ART AND SOCIETY

CONTENTS

Simulating Terror: An Affective Empathy Approach

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Abstract

Historical education often prioritises factual narratives over the emotional dimensions of past experiences. This paper explores how historically-structured board games, particularly *The Troubles*, foster affective empathy — an emotional connection to historical actors and events. By analysing game mechanics, components, narrative framing, and player engagement, this study demonstrates how board games can challenge players to confront moral ambiguity, power dynamics, and the human cost of conflict. The paper argues that historically-structured board games serve as powerful pedagogical tools, supplementing traditional history education by making emotional realities more significant and efficacious.

Keywords: historically-structured boardgames, Northern Ireland, *The Troubles*, historical empathy, affective empathy, simulation, narrative

1. Introduction

Traditional history education frequently focuses on cognitive understanding: teaching students about historical events, motivations, and consequences. However, an essential component of historical empathy, affective empathy, is often overlooked. Affective empathy involves emotionally connecting with historical figures and understanding their lived experiences beyond mere intellectual comprehension.

One emerging method for addressing these gaps is the use of historically-structured board games (HSBGs) — games designed to simulate the social, economic and political events, conflicts, and power struggles through period-appropriate interactive mechanics (Ambrosio & Ross 2021; Ambrosio & Ross 2023; Ambrosio 2024). HSBGs offer a unique means of fostering this deeper engagement.

This paper examines how affective empathy is cultivated in HSBGs, using *The Troubles* as a case study. By exploring its mechanics, narrative, and player experience, this research investigates how boardgames that are historically-structured evoke emotional responses that deepen historical understanding.

2. Literature Review

2.1 Historical Empathy: Cognitive and Affective

When we study actors from the past it is imperative that we approach them with an understanding of the various structures — within which they conducted their daily lives: the societal, geopolitical and ideological (Smith, 2016).

To be able to both understand and sympathise with these lives past, one approaches such studies through the distinct yet complementary strands of cognitive and affective empathy. Cognitive empathy is the ability to understand another person's thoughts, feelings, and perspectives; affective empathy, the key focus of this paper, involves feeling the emotions of another person, about the emotional connection that resonates with someone else's experience, rather than simply acknowledge and understanding their viewpoint. By engaging with both facets, one is likely to have a broader, more nuanced and critical understanding of a historical topic. However, it is with the latter strand of empathy with which this paper is primarily concerned as it is often overlooked by

game designers.

2.2 Game-Based Learning

Game-based learning (GBL) is an educational approach where games are used as pedagogical tools to promote learning through engagement, problem-solving, and critical thinking (Boyle et al, 2011; Connolly et al, 2012). Unlike traditional methods, which may focus on textbooks and lectures, games provide an interactive experience where students can step into the shoes of historical actors, make decisions, and witness the repercussions of those choices. The potential of board games in fostering empathy lies in their ability to simulate complex historical environments in which players navigate moral dilemmas, understand conflicting viewpoints, and make decisions that affect not only the outcome of the game but also theirs and their fellow players' emotional and intellectual engagement with the history.

Through this immersive experience, students engage in active learning, where their cognitive and emotional understanding of historical events is shaped by their gameplay. They gain insight into the lived experiences of people from different backgrounds — whether they are soldiers, politicians, or civilians — and learn to appreciate the complexity of historical narratives and the implications of human conflict.

2.3 Historical Game Studies

Historical Games Studies (HGS) is a field of GBL aimed at understanding how games can serve as a medium for conveying historical knowledge and empathy. Chapman (2016; 2017) emphasises the potential of games to bridge the gap between didactic, factual histories and the human emotions that underpin these events, arguing that games, particularly those that focus on historical narratives, have the capacity to engage players in critical thinking while allowing them to experience history in a visceral, emotionally veridical way. Chapman points out that historical games offer a unique "lived" experience of history that goes beyond what books or documentaries can provide. Through interactive mechanics, such as role-playing and decision-making, players can experience the consequences of historical actions first hand.

2.4 Historically-Structured Boardgames

Historically-structured boardgames (HSBGs) immerse players within and important "heuristic cycle in which imagination is informed by evidence" (Smith, 2016) as players face period-relevant situations that place cognitive and affective demands on them. Ambrosio's framework for understanding historically-structured board games focuses on how game mechanics and narrative design are aligned with historical events to foster empathy and understanding (2024). According to the author, historically-structured games are designed to place players within the social and political context of a conflict where their choices are shaped by the historical environment (see Figure 1).

Figure 1. Balbane Pass man, Billy Campbell, pictured in foreground, sustained head injuries at the People's Democracy march at Burntollet, January 1969 (Derry Journal, 2019)

Source: Derry Journal, 2019.

These games often require players to understand the complexities of power, social dynamics, and political

ideologies. Ambrosio's framework emphasises that the emotional and cognitive dimensions of empathy are not merely a by-product of playing historical games; instead, they are intentionally cultivated through the entire game design. By taking on different roles and perspectives, players can experience the moral ambiguities and emotional weight of historical events in a way that encourages both understanding *and* emotional connection.

2.5 Narrative

Communication is fundamental to our existence (Crookall, 1989, p. 5). Narratives shape our perception of the world (Bruner, 1991) and help us make sense of it through definition, analogy, and metaphor, both literally and abstractly (Simons & Green, 2013).

Narratives hold persuasive power, influencing our thoughts and belief systems through what we see, read, hear, and even write (Appel & Richter, 2007; Hanratty, 2013). They also serve a cathartic function for both the storyteller and the audience. As Halpern suggests, when one person truly listens to another's story, emotional resonance and empathy often arise naturally (2001, cited in Barton & McCully, 2012, p. 398).

Narratives humanise history, transforming abstract events into personal stories that evoke emotional responses (Wei, 2011, xvi; Bruner, 1991; Falk & Dierking, 2018, 48–49). The importance of narrative in historical games is crucial to the development of both cognitive and affective empathy. Narrative structures in games provide players with a context that goes beyond mere facts, allowing them to immerse themselves in the lives and perspectives of individuals within the historical event (see Figure 2). The interplay between narrative and gameplay is key in helping players emotionally engage with the history they are learning.

Figure 2. An image depicting the various 'actors' and organisations involved in the Troubles

Source: Box cover artwork, from *The Troubles: Shadow War in Northern Ireland*. Reprinted with permission from Compass Games LLC.

As players co-construct and navigate the narrative (Neitzel quoted in Raessens & Goldstein, 2011; Ambrosio & Ross, 2023, 853), they often face tough moral decisions and witness the consequences of their actions, which further drives both cognitive and affective empathy. Additionally, game narratives often allow players to make choices that impact the direction of the story, making them more likely to internalise the consequences of those choices. This "narrative agency" (Cohen, 2001) empowers players to reflect on how their decisions shape history, further enhancing empathy for the individuals affected by those decisions.

Narrative is essential in shaping how players engage with history. It transforms board games from abstract strategy exercises into meaningful explorations of historical even; the combination of storytelling and mechanics fosters a dual-layered form of historical empathy — cognitive understanding of the conflict's complexities and affective resonance with those who lived through it.

2.6 Previous Research

Research on how historical games foster empathy has been extensive, particularly in educational games (Boltz,

2017; Johnson, 2019; Schrier & Farber, 2022). Studies have shown that games like *Freedom: The Underground Railroad* and *Twilight Struggle* not only teach players about history but also evoke emotional responses that allow players to connect with the past on a personal level.

In these games, players are not only exposed to historical facts but are placed in situations where they must make decisions that reflect the moral dilemmas faced by individuals in history. Research also indicates that the use of narrative in historical games is particularly effective in promoting empathy (Pasupathi & Wainryb, 2010, 65; O'Donnell, 2024).

By engaging players in stories derived from historical narratives that highlight the human experience, games create opportunities for players to develop both cognitive and affective empathy. For example, in games focusing on war or social movements, players are encouraged to understand the struggles of people who lived through these times while also experiencing the emotional toll of those struggles (Kaplan, Garner, & Brock, 2019). Additionally, studies have shown that the more immersive and emotionally engaging a game is, the more likely it is to foster deeper empathy (Kaseem & Noor, 2021; Donadello, 2022). Games that allow players to make morally difficult choices or experience the emotional consequences of conflict, lead to stronger empathy development, as players are forced to confront the complexity of historical events on both an intellectual and emotional level.

3. Theoretical Framework

The theoretical foundation of this study is grounded in the concept of historical empathy, particularly as it applies to game-based learning. As previously mentioned, it employs Thomas Ambrosio's framework of historically-structured board games to analyse how *The Troubles* fosters historical empathy through its mechanics, aesthetics and narrative design. By examining the interplay between cognitive and affective empathy in the game, this framework provides a lens to assess how *The Troubles* encourages players to engage with the complexities of Northern Ireland's conflict. In doing so, this study contributes to broader discussions on the role of board games in shaping historical understanding and emotional engagement with the past.

Empathy in Game-Based Learning

While empathy plays a crucial role in game-based learning, its manifestation varies depending on the game's design and intended learning outcomes. HSBGs provide unique opportunities for fostering both cognitive and affective empathy by immersing players in historical contexts and decision-making processes. Understanding how these games engage players on both intellectual and emotional levels is essential for evaluating their potential as tools for historical learning.

Cognitive and Affective Empathy in Historically-Structured Games

Cognitive Empathy

Role-taking. Board games often assign players specific roles or factions with distinct goals, values, and histories (e.g., political leaders, military commanders, or civilians). When players step into the shoes of these roles, they must understand the motivations behind actions that they "find morally repugnant" (Juul, 2001; O'Donnell, 2024, p. 12) or find difficult to comprehend. Each faction has its own interests, and players need to think about the historical context and reasons behind these perspectives: they are tied to particular goals and challenges.

Strategy and Complex Decision-making. HSBGs with intricate rules and moral dilemmas present strategic choices where players must assess the needs of their faction: the historical realities, and the consequences of their decisions. Understanding the complexities of each faction's situation requires players to adopt the disposition of the group they control, thus developing cognitive empathy by engaging with multiple perspectives on the same historical event (Bermudez, 2021, p. 291). Players not only have the opportunity to view the actions of other factions, they may play as that faction at another time.

