportional scale to maintain balance.
Linear Tonal Values and Contours: In the drawing, charcoals drawn with light-dark shadows are designed with single lines in the illustration, creating the dynamism of movement on a coloured background. The lines are gradually simplified to emphasize the essence of movement.
Pose and Movement: The figure represents a body flat against the front of the body. While the right arm is leaning backwards, the left arm is in an upright fist due to the balance of power. The body is in a calm and upright position and draws its power from the left side.

H3: Slam Dunk Drawing 3

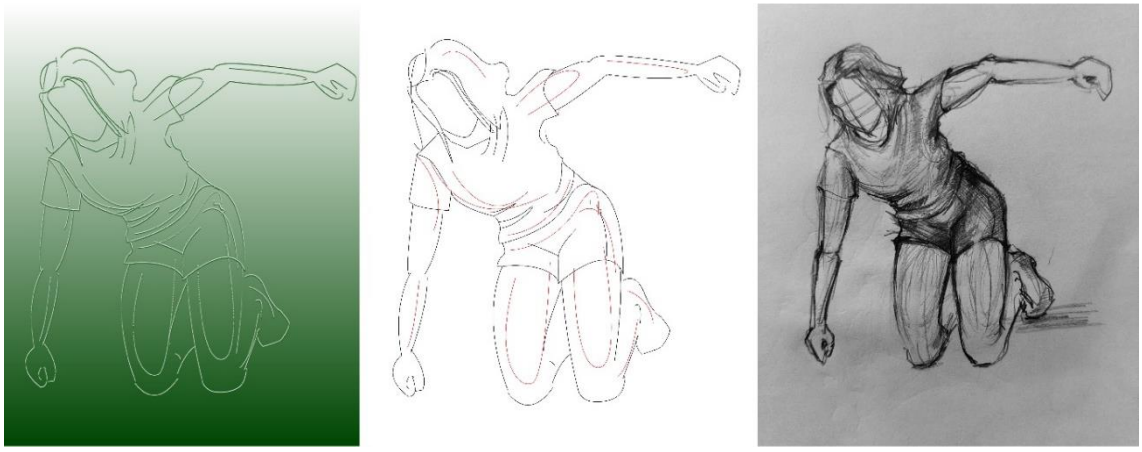
Perspective: The figure creates perspective with a movement seen from the side.
Proportion and Proportion: The figure is arranged in proportion with the left foot cross-legged with the ground and the upper part of the body turned to the right side. While taking the principle of power from the left side, the right arm has turned into a backward attack.
Linear Tonal Values and Contours: In the drawing, charcoals drawn with light-dark shadows are designed with single lines in the illustration and the dynamism of the movement on the coloured background is stylized according to the direction of the lines.
Pose and Movement: The figure leans his body backwards with his left foot on the ground, while his right arm is arranged backwards towards the offense.



H4: Slam Dunk Drawing 4

Perspective: A perspective is formed when the figure's knees are bent and seen from above.
Proportion and Proportion: A balanced ratio and proportion is provided by the figure's body leaning backwards, the knees curled and the body leaning backwards.
Linear Tonal Values and Contours: In the drawing, pencil lines drawn with light-dark shadows are shaped by curving diagonally.
Pose and Movement: The figure is in an attacking position with the right arm leaning back and the knees bent backwards.

S1: Defence Drawing 1



S2: Defence Drawing 2

S3: Defence Drawing 3

S1, S2 And S3 Drawing

Perspective: Most of the perspective figures are taken from the front. Perspective throughout the image is taken according to the direction of movement.
Ratio and Proportion: Proportions are done in a measured way. The figures are arranged on the right side of the image in S1, in the center of the paper in S2 and on the left side of the door in S3.
Linear Tonal Values and Contours: In the drawings, the emphasis on the compositional arrangement of the figures and the direction of the movement leaning towards the left side balances the movement in S3. In S1, the figure balancing on the left foot supports the figure by creating power in the front part.
Pose and Movement: The figures are drawn with body movements that are more static and close to the ground in the defense movement.

CONCLUSIONS

Within the scope of the research, pencil drawings were first used as an important tool in the transformation of volleyball figures. The drawings expressed the details of offensive and defensive movements with light-dark tones and linear movements. The shading made with the use of toning, stain and tonal values in charcoal provided a clearer and more impressive representation of the movement. With the digital transformation of the illustrations, illustrations representing volleyball movements in a stylized way were created based on these pencil drawings. The direction of the movements and the formal extensions of the figures are organized diagonally in a single line. In this direction, the illustrations have been stylized with the digital environment to create the dynamism and flow of the movement in the form of a single line without tonal values. The direction of the movements and the formal extensions of the figures are arranged diagonally in a single line with the illustration program. These illustrations successfully expressed the dynamism and flow of movement in the form of a single line without tonal values by stylizing pencil drawings in a digital environment. The illustrations created on a colored background emphasized the dynamism of movement more clearly and in detail with a single color through Photoshop. The direction and balance of the movements are clearly expressed with line tones. While the tonal values within the colored ground are arranged monochromatically, the dynamism of the figure's movement is successfully created with a single color illustration.
These results demonstrate the successful representation of volleyball movements through various visual techniques and the importance of manual drawings in the sketching process during the conversion from pencil to digital. Pencil drawings, illustrations and movements on colored backgrounds have the ability to express the dynamism and character of movement from different perspectives. Moreover, the transformation of drawings from sketch to digital emphasizes the meaning of visual expression and movement.

Author Contributions

Conceptualization, A.Ç. methodology, A.Ç. formal analysis, A.Ç.; investigation, A.Ç.; data curation, A.Ç.; writing–original draft preparation, A.Ç.; writing–review and editing, A.Ç.

Informed Consent Statement:

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The authors declare that no conflicts interest.

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