Historical Context and Reflection. A well-designed HSBG game must include historical backstory and events that prompt players to think critically about how historical figures or groups responded to various situations. Incorporating real historical events, figures, and dynamics in the game's design promotes a deeper understanding of the history. In such games, players often learn about specific historical periods through in-game text, images or facts presented within the mechanics, such as historical documents, timelines, or period-specific actions. By understanding the motivations behind actions, players expand their cognitive empathy, which may already be informed by previous historical knowledge or experience. The game should include challenges and conflicts that were faced by historical groups, encouraging players to engage with history beyond just the narrative, thus fostering cognitive empathy.

Asymmetrical Gameplay. Factions have different objectives, strengths, weaknesses, and historical backgrounds. By playing a faction, players must consider the strategic goals and motivations behind the actions of their assigned group. This allows them to understand why a faction might act the way it does, even if they do not

agree with the actions, and how asymmetrical gameplay contributes to collaborative and competitive play.

Affective Empathy. In historically-structured board games, affective empathy can be achieved through emotional engagement with the game's story, characters, and moral dilemmas.

Emotional Engagement through Immersive Narrative. Historically-structured games can create emotional investment by telling a compelling story that highlights the personal experiences of individuals caught in historical events (Allan, 2019; Naul, 2019). For example, a game might show the emotional consequences of violence, loss, or the struggles of ordinary people during the conflict. Through storylines, players can become emotionally involved in the fates of their characters, helping them develop a deeper connection to the emotional realities of the historical period (Gerrig & Mumper, 2017; Green, 2021).

Player Identification with Characters or Groups. Strongly designed characters in historically-structured games can evoke an emotional response from players. Characters with rich backstories, struggles, and personalities can foster an emotional bond, allowing players to feel empathy for their plight (Kaplan, Garner, & Brock, 2019). The humanisation of characters through storylines and personal stakes helps generate affective empathy.

Moral Dilemmas and Emotional Stakes. Games that present players with difficult moral decisions, where there is no clear "right" choice, can engage affective empathy by making players feel the weight of their decisions. For instance, players might face the choice of engaging in "political violence [which is] socially constructed, rather than a natural or impulsive response to conflict" (Bermudez, 2021, p. 282), or negotiating for peace but risking their faction's position. Such decisions may stir emotional discomfort as players experience the personal and collective consequences of their actions, allowing them to emotionally resonate with those who lived through such choices (Kello & Wagner, 2017; Kaplan, Garner, & Brock, 2019).

Consequences of Actions. The game's mechanics should show the emotional impact of the players' actions. For example, if a player chooses an aggressive tactic, the game might depict the resulting civilian casualties or social divisions, evoking feelings of guilt, sorrow, or regret in that individual player or those participating with him. This encourages players to not only think about the consequences but also to feel the emotional consequences of their actions, leading to a deeper affective empathy.

Immersive Experience through Sensory Engagement. A game's design elements (such as artwork, and physical game components) can enhance the emotional atmosphere of the game, immersing players in the historical setting. For example, realistic depictions of the environment, or depictions of conflict might increase the emotional weight of the game, enhancing players' emotional connection to the event. The components themselves provoke "certain reactions and expectations which we project back on to it in such a way that the polysemantic possibilities are greatly reduced in order to be in keeping with the expectations that have been aroused" (Pearce, 1992, p. 220).

Narrative Theory

Narrative provides the contextual and emotional depth needed to connect players to historical events "it changes what [students] see in the world and how they see it" (Lee in Smith, 2016, p. 15). A well-designed narrative does not just inform but immerses players in the lived experiences of the people involved, and this immersion enables players to both understand and feel the historical realities of a conflict. For cognitive empathy, the story provides historical context, helping players grasp different perspectives, motivations, and strategic dilemmas. Players learn *why* certain factions acted as they did and develop a more nuanced understanding of history. For affective empathy, the story humanises historical figures and civilians, making the consequences of players' actions feel more personal and emotionally engaging.

Cognitive empathy requires players to analyse perspectives and strategic decision-making within a historical setting, and narrative facilitates this by providing historical context, embedding historical details in the game's mechanics, players must consider real-world complexities. Encouraging role-taking in the storytelling, players adopt the perspectives of different factions. They must think critically about how and why groups pursued certain actions, fostering intellectual engagement with historical perspectives. And in shaping decision-making, narrative-driven choices (e.g., how to respond to a political crisis) force players to weigh multiple viewpoints and consequences, deepening their strategic and historical understanding.

Affective empathy is evoked through emotional engagement, which narrative strengthens by creating personal stakes: stories make historical conflicts feel less abstract. Instead of viewing a particular historical period as a distant political struggle, players experience it through the lens of characters whose lives are directly affected (Leith et al., 2019; Smith, 2016). By introducing moral dilemmas, narrative-driven decisions (e.g., whether to use violence for political gain or pursue a long and difficult rout to peace) create emotional tension, forcing players to wrestle with the ethical consequences of their actions. Through storytelling elements (e.g. in-game events where civilians suffer due to factional violence), players feel the emotional weight of historical trauma, fostering a deeper connection to the period — depicting the human cost.

The Interplay of Narrative and Mechanics

HSBGs benefit from an integrated approach where narrative reinforces mechanics. If a game provides historical backstories for factions but lacks emotional stakes, it may foster cognitive empathy but not affective empathy. If a game has immersive storytelling but lacks strategic decision-making, it might evoke emotions but fail to promote critical historical thinking. By merging and providing a balanced implementation of both, a game ensures players think deeply about history while also feeling the impact of their decisions.

Visual Representation

Incorporating images into the game's components, especially those that focus on individual or group fatalities, is an important design decision, as it can strongly influence both cognitive and affective empathy. Visual representations of violence, loss, and suffering have a profound impact on how players emotionally engage with a historical event.

Cognitive Empathy Through Visual Representation

Historical Contextualisation. Images of fatalities, destruction, or significant events in the game's historical context can help players connect the emotional consequences to the broader historical narrative. For example, a photograph of an attack during a play session might help players better understand the scale of violence and its effects on communities, shifting their focus from abstract concepts (e.g., "political conflict") to tangible, human experiences. Players can analyse how the loss of individuals or groups fits into the larger political and social dynamics of the conflict, deepening their understanding of the causal relationships that drive the history.

Understanding Different Perspectives. By presenting images that depict different factions or perspectives (e.g., the grief of civilians, soldiers' deaths, or the impact of the violence on communities and families), players gain insight into the varying human experiences of the same historical event. The images can help players reflect on the moral and ethical complexities of the event, encouraging a deeper understanding of the diverse stakeholders. Empathetically, the game can help players understand that the same event is perceived differently depending on who experiences it, which challenges the player to understand different viewpoints more deeply.

Affective Empathy Through Visual Representation

Emotional Impact of Visuals. Images of fatalities, victims, or destruction are powerful in triggering emotional responses. Photographs or illustrations that show the devastation of families, the loss of life, or the physical damage done to communities bring an emotional depth to the game. Players might feel a sense of sorrow, anger, or both when encountering these images, particularly if they depict real historical moments with human faces attached. These images can evoke compassion and emotional resonance with the people involved in the historical event, fostering an emotional connection to the loss and suffering experienced by individuals (Hunicke, Leblanc, & Zubek, 2004).

Personalisation and Connection. When images show individuals or small groups suffering, it personalises the history. Players may connect more with the faces and names they see, which can make the emotional impact feel more immediate and real. For example, if the game's card depicts a family mourning a lost loved one, players might emotionally respond more strongly than if the event were described in abstract terms like "a casualty in battle." Players are more likely to feel empathy for specific individuals or communities, rather than simply understanding the abstract concept of "death" or "casualty" in a conflict. The visual representation gives the emotion of loss a human face, making the history more relatable and deeply felt.

Ethical Reflection Through Graphic Content

Images that depict the harsh realities of war (e.g., dead bodies, destruction of homes, or displaced people) can serve as a tool for reflection. By seeing the outcomes of violence, players might reconsider the moral costs of their in-game decisions. For instance, after making a violent or purely objective decision in the game, a player might encounter a narrative card showing the aftermath of that decision — such as the image of civilian suffering — which can provoke both cognitive and emotional reflection on their choices. These objects and images can prompt players to engage more deeply with the broader impact of their decisions, making them think about the moral consequences of their actions — and the actions of others — in the historical context. This "need to decipher gives us the chance both to bring out what is in the object and what is in ourselves; it is a dynamic, complex movement which unfolds as time passes, and in the act of interpretative imagination we give form to ourselves" (Pearce, 1992, p. 220).

Moral Dilemmas in Imagery. Using graphic images of fatalities forces players to engage with the moral ambiguities of war. The emotional weight of the image often makes players reflect on the human cost of their decisions, encouraging a more holistic understanding of the conflict, rather than a detached, intellectual view of strategy and tactics. The game may evoke a sense of guilt, responsibility, or compassion as players reflect on the visual content, triggering a stronger emotional response to the consequences of war.

Physical Representation

The tangible elements of a game — such as maps, boards, cards, components — play a crucial role in shaping player engagement, influencing both cognitive and affective empathy. The physicality of game components can reinforce historical narratives, encourage immersion, and deepen emotional connections by providing players with a concrete link to the past.

Cognitive Empathy Through Physical Components

Tactile Engagement with Historical Context. Physical components serve as tangible representations of historical elements, making abstract concepts more concrete. Maps, wooden or plastic components, and cards can represent real-world locations, individuals, or events, grounding players in the historical setting. For example, a textured game board depicting an actual urban landscape (see Figure 3) can help players grasp the material realities of conflict, shifting their focus from abstract statistics to lived experiences. Participants can better understand how geography, resource limitations, or environmental conditions influenced their historical analogues' decisions, fostering a deeper comprehension of historical constraints.
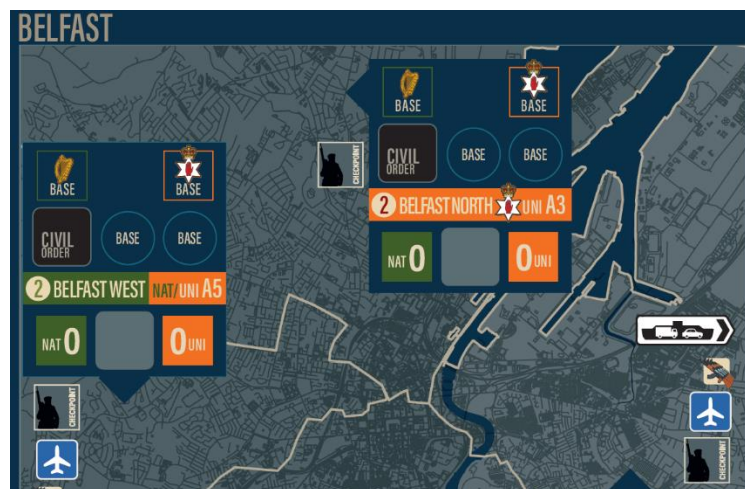

Figure 3. Belfast West and Belfast North

Source: VASSAL, from *The Troubles: Shadow War in Northern Ireland*. Reprinted with permission from Compass Games LLC.

Manipulating Game Pieces to Understand Perspective. By physically moving tokens or cards that represent different factions, communities, or individuals, players engage with multiple viewpoints in a tactile way. This act of control reinforces an understanding of competing interests, power dynamics, and the shifting nature of historical events. A game in which players must physically place voting pieces in a conflict zone, for instance, may highlight the human cost of war and the difficulty of achieving a peaceful resolution through democracy (see Figure 4).

Figure 4. Vote canvassing by the Nationalist faction (represented by the green cubes) in a peaceful Londonderry

Source: VASSAL, from *The Troubles: Shadow War in Northern Ireland*. Reprinted with permission from Compass Games LLC.

Players actively reconstruct historical events through movement and placement, helping them comprehend the perspectives of different stakeholders and the complexity of historical decision-making.

Affective Empathy Through Physical Components

Emotional Significance of Tactile Interaction. The physical act of handling game pieces — placing tokens that represent casualties, drawing a card detailing the opportunity to commit a bombing campaign, possibly removing a character from the board — can evoke strong emotional reactions. When players must physically remove a game piece that represents a person, it personalises loss in a way that abstract descriptions may not achieve. The tangible act of removing a piece can create a sense of sorrow or loss, reinforcing an emotional connection to the historical experience and encouraging players to feel the weight of historical tragedies, the finiteness of people and things.

Materiality and Personal Connection. The texture, weight, and design of game components can enhance immersion and evoke an emotional response. A game that uses period-appropriate colour schemes, image quality or font for narrative event cards, or rough, damaged tokens to represent war-torn cities, can create a sensory link to the past. Custom-designed components, such as character cards with personal biographies, can encourage players to form attachments to specific individuals within the game. Players are more likely to emotionally invest in the history being represented when physical components provide a tangible sense of realism, making the game feel more immediate and personal.

Ethical Reflection through Physical Components

Moral Weight of Material Decisions. Physical components can be used to reinforce ethical dilemmas within a game. If players must allocate limited resources using physical tokens — deciding, for instance, which action may be permitted, and which are not — the materiality of the decision can make the moral weight feel more significant. This differs from digital or abstract decision-making, where consequences may feel more detached. The physical act of choosing between different game pieces or tokens can create a sense of responsibility, leading to deeper reflection on the ethical complexities of historical events.

Symbolism and Interpretation of Physical Objects. Game components can carry symbolic meaning, encouraging players to interpret their significance beyond gameplay mechanics. A deck of cards that slowly diminishes may represent dwindling hope or escalating violence, while a game board that physically fragments over time can symbolise societal collapse. Such components invite players to think critically about the historical narrative being conveyed. The evolving physical state of the game can evoke an emotional response, making historical events feel more real and immediate as players witness destruction, loss, or change unfold in a material way.

Linking this Framework to *The Troubles*

To successfully integrate both cognitive and affective empathy into a historically-structured board game, the

game needs to offer both intellectual challenges (through strategic thinking, understanding of historical context, and perspective-taking) and emotional engagement (through narratives, moral dilemmas, and the emotional consequences of actions). Games that achieve both can create a holistic learning experience where players not only understand the historical complexity of an event but also connect emotionally to its abhorrently human cost.
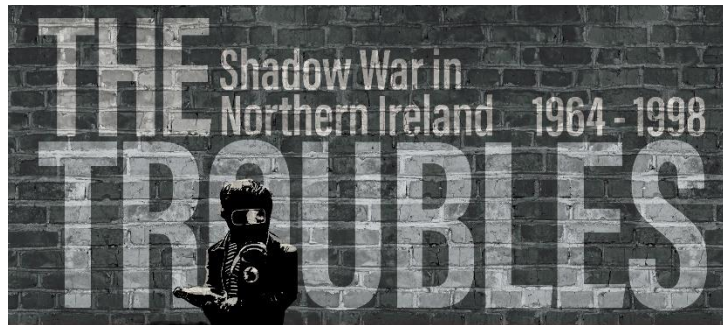

Figure 5. Iconic image of the 'Boy in the Gas Mask'

Source: from *The Troubles: Shadow War in Northern Ireland*. Reprinted with permission from Compass Games LLC.

Cognitive empathy in *The Troubles* may come from understanding the motivations behind the actions of paramilitaries or the British Forces and analysing the political strategies involved. Affective empathy could be elicited when players are emotionally moved by the effects of their decisions, such as the suffering of civilians or the devastation of a community torn apart by violence. By combining both, a game like *The Troubles* can foster a deeper historical empathy that teaches players not just to understand but also to feel the impact of the events, creating a more meaningful and reflective experience.

Everything from the use of images, symbols and colour on narrative cards serves as a tool to provoke both cognitive and affective empathy. They help players intellectually engage with the historical event by providing a visual link to the consequences of actions, and they evoke emotional responses that humanise the history. By carefully selecting and presenting these images, game designers can deeply enhance the emotional and intellectual impact of the game.

Through the narrative, physical and visual elements, *The Troubles* transforms historical learning into an immersive, multisensory experience, reinforcing both analytical understanding and emotional connection to the events of the Northern Ireland conflict.

4. Case Selection: *The Troubles*

Historical Context: A Background to The Troubles

The period of conflict that engulfed Northern Ireland between 1969 and 1998 is commonly known as the Troubles. Its origins can be traced back to the sectarian divisions that emerged when King James I of England unified the predominantly Catholic island of Ireland with England and Scotland in 1604.

In the late 19th and early 20th centuries, there were three formal attempts to challenge the union with a largely Protestant Great Britain. After the third failed attempt to secure Home Rule, Great Britain partitioned six of Ireland's thirty-two counties in 1922, incorporating them into the United Kingdom, while the remaining twenty-six counties became the Irish Free State, now the Republic of Ireland.

Between 1922 and 1969, Northern Ireland operated under a Unionist-controlled electoral system that was predominantly Protestant and widely regarded as designed to uphold a socio-economic structure that disadvantaged the Nationalist, mostly Catholic population, who identified as Irish rather than British (see Figure 6).

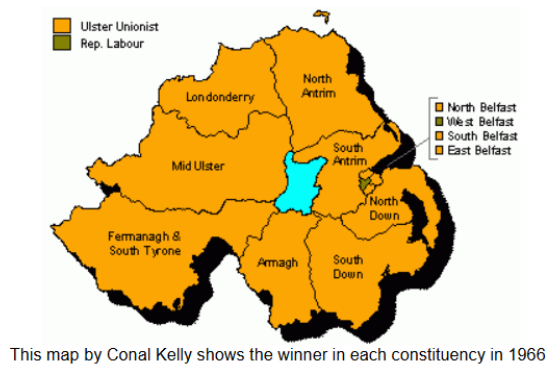This map by Conal Kelly shows the winner in each constituency in 1966.

Figure 6. Map of 1966 Westminster Election Results in Northern Ireland: Unionists dominate Nationalist MPs (11-1)

Source: ARK Northern Ireland 2025.

Although Unionist Prime Minister Sir Terence O'Neill sought to address these inequalities amid the rise of the civil rights movement — such as the Campaign for Social Justice in Northern Ireland (1964) — and the emergence of a Catholic middle class, his reforms provoked a resurgence of the Loyalist paramilitary group, the Ulster Volunteer Force (UVF). Viewing these changes as a threat to Northern Ireland's union with Britain, the UVF launched a series of bomb attacks on utility infrastructure. This, along with other acts of civil disobedience targeting the Nationalist Catholic community, stemmed from fears that O'Neill's progressive policies would ultimately lead to a united Ireland and weaken ties with the UK.

In August 1969, as sectarian violence escalated, British troops were deployed to protect Catholic communities under attack from the UVF. Their presence would extend for four decades, making it the longest military deployment in British history. The Troubles resulted in approximately 3,500 direct fatalities, but an estimated 24,000 additional deaths were attributed to "structural violence," in which socio-economic conditions severely impacted quality of life, contributing to increased mortality rates (The Treason Felony Blog, 2021).

Cognitive & Affective Empathy

For historical events like the Troubles, which are emotionally and politically charged, empathy becomes an essential tool for learning. Cognitive empathy allows students to grasp the different political and ideological stances held by various factions (e.g., the British Forces (BF), the Irish Republican Army (IRA), the Unionist political parties). Simultaneously, affective empathy helps students emotionally engage with the personal toll of violence, loss, and division, fostering deeper emotional understanding and reflection on the impacts of the conflict of Northern Ireland.

Authenticity & Sensitivity in Narrative Framing

The Troubles focuses on the simulation of a highly sensitive and traumatic period in Northern Ireland's history, and its narrative structure reflects this complexity.

Narrative Cards

Released in 1993 and designed by Mark Herman, *We the People* is widely regarded as the first wargame to incorporate the card-driven (CDG) mechanic. In this system, playing cards not only supported but also influenced players' actions, evolving to depict key historical events in a narrative-driven manner. Since then, numerous board games have adopted this mechanic, including *Paths of Glory* and *A Distant Plain*.

The Troubles utilises the card-driven game (CDG) mechanic. Enshrined in *The Troubles* are 260 such cards known as Narrative Events, each of which has an accompanying expanded textual narrative in the accompanying Historical Playbook.

Play begins with an initial Scenario setup, of which there are eight. Each Scenario (named an 'Epoch') contains a specific series of Narrative Cards, each representing actual events within a timeline (see Figure 8). Mainly episodic in nature, these artefacts depict a day or succession of days in the historical timeline of Northern Ireland between 1964 and 1998, and each card has an accompanying summary of the actual event in the accompanying documentation. Ranging from the strategic and geopolitical to the tactical, domestic and deeply individualised and personal, each card helps to narrativise "*the meaning of a violent past* by positioning it as an episode of longer historical processes" (Bermudez, 2021, p. 279).

Most cards also provide the executing faction with instructions to create an effect in the current play session that is historically-accurate, or provide an ahistorical alternative as some Narrative Cards enable a feature known as a

Development or a Temporary Effect, which mimics an historical event, enables or disables a player's capabilities or changes their victory conditions consistent with the dynamics of the actual narrative permanently or until some temporary condition has been met or exhausted. (See Figure 7)

Utilising colour schemes and imagery that evoke the media of a particular time period can enhance emotional engagement, making players more likely to relate to historical experiences and cultivate affective empathy (see Figure 7). Hegarty elucidates on the authenticity of each of the 260 unique Narrative Cards present in *The Troubles*, many of which feature a still image derived from the medium of the time:

"The images are meant to evoke the main media of news in my youth - newspapers, with TV style and color coming later in the cards. They are meant to be rough and a bit fragmentary like many of my memories of the Troubles. I remember mistaking an image of bombed out Beirut for Belfast when I was still in primary school... Hard black/white contrast like the narratives of the sides" (D. Hegarty, 2023).

Figure 7. Narrative Card No. 153: Two IRA prisoners depicted undertaking the 'blank protests' in the Maze Prison

Source: from *The Troubles: Shadow War in Northern Ireland*. Reprinted with permission from Compass Games LLC.

From the narrative card imagery, the paratextual elements — the rulebook and historical supplement — players are under no illusion that they are dealing with anything other than actual events, many of which involved atrocities and the fatalities of approximately two thousand innocent human beings.

NARRATIVE CARD RANGES							
Beginning	End	Title		Card #s	# Cards	Limited Duration (9.2) #Cards	# Developments
1964	1970	"Wars and rumours of wars…the end is still to come" (Matthew 24:6).	▲	1-61	62	20	5
1970	1974f	The Bloody Years	●	62-109	48	24	13
1974F	1974O	Sunningdale	◯	110-135	26	26	5
1974O	1979	Talks & H-Blocks	★	136-168	33	11	7
1979	1983	The Thatcher Years #1: Iron and Hunger	●	169-194	26	13	7
1983	1987	The Thatcher Years #2: Target Mainland	✦	195-213	19	9	5
1987	1992	The Thatcher Years #3: Anglo-Irish	◆	214-237	24	12	8
1992	1997	The Road to Peace	■	238-254	17	12	5
1997	1998	"They shall beat their swords into plow-shares" (Isiah 2:4)	▼	255-260	6	6	2
1964	1994	The Troubles		1-260	260	95	52

Figure 8. An overview of the nine Epochs into which the Narrative Cards are divided; 'The Troubles' is the use of all 260 cards played in chronological order

Source: Scenario table from Rulebook, from *The Troubles: Shadow War in Northern Ireland*. Reprinted with

permission from Compass Games LLC.

Contextual Framing

With *The Troubles*, the historical context is embedded in the game through narrative event cards, mechanics and iconography that are derived from real-life political and social tensions. Furthermore, the paratextual elements — rulebook, historical supplement — provide additional narrative backstory and references to primary sources, which may be used (before, during, and after gameplay) as materials to prevent historical misconceptions. For example, electoral data pertaining to win ratios and parliamentary seat distribution between the Nationalist and Unionist political parties representing Northern Ireland in the United Kingdom were garnered from Ark Election data (see Figure 9) and used for each Scenario setup.
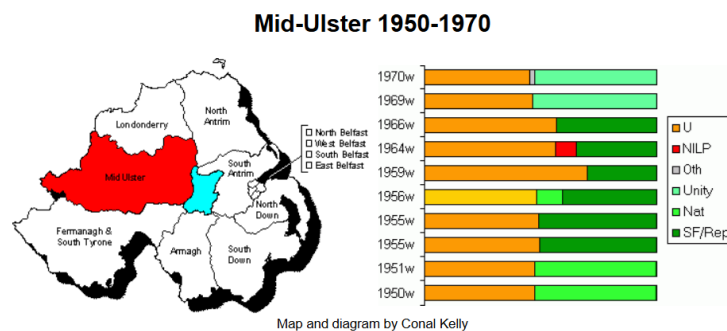

Figure 9. Northern Ireland Westminster Election Data

Source: ARK Northern Ireland 2025.

Primary Sources & Diverse Perspectives

Incorporated are multiple historical viewpoints to reflect the complexity of the period, avoiding binary representations (e.g. "good vs. evil") and instead offer diverse viewpoints, including marginalised voices. *The Troubles* presents multiple factions (e.g., the British Army, Republican and Loyalist paramilitaries, and Nationalist and Unionist political parties), avoiding oversimplified depictions of conflict (Sisler, 2008). In this way the simulation should not impose a single "correct" interpretation but allow players to explore different perspectives.

Mechanics That Reinforce Historical Structures

The game mechanics reflect real political and historical constraints — e.g., asymmetric power structures, difficult moral decisions, and indirect as well as unintended consequences, forcing players to operate under different limitations, mimicking the real power imbalances (see Figure 10).

Figure 10. *The Troubles* models Northern Ireland's representation within the United Kingdom's Westminster Parliament

Source: VASSAL, from *The Troubles: Shadow War in Northern Ireland*. Reprinted with permission from Compass Games LLC.

Player Choice & Consequence

Many decisions in *The Troubles* carry weight, mimicking the uncertainty and stakes of real historical actors. Players should face difficult decisions with no easy solutions, mimicking historical dilemmas, with players forced to deal with the consequences.

Tension & Conflict Representation

Instead of purely focusing on direct combat, there is an emphasis on political manoeuvrings, societal pressures, or ethical dilemmas to capture both the period's domestic and international complexity.

Figure 11. International

Source: VASSAL, from *The Troubles: Shadow War in Northern Ireland*. Reprinted with permission from Compass Games LLC.

Figure 11 highlights the arms networks that supplied both the IRA and Loyalist paramilitary organisations included the Republic of Ireland and United States of America, both of which were instrumental in the signing of the Good Friday Agreement and the cessation of violence. This area of the simulation allows both paramilitary factions to spread their terror beyond Northern Ireland.

Role-Playing & Perspective-Taking

Diverse Player Roles

Players step into different perspectives (e.g., political activists, politicians, paramilitaries, security forces) rather than reducing the conflict to binary factions. Games such as *The Troubles* should encourage players to understand the motivations and constraints of historical actors. Players take on different roles that mirror the complex decision-making of historical actors rather than reducing the conflict to a military game of attrition. Equipped with actions that allow them to kill or bomb, so too are they similarly imbued with the ability to support political progress, enact ceasefires and engage in a peace process.

Moral Ambiguity

Presented scenarios have no clear "right" answer, reflecting the ethical complexities of historical events. These force players to reflect on historical decision-making, to weigh short-term gains against long-term consequences both for themselves and the other participants.

Empathy Building through Mechanics

Mechanics such as constrained decision-making, resource scarcity, or moral dilemmas to immerse players in the historical context. Elements of the game system respond to player choices in ways that highlight real historical consequences — alterations to the movement within the map; affecting the turn-taking mechanism to demonstrate power imbalances; a Random Event Chit (REC) mechanism to simulate the random nature of paramilitary attacks.

Unlike traditional war games where civilians are often an afterthought — or simply omitted — *The Troubles* places them at the centre of the conflict. Civilians and non-combatants play a role, reinforcing that the conflict impacted more than just military factions, with imprisoned and fatalities in clear sight on the playing area and having impact on victory conditions. This forces players to consider how their actions affect not just military goals, but also the lives of ordinary people — enhancing empathy by requiring engagement with

non-combatants' experiences.

Avoiding 'Gamification' of Tragedy

Respectful Representation of Violence & Trauma

The design of *The Troubles* avoids making suffering a mere game mechanic; rather than glorifying or abstracting violence (Robinson, 2012), games should focus on its impact on individuals and communities. The game does not trivialise violence; instead, it explores its political and social ramifications, ensuring that suffering and conflict are contextualised rather than turned into abstract resources.

Non-Traditional Win Conditions

Rather than a simple victory/loss system, it considers goals like negotiation, compromise, or reconciliation to reflect real historical stakes, or long-term social consequences. Players must navigate the lasting consequences of their actions.

The Visuals

Already well-established in the games industry for political and wargame-themed titles such as *1960: The Making of a President* (2007), *Labyrinth* (2010), *Red Flag Over Paris* (2021), Domhnall Hegarty produced all artwork for *The Troubles*, stating:

> "I went with a color scheme that most reflects my memories of the troubles. Late Seventies through mid-Eighties, the time when I was least consciously aware that there was anything out of the norm with the state of things" (D. Hegarty, 2023).

The entire 'world' inhabited by the six factions is confined within a 22" by 34" playing space that depicts the Six Counties of Northern Ireland. It represents 14 thousand square kilometres of urban, open and rural land upon which thousands of lives were lost. It depicts the border between the North and the South of Ireland, which for some represents a scar remnant of hundreds of years of wrestling; for others a fragile, porous division between Home Rule and Unionism. The names on the map: Londonderry (Derry), Belfast, Westminster, Dublin, Enniskillen, Omagh. Small pinpricks on the map; huge reservoirs of hurt, once peaceful communities now forever grieving.

Civilians and Soldiers: Emotional and Intellectual Engagement

Civilians.

Cognitive Impact. The images depicting civilians who suffer because of political or military conflict may make players intellectually reflect on the disproportionate impact of war on non-combatants. These images may prompt players to consider the moral complexity of their decisions that affect innocent lives, especially in a highly polarised conflict like *The Troubles*. This helps to build cognitive empathy, as players may understand the historical consequences of conflict on vulnerable populations, a photograph or illustration of a family displaced from their home or injured civilians in a bombing. This visually highlights the human cost of war, shifting the focus from military strategy to the real-life consequences for families.

Figure 12. Civilian casualties and prisoners sit alongside British and RUC Forces, IRA and Loyalist factions

Source: VASSAL, from *The Troubles: Shadow War in Northern Ireland*. Reprinted with permission from Compass Games LLC.

Affective Impact. Civilians are often perceived as innocent bystanders, making images of their suffering particularly effective in triggering emotional empathy. Players are more likely to feel sorrow, compassion, or

guilt when confronted with images of civilians, especially those depicted in positions of vulnerability or suffering. These images can elicit an emotional response that may lead to players reassessing their decisions, especially if *they* have made choices that harm civilians in the game (see Figure 12). Players may experience guilt or empathy for the civilian populations affected by decisions made in the game, even if those decisions were motivated by strategic considerations either by themselves of their fellow faction players.

Soldiers.

Cognitive Impact. Soldiers, the British Forces (BF) and the Ulster Defence Regiment (UDR), as well as the police force, the Royal Ulster Constabulary (RUC), as active participants in the conflict may prompt players to focus more on the tactical and strategic dimensions of the conflict. Images of soldiers can foster cognitive empathy by helping players understand the role of the military in a historical context. However, these images can also challenge players to think about the humanity of soldiers — how combatants are individuals caught up in a larger ideological or political struggle, which can foster understanding of the complex moral choices soldiers face. A photograph of soldiers in combat, or a soldier mourning the loss of comrades, are types of images that can help players understand the personal toll of warfare, as well as the human cost of following orders in a conflict.

Figure 13. Belfast West is in a state of 'Civil Disorder' as the result of the Loyalist faction activating an active service unit

Source: VASSAL, from *The Troubles: Shadow War in Northern Ireland*. Reprinted with permission from Compass Games LLC.

Affective Impact. Soldiers' images may evoke emotional reactions such as sympathy or frustration. While soldiers are often seen as "combatants," images that focus on the human side of soldiers — showing their emotions or vulnerabilities — can trigger affective empathy. For example, a soldier's sorrow for the loss of a comrade can as a result of an engagement with a Loyalist paramilitary (see Figure 13) may prompt players to feel sympathy for that individual, even if they are part of the "enemy" faction. These images also help humanise soldiers, making them more than just "enemy combatants." Players might feel compassion for soldiers who face moral dilemmas or stress from the realities of war, which can create a more nuanced emotional experience of the conflict.

Victims and Perpetrators: Moral Reflection and Empathy Development

Images of Victims (Both Civilian and Soldier).

Cognitive Impact. Victim images, particularly those of civilians, bring the player's focus to the consequences of violence and its victims, forcing them to think critically about who suffers in a historical conflict. Images of victims — whether they are children, elderly people, or individuals caught in a bombing — focus the player's attention on the broader social consequences of conflict, fostering understanding of the disproportionate impact that violence has on non-combatants. A depiction of a child or family grieving after an attack or displacement, which can deepen the player's understanding of the cost of conflict on families and communities.

Affective Impact. Victim images elicit strong emotional responses. Players may feel anger, grief, or guilt upon encountering images of victims who have suffered due to violence or injustice.
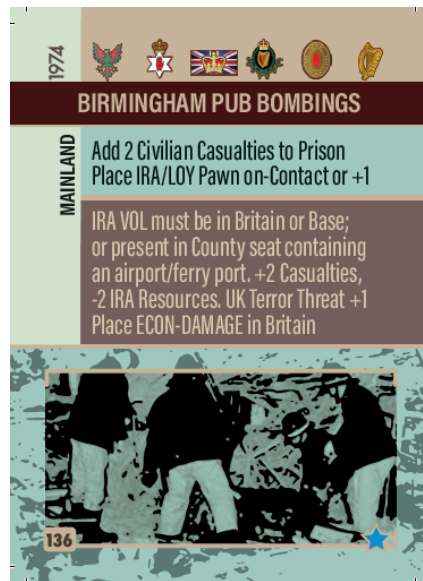
Figure 14. Narrative Card No. 136: Firemen attend the scene of the Birmingham Pub Bombing which claimed 21 lives, with over 180 others injured

Source: from *The Troubles: Shadow War in Northern Ireland*. Reprinted with permission from Compass Games LLC.

These images (see Figure 14) humanise the consequences of conflict, creating a powerful emotional connection with the individuals who bear the brunt of it. This can lead to greater empathy for the marginalised and oppressed groups in the game. Sadness or compassion for victims, which might influence a player's moral decisions in-game, encouraging them to adopt a more empathetic approach to the characters they interact with.

Images of Perpetrators.

Cognitive Impact. Depicting perpetrators — whether they are soldiers or paramilitaries committing violence or political leaders responsible for decisions — can make players reflect on the role of power, authority (especially Britain's initial role, but subsequent reputation within the Nationalist communities), and ideology in conflicts. It challenges them to think about the moral and intellectual motivations behind actions that cause harm. These images may promote cognitive empathy by forcing players to reflect on the motivations, fears, and rationalisations that drive people to become perpetrators. A paramilitary or military faction (see Figure 15) giving an order that results in civilian casualties, which prompts players to think about the moral responsibility of those who instigate violence or oppression, and the context leading to this decision.
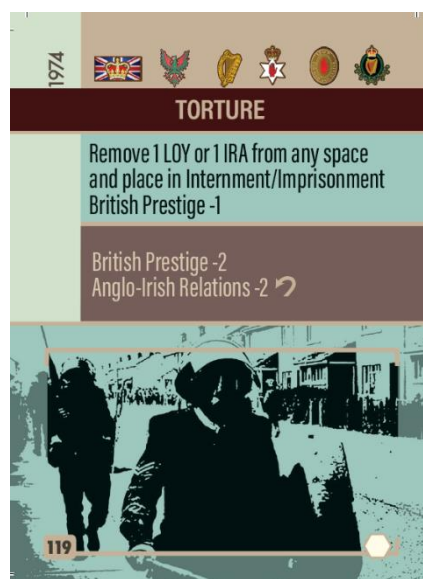

Figure 15. Narrative Card No. 119: RUC men brandish riot gear on an unknown street in Northern Ireland

Source: from *The Troubles: Shadow War in Northern Ireland*. Reprinted with permission from Compass Games LLC.

Affective Impact. When depicting perpetrators, the emotional response can be more complex. Players might feel anger or frustration toward individuals who cause harm, especially if these perpetrators seem to act without regard for human suffering. However, showing perpetrators in moments of vulnerability (e.g., a leader questioning their decisions) can foster a more complex emotional empathy, making players reflect on how even perpetrators may be humanised by their own internal conflicts. A feeling of resentment or disgust for the perpetrators of violence or oppression, but potentially also compassion if the images suggest the complexity of the perpetrators' own personal or ideological struggles.

Images of Paramilitaries/Terrorists: Ideological Commitment and Moral Dissonance.

Cognitive Impact. Paramilitary fighters or individuals labelled as "terrorists" in historical conflicts often operate outside conventional military structures, motivated by ideological, political, or social grievances. Images of such individuals can challenge players to think critically about the motivations behind armed resistance, exploring how groups justify violence as a means of achieving political goals. Unlike conventional soldiers, paramilitary members are often deeply embedded in local communities, blurring the lines between combatants and civilians. A photograph of a masked paramilitary member holding a weapon (see Figure 16) in an urban setting, or a propaganda poster promoting their cause.
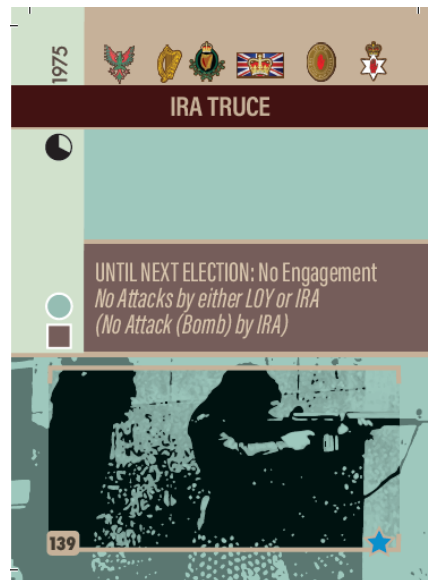

Figure 16. Narrative Card No. 139: A female IRA volunteer on active duty

Source: from *The Troubles: Shadow War in Northern Ireland*. Reprinted with permission from Compass Games LLC.

These images can encourage players to reflect on how ideology, community identity, and historical grievances shape participation in armed conflict. While players may initially view paramilitaries as purely violent actors, imagery that humanises these individuals — such as depicting them in moments of loss or imprisonment — can foster cognitive empathy by encouraging an understanding of their perspectives, even if players do not condone their actions.

Affective Impact. Images of paramilitaries or terrorists invariably provoke strong emotional reactions, including fear, anger, or discomfort. These figures are frequently associated with acts of violence directly or indirectly targeting civilians, making them more likely to be perceived as aggressors. However, when presented in a more personal or vulnerable light — such as through images showing the emotional strain of living a life of violence — players may experience a more conflicted emotional response (see Figures 17). A paramilitary member grieving over a fallen comrade, or one looking at a childhood photograph before carrying out an attack. These images may create a sense of unease, sadness, or even reluctant sympathy, as they reveal the personal costs of ideological violence.

Figure 17. Two IRA prisoners undertaken hunger strikes

Source: www.anphoblacht.com.

Players may feel both condemnation and pity for paramilitary fighters, particularly if the game explores how individuals are radicalised or coerced into joining such groups. This duality can create moral dissonance, forcing players to grapple with the complexities of labelling individuals as purely "villains" or "freedom fighters," depending on perspective. It is exactly the elicitation of reflexive critical analysis that historically-structured boardgames bring to such topics.

The Physical Components

In *The Troubles*, physical components play a crucial role in fostering both cognitive and affective empathy by making historical events more tangible and emotionally efficacious. The game's two map-boards, narrative cards, counters and wooden components, serve as material representations of the conflict, allowing players to engage with history in a tactile way.

The main playing area depicts Northern Ireland as well as other status tables; a smaller separate map depicts Belfast (see Figure 18).
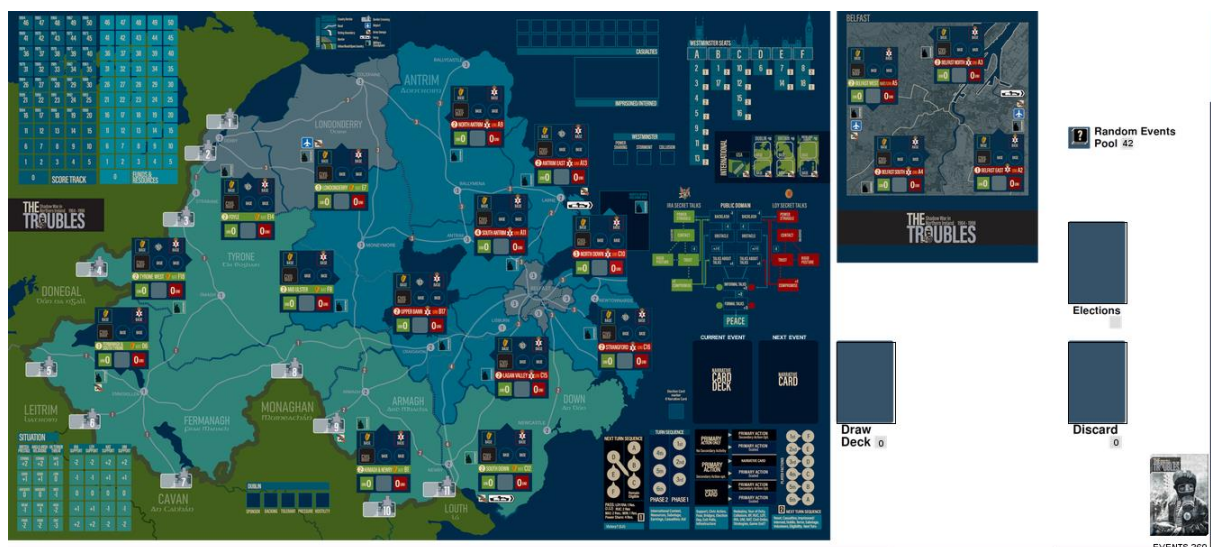

Figure 18. The Main Map and Belfast Insert

Source: VASSAL, from *The Troubles: Shadow War in Northern Ireland*. Reprinted with permission from Compass Games LLC.

Every object in *The Troubles* provide a unique visual experience that enhances emotional engagement, as they

maintain a veridical resolution and density of information (Leinhardt in Paris, 2002) that cannot be replicated through photographs or drawings. This authenticity can evoke stronger feelings of empathy in viewers as they connect with the tangible aspects of history.

From a cognitive empathy perspective, handling physical components — such as moving wooden cubes or octagons, placing military checkpoint tokens, or managing resources and funds — encourages players to think critically about historical constraints and decision-making. The act of positioning figures or drawing narrative event cards helps players grasp the complex interplay of geopolitical strategy, violence, and community resilience, making the conflict's historical dynamics more comprehensible.

In terms of affective empathy, the materiality of the game reinforces emotional engagement. The removal of character pieces due to violence, the destruction of locations on the board, or the deterioration of community stability through card mechanics can evoke a sense of loss and grief. The physical interaction with these elements makes the human cost of the conflict more immediate and personal.

Additionally, the game's ethical dimension is heightened by its physical components. Players may face moral dilemmas when choosing how to allocate limited resources, deciding the fate of civilians, or witnessing the escalation of violence through game mechanics. The tangible nature of these choices adds weight to their consequences, prompting deeper reflection on the real-world impact of similar historical events.

Facilitating Reflection and Discussion

The discourse that occurs during and after engagement in any simulated activity is as integral to the design as are the physical components and the mechanics:

> "game design should start with the place where the participants are going to learn, that is, with the debriefing. At the very least, the debriefing should be a design consideration right from the start" (Crookall, 2010, p. 908).

Debriefing Mechanisms.

HSBGs like *The Troubles* should offer mid- and post-game discussions, reflection prompts, or companion materials to encourage critical thinking about historical empathy. Players should be encouraged to discuss their experiences and compare them to historical realities; reflect on historical events and how different perspectives shaped the conflict.

Scaffolded Learning.

HSBGs should be part of a broader learning framework, including supplementary materials and discussion guides. While primarily a board game, *The Troubles* can be used as an educational tool to foster discussions on historical memory, to explore how history is remembered and interpreted differently.

5. Discussion

Comparative Analysis with Other Games

To highlight *The Troubles*' approach, it's useful to compare it to other historical games that tackle similar themes.

Table 1.

Game	Historical Setting	Approach to Narrative & Empathy	Comparison to *The Troubles*
Twilight Struggle	Cold War (1945–1991)	Geopolitical strategy, limited personal empathy	Focuses on high-level politics, lacks personal narratives seen in *The Troubles*.
Labyrinth: The War on Terror	Post-9/11 Global Conflict	Counterinsurgency mechanics, ideological struggle	Uses asymmetry like *The Troubles*, but focuses on U.S. vs. Islamic insurgency.
This War of Mine	Civilian perspective in war	Survival-based, highly affective empathy	More focused on civilian suffering, whereas *The Troubles* balances combatants & civilians.
Freedom: The Underground Railroad	Slavery in the U.S. (19th century)	Players take on abolitionist roles, high affective empathy	Like *The Troubles*, forces moral choices, but focuses on activism rather than conflict.
Pax Pamir	Great Game in	Players shift loyalties between	Similar asymmetry & political

	19th-Century Afghanistan	factions	negotiation, but focuses on colonial power struggles.
Wir Sind Das Volk!	Divided Germany (1945–1989)	Economic and social struggles between East & West Germany, structural empathy	Shares an asymmetrical dynamic with *The Troubles*, but focuses on internal tensions within a divided nation.
1979: Revolution in Iran	Iranian Revolution (1979)	Story-driven, personal choices, strong affective empathy	Like *The Troubles*, it emphasises individual perspectives in a broader historical conflict, but with a more cinematic and linear approach.

Similarities and Differences

Compared to traditional war games (*Twilight Struggle*, *Labyrinth*), *The Troubles* humanises history more, focusing not just on grand strategy but also on the personal and emotional impact of conflict. Conversely, civilian-focused games (*This War of Mine*), *The Troubles* does not solely focus on civilians but balances military, political, and social perspectives, making it more comprehensive. *The Troubles,* in depicting social and political struggle, presents both oppressors and insurgents, rather than focusing on one side of a struggle. Factions are equipped with actions that are both strategic and tactical, aimed at destruction or peaceful negotiation, allowing geopolitical and domestic narratives to be simultaneously woven into an emerging co-constructed personal and collective narrative (Neitzel quoted in Raessens and Goldstein, 2011).

Implications

For Designers

Narrative Complexity. Games should provide rich, multi-layered narratives that offer a variety of perspectives as "narratives that de-normalize violence expose the agency and responsibility of different actors, on different sides of a conflict" (Bermudez, 2021, p. 282) The moral dilemmas presented should force players to reflect not only on the outcomes of their decisions but also on the human cost of these decisions, which helps build both cognitive and affective empathy.

Asymmetrical Gameplay. The use of asymmetry in gameplay, where players take on roles with different objectives and challenges, is essential in helping players understand the diverse perspectives within a conflict. Game designers should continue to develop mechanics that encourage players to inhabit the personas of different individuals affected by the historical event. The use of colour schemes and imagery that reflect the media of a specific period can deepen emotional engagement, making players more likely to connect with the experiences of others and develop affective empathy. Sensitively-deployed graphics with non-gratuitous imagery would help "to mitigate some of the weight of the subject matter" (Juul, 2013).

Emotional Engagement Mechanics. Designers should embed mechanics that allow players to connect emotionally with the game's period-appropriate characters and situations. This could involve using dynamic, context-sensitive events, arresting narrative card imagery, and which carry historical and ahistorical consequences that highlight the emotional stakes of the conflict being modelled. Visual representations in games or educational settings can evoke emotional responses that resonate with players' memories and perceptions, enhancing their ability to empathise with characters and situations presented in the narrative.

Player Agency and Consequences. Players should be provided with realistic and meaningful choices and foregrounding the consequences of their actions can amplify both cognitive and affective empathy. Game designers should ensure that decisions have both temporary and long-term impacts that affect both the player's understanding of the conflict and their emotional connection to it, which authentically mimics the temporal progression of the events being simulated.

By considering these design elements, game developers can create experiences that are not only engaging but also serve as powerful tools for fostering empathy in players, helping them navigate the emotional and intellectual complexities of historical (and ahistorical) events.

For Education

Incorporating educational elements like fact-based content, historical context, and post-game discussions can enhance the empathy-building potential of the HSBGs. Game designers can work with educators to include built-in reflection questions or discussion prompts to encourage deeper engagement with the history being portrayed.

Use of *The Troubles* in Classroom Settings

Pedagogical Strategies. To maximise the potential for cognitive and affective empathy, educators should employ strategies that deepen students' engagement with both the emotional and intellectual dimensions of the game. Some effective strategies might include:

- **Debriefing Sessions.** After playing, facilitating class discussions where students can reflect on their choices and the emotional impact of the game. Educators can ask students to reflect on how they felt when making difficult decisions or when witnessing the consequences of their actions. These discussions could centre on the differences between cognitive and affective empathy, helping students articulate the emotional and intellectual aspects of their experience.

- **Role Play and Perspective-Taking.** Pairing game sessions with structured role-playing exercises, where students must assume the perspective of a specific faction or individual (e.g., an Irish civilian or a British soldier), can enhance their ability to understand the conflict from multiple viewpoints. This allows students to further immerse themselves in the game's complex moral and ethical dilemmas.

- **Journaling and Reflection.** Encouraging students to keep journals or reflective essays after playing the game can help them process their emotional responses (affective empathy) and analyse the strategic decisions they made (cognitive empathy). These reflective exercises would prompt deeper thinking on how historical events can impact individuals on both an emotional and intellectual level.

- **Integrating Media and Context.** To provide students with a broader understanding of *The Troubles'* historical context, educators can incorporate documentaries, primary sources, and other educational media alongside gameplay. This enriches students' knowledge base and facilitates a more nuanced engagement with the game's content.

Narrative

Ultimately, *The Troubles* demonstrates that historical board games (HBGs) must integrate narrative into their mechanics to be effective tools for historical empathy, and that historically-structured boardgames (HSBGs) are a progression of this medium. Such games excel by:

- blending strategy with emotional weight: players are not just making strategic moves but are also emotionally invested in the consequences of those moves;

- encouraging perspective-taking: through asymmetrical mechanics, players adopt the perspective of real historical actors, experiencing their constraints and motivations;

- emphasising the human cost: rather than glorifying violence, the game forces players to reckon with its moral and social repercussions.

By achieving both cognitive and affective empathy, *The Troubles* serves as a powerful model for how board games can deepen understanding of history beyond textbooks, where we "think of history pedagogy not in relation to knowledge as a thing made but to knowledge in the making" (Ellsworth, 2005, as cited in Butler, 2013).

Figure 19. Narrative Card No. 260 marks the formal cessation of the violence of the Troubles in Northern Ireland

Source: VASSAL, from *The Troubles: Shadow War in Northern Ireland*. Reprinted with permission from Compass Games LLC.

The holistic collection of features available from the objects of *The Troubles*, such as textures, colours and imagery, contributes to a more immersive experience, allowing individuals to empathise with the historical context and the people associated with those objects.

6. Conclusion

The aim of this paper is to evaluate the efficacy of historically-structured boardgames (HSBGs) and their ability to support the development of affective historical empathy in their players.

Through the incorporation of historical storytelling and visual representations, HSBGs bring to attention often overlooked facets of history, like paramilitary violence or ideological tensions, forcing players to engage with historical complexity and difficult moral dilemmas. HSBGs, by fostering empathy and affective learning, create emotional connections by placing players in the shoes of individuals affected by historical events, making marginalised histories personally relevant. They expose the emotional consequences of war on civilians, offering an experience beyond traditional military-centric, attrition-focused narratives.

Promoting active historical inquiry and critical thinking through experiential learning and agency in decision-making, HSBGs transform history into a dynamic, contested field, requiring players to engage with ethical dilemmas and historical inquiry. Rather than passive learning, players analyse evidence and motivations, actively questioning dominant narratives and understanding history as a multifaceted process. Through co-constructed interactive storytelling, HSBGs provide opportunities for immersive learning, allowing players to make historical decisions with real-world consequences. This visceral approach leads to deeper understanding and personal investment in historical conflicts, offering insights beyond what textbooks can provide.

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Pregnancy as an Agent to Neutralize Painting as a Gender-Biased Concept in Contemporary China — The Works of Yu Hong, Ji Jingning and Xu Hualing

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Abstract

This article offers a brief inquiry into pregnancy as a theme of contemporary art in the West and China. It subsequently tracks the entrenched frameworks of painting in China and the neglect of pregnancy as a theme in the Chinese art world from the historical perspective, in order to navigate pregnancy-themed paintings by three selected female artists: Yu Hong, Ji Jingning, and Xu Hualing. Through analyzing their paintings, it concludes that these pieces not only increase the visibility of women's self-perception during pregnancy but also aestheticize pregnancy as a subject within their respective artistic traditions.

Keywords: women's art, realism, ink-wash painting, fine brushwork, maternal imagery

1. Introduction

When viewing Susan Hiller's (1940–2019) *Ten Months* (1977–1979) from a distance, the audience might initially interpret this installation—comprising sequential photographs with captions—as pursuing the aesthetics of abstract minimalism or resembling lunar landscapes.[1] However, upon closer inspection and reading of the captions, the viewer can identify its subject—pregnancy and recognize that this installation is a visual representation of the pregnant belly in different chronological stages. Recognized as a feminist artwork, *Ten Months* unveils the artist's pregnancy and unfolds it as a theme of contemporary art imbued with aesthetic value. It challenges the phallocentric view of Art and aesthetics (i.e., the notion of art's autonomy), as well as the entrenched prejudice—prevalent in nearly every culture—that pregnancy and breastfeeding have traditionally been stigmatized or rendered invisible.[2] Since the early 1990s, the pregnant body has become a subject of sustained feminist engagement in art, literature, and cultural studies.[3] More recently, several exhibitions in the West have focused exclusively on human reproduction, including pregnancy,[4] highlighting both the increasing visibility of women's embodied reproductive experiences and their growing resistance to entrenched, phallocentric understandings of reproduction and gender-biased aesthetic frameworks. A landmark example is the exhibition *Portraying Pregnancy: From Holbein to Social Media*, held at the Foundling Museum in London in January 2020. This exhibition provided a historical survey of portraits of pregnant women spanning over 500 years and offered a predominantly British context in which to explore the evolving representations of women's

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[1] Rosemary Betterton, (2006). Promising Monsters: Pregnant Bodies, Artistic Subjectivity, and Maternal Imagination. *Hypatia,* 21(1).

[2] Edward Lucie-Smith and Judy Chicago, (1999). *Women and Art: Contested Territory* (New York: Watson-Guptill Publications), 55.

[3] Rosemary Betterton, (2009). Maternal Bodies in Visual Culture. *Studies in the Maternal, 1*(1).

[4] Examples such as *Matrescence,* (2024, MassArt x SoWa Graduate Gallery, Boston), *Designing Motherhood* (2024-25, Houston Center for Contemporary Art), *Acts of Creation: on Art and Motherhood* (2024, Arnolfini, Bristol).

identity.[1]

Chinese female artists, following the influx of feminist thought into China after the *Fourth World Conference on Women* in Beijing in 1995, have also created artworks that challenge entrenched artistic conventions and their broader sociocultural networks. These challenges are often expressed through depictions of maternal or pregnant bodies using various new media—including photography, performance art, and installation—rather than traditional easel painting.[2] [3] Xing Danwen's (b. 1967) *Born with the Cultural Revolution* (1995) is an example of a photographic series that explores the conflict between women's embodied experience of pregnancy and the intervention of biopolitics, as defined in Foucauldian terms and shaped by Maoist revolutionary ideals.[4] In this series, the pregnant body is juxtaposed with portraits of Chairman Mao and other communist symbols (e.g., the five-starred red flag) from various angles, theatrically unfolding this ideological tension.[5] Due to its alignment with feminist art practices and its resonance with Western expectations of post-socialist Chinese imagery, the series has been exhibited in several overseas venues.[6] However, its subversive visual strategies likely make it unsuitable for domestic exhibitions in China, where nudity[7] and the critical appropriation of communist icons are prohibited. In contrast, a 2023 exhibition titled *Drawing for Mom* presented a collection of 97 paintings themed around motherhood. In this show, the model mother—embodying traditional virtues such as actively performing parental duties—was both articulated and promoted.[8] The exhibition was held at the Taicang Art Museum, a state-funded municipal institution, suggesting official endorsement of traditional motherhood and patriarchal family values (e.g., family harmony). The idealized images of mothers in this exhibition sharply contrast with Xing Danwen's "indecent" photographs of pregnant women, which defy both traditional and socialist stereotypes of femininity and womanhood. More broadly, activism related to motherhood and gender remains subject to censorship under the Chinese government.[9] [10]

Consequently, when viewers browse an exhibition catalogue or visit an art exhibition in China randomly, it is rare for them to encounter works centered on pregnancy or pregnant women. In the field of painting in particular, depictions of pregnancy are extremely scarce. Pregnancy, long understood as a biological process typically associated with cisgender women, is often regarded by male-dominated art institutions as irrelevant to the pursuit of so-called "universal" aesthetics.

Although some male artists have produced pregnancy-themed works, these often reflect entrenched stereotypes of women and conform to conventional artistic canons. For instance, Li Zijian (b. 1954) created a series of oil paintings depicting his wife's experience of motherhood, including scenes of pregnancy and childcare, which exemplify traditional gender norms. In this series, the wife is shown actively performing childcare duties with carefully styled makeup and clothing, appearing serene and content. *Pregnancy* (1987) from the series portrays a side profile of the pregnant wife seated. The soft color palette, long white skirt, introspective and elegant

[1] Foundling Museum, (n.d.). Portraying Pregnancy: From Holbein to Social Media, accessed June 29, 2025, https://foundlingmuseum.org.uk/event/portraying-pregnancy/.

[2] Patricia Eichenbaum Karetzky, (2020). *The Art of Women in Contemporary China: Both Sides Now* (Newcastle: Cambridge Scholars Publishing), 20-21.

[3] Specific Examples include Song Hong's *Fear of Birth* (1995), Feng Jiali's *Pregnancy Is Art* (1999) (Shuqin Cui, "The (In)visibility of the Female Body in an Art Traditionin *Gendered Bodies: Toward A Women's Visual Art in Contemporary China*, ed. Shuqin Cui (Honolulu: University of Hawai'i Press, 2015). and Cui Xiuwen's Angel series (2004-2008) (Karetzky, *The Art of Women in Contemporary China: Both Sides Now*, 65.).

[4] Karetzky, (n.d.). *The Art of Women in Contemporary China: Both Sides Now*, 20.

[5] Hong Wu, *Transcience: Chinese Experimental Art at the End of the Twentieth Century* (Chicago: University of Chicago Press, 1999), 48.

[6] In 1999, art historian and critic Wu Hong curated the exhibition *Transience: Chinese Experimental Art at the End of the Twentieth Century* held in several museums in the USA, in which *Born with the Cultural Revolution* was included ("Transience: Chinese Experimental Art at the End of the Twentieth Century (Revised Edition), Asia Art Archive, accessed June 28, 2025, https://aaa.org.hk/en/collections/search/library/transience-chinese-experimental-art-at-the-end-of-the-twentieth-century-revised-edition-89697.). Other exhibitions such as Between Past and Future: New Photography and Video from China held in various overseas venues. (Hong Wu, *Between Past and Future: New Photography and Video from China* (Chicago: University of Chicago Press, 2004).

[7] Karetzky, *The Art of Women in Contemporary China: Both Sides Now*, 12.

[8] Zhangyu Deng, (2023). Exhibition Shows Portraits of Mothers, Center for International Cutural Communication, accessed July 1, 2025, https://www.heychinaculture.com/exhibition/1988.html.

[9] Julia Hartmann, (2021). Bold Characters Motherhood and Censorship in Chinese Art and Curating in *Radicalizing Care Feminist and Queer Activism in Curating*, ed. Elke Krasny et al. (London: Sternberg Press).

[10] Sara Liao, (2024). Unpopular Feminism: Popular Culture and Gender Politics in Digital China. *Communication and the Public*.

posture, and delicate facial expression together present an idealized woman embodying traditional virtues and feminine beauty. This painting was displayed in the *First Chinese Oil Painting Exhibition* (1987–1988) at the Shanghai Exhibition Hall, organized by the Chinese Artists Association, the official national art institution.[1] Its inclusion in such a high-profile exhibition demonstrates its conformity with state-sanctioned aesthetic standards.

With the surge of feminism in China, critics and artists influenced by feminist thought have begun to question the so-called "universal" aesthetic experience and its networked hierarchical norms, revealing their patriarchal and hegemonic underpinnings. These critics and artists have also worked to increase the visibility of women's everyday experiences and their understandings of art within the Chinese art world. Through the efforts of such forerunners—committed to promoting gender equality and challenging male-centered aesthetic traditions—painting has been increasingly exposed as a social and historical construct infused with phallocentric ideologies. In contemporary China, women's lives are shaped by the joint forces of Confucian patriarchy, masculine revolutionary culture, and a market-oriented neoliberal environment.[2] Among the various artistic media, painting is particularly entangled with these sociocultural forces, due to its enduring role in both traditional Chinese culture and socialist art institutions, as well as its high degree of institutionalization.[3]

In the existing literature on pregnancy and contemporary art in China, Shuqin Cui's *The Pregnant Nude and Photographic Representation* is a landmark study that exclusively examines pregnancy as a subject in contemporary Chinese art. By asserting that pregnancy is—or can be—an aesthetic phenomenon, Cui positions both pregnancy and maternal nudity as legitimate themes within the Chinese art world and as potential catalysts for transforming gender-biased sociocultural norms in broader Chinese society.[4] What distinguishes my study from Cui's work is its exclusive focus on painting. Inspired by Kimberlé Crenshaw's concept of intersectionality,[5] my study views each pregnancy-themed painting as a site where one of the dominant canons of painting in China intersects with the artist's lived, gendered experience and subjectivity.

2. Painting and Pregnancy as Two Social and Historical Constructs

To understand the patriarchal nature of painting and the scarcity of pregnancy as a theme in contemporary China, two terms hold central importance: Chinese painting and academic realism. The first refers to China's indigenous artistic tradition, characterized by ink-wash and brush techniques; the second refers to Western academic realism, which became institutionalized in China's art education system and cultural organizations following the establishment of the People's Republic of China (PRC) in 1949. In imperial China, Chinese painting was predominantly produced by (male) literati or scholar-gentry who had passed the imperial examination and acquired high social status recognized by the imperial court.[6] This literati class dominated the creation, circulation, and discourse of Chinese painting, regarding it as a medium for spiritual cultivation (e.g., harmony with nature) and a means to assert cultural privilege.[7] Landscape painting was especially idealized for its transcendental aesthetic quality, exemplified through the atmospheric effects achieved by sophisticated ink-wash techniques. Another recurring theme was the "Four Gentlemen," referring four plants (e.g., plum blossom, orchid, bamboo, and chrysanthemum) used to eulogize the moral virtues associated with the literati.[8]

Conversely, women were largely excluded from learning and practicing Chinese painting, with rare exceptions such as courtesans or women from elite intellectual families.[9] Though seldom the creators of Chinese paintings, women frequently appeared as aestheticized subjects, often likened to flowers, birds, or plants—anonymous

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[1] Li Zijian Art Museum, (n.d.). 世界上的一切光荣和骄傲，都来自母亲, [All the Glory and Pride in the World Come from Mothers], accessed July 2, 2025, http://www.lizijianmsg.com/post/53.html.

[2] Yun Zhou, (2025). How Gendered Lived Experiences Shape Sex Preference Attitudes in Contemporary urban China. *Journal of Marriage and Family, 87*(1).

[3] Academic realism and Chinese (ink-wash) painting are two types highly institutionalized in the official and semi-official art and cultural framework.

[4] Cui Shuqin, (2014). The Pregnant Nude and Photographic Representation in *New Modern Chinese Women and Gender Politics*, Routledge.

[5] Kimberle Crenshaw, (1991). Women of Color at the Center: Selections from the Third National Conference on Women of Color and the Law: Mapping the Margins: Intersectionality, Identity politics, and Violence against Women of Color. *Stanford Law Review, 43*(6).

[6] Su Li, (2018). Scholar-Officials in *The Constitution of Ancient China*, ed. Yongle Zhang and Daniel A. Bell (Princeton: Princeton University Press).

[7] Suzanne E Cahill, (2005). The Moon Stopping in the Void: Daoism and the Literati Ideal in Mirrors of the Tang Dynasty. *Cleveland Studies in the History of Art,* 9.

[8] Cui, "The (In)visibility of the Female Body in an Art Tradition."

[9] Ibid.

figures portrayed within rigid collective stereotypes, devoid of individual agency.[1] [2] In the Qing dynasty, the prevailing image of women emphasized submissiveness, introversion, fragility, and moral virtue—traits that catered to the aesthetic sensibilities and ethical expectations of male literati.[3] Female bodies in such works were typically clothed, conforming to the virtues prescribed by patriarchal norms. Within the canon of traditional Chinese painting, there is no known masterpiece that explicitly depicts pregnancy. Representations of pregnancy are found only in medical illustrations from imperial China, and even then, for practical rather than aesthetic purposes. These facts collectively suggest that Chinese painting has long operated as a hierarchical construct—both thematically and technically—reinforcing particular aesthetic ideals.

Following the demise of the Qing dynasty and the subsequent decline of the literati in the early 20th century, Chinese painting was revalorized as a symbol of national cultural essence by (male) cultural nationalist traditionalists. This effort aimed to bolster domestic cultural confidence and resist the intrusion of Western realism.[4] [5] On the one hand, the incorporation of cultural nationalism brought new vitality to Chinese painting; on the other hand, the reframing was still shaped by entrenched phallocentric views and led by male elites. During the Maoist period, Chinese painting was further remolded to serve the masculine ethos of socialist revolutionary culture,[6] [7] leaving little space for autonomous female voices in either the production or interpretation of Chinese painting.

Another way to track painting in China is through the institutionalization and Sinicization of Western academic realism, particularly in the form of realistic oil painting. In classical Western art, the pregnant woman is most commonly represented in depictions of the Virgin Mary, yet her pregnancy is often symbolically reduced—her gendered experience muted by the sacredness of religious iconography.[8] In this sense, even before realism was introduced to China, both the artistic style and the theme of pregnancy were already embedded within patriarchal frameworks. When academic realism was imported into China, it was initially regarded as a scientific method for achieving representational accuracy.[9] [10] This introduction, which took place in the first half of the 20th century, was also spearheaded by male artists such as Xu Beihong (1895-1953), who favored heroic and monumental subjects rendered in realist techniques. After the founding of the PRC in 1949, socialist realism became the exclusive, state-sanctioned genre and the primary institutional pathway for studying and producing realist art.[11] Within this system, realist techniques were subordinated to the goals of collective, masculine revolutionary culture, leaving little room for women's self-perceived experiences, which were marginalized to the point of near invisibility. During the Maoist period, the dominant female public figure became the so-called "iron girl," a masculinized role model,[12] while traditional roles such as housewife and caregiver were relegated to the domestic sphere, serving the interests of male peasants and reinforcing gendered labor divisions.[13]

Despite the entrenched doctrines in painting in China that render pregnancy a taboo subject, many Chinese female artists have attempted to present their pregnant bodies through various media outside of painting. To explore how women artists in China respond to the entrenched norms of painting, the patriarchal framing of

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[1] Mary H Fong, (1996). Images of Women in Traditional Chinese Painting. *Woman's Art Journal, 17*(1).

[2] Ibid.

[3] Cui, "The (In)visibility of the Female Body in an Art Tradition."

[4] Qi Zhu, (2019). 重审水墨现代性 [Review the Modernity of Ink Painting] (Hangzhou: Xiling Seal Engraving Society Publishing House), 31.

[5] Michael Sullivan, (2013). *Art and Artists of Twentieth-century China* [20 世纪中国艺术与艺术家] (Shanghai Shanghai People's Publishing House), 60.

[6] Julia F Andrews and Kuiyi Shen, (2012). *The Art of Modern China* (Los Angeles & London: University of California Press), 161, 66.

[7] Lan Qi, (2015). 现代语境中的中国画-20 世纪中国画的观念重构 [Chinese Traditional Painting in Modern Context: Concept Reconstruction of Chinese Traditional Painting in the 20th Century] (PhD diss., Shanghai University), 103, 09.

[8] EL Putnam, (2018). Performing Pregnant: An Aesthetic Investigation of Pregnancy in *New Feminist Perspectives on Embodiment*, ed. Clara Fischer and Luna Dolezal (Cham: Palgrave Macmillan).

[9] Julia Frances Andrews and Kuiyi Shen, eds., (1998). *A Century in Crisis: Modernity and Tradition in the Art of Twentieth-Century China* (New York: Guggenheim Museum), 148.

[10] Peng Lü, (2007). *20 世纪中国艺术史* [History of Chinese Art in the 20th Century] (Beijing: Beijing University Press), 212.

[11] Sullivan, (n.d.). *Art and Artists of Twentieth-century China*, 227.

[12] Daimei Yao, (2010). 自我画像：女性艺术在中国 (1920-2010) [*Woman Art in China (1920-2010)*] (Guangzhou: Lingnan Press), 104.

[13] Xinlei Li, (2018). "抱娃的妇女"-中国近现代美术图像中的"新母亲"形象研究 ["Woman Holding a Baby"-A Study on the Image of "New Mother" in Modern Chinese Art Images]" (MA diss., Guangzhou Academy of Fine Arts), 91-92.

pregnancy, and the influence of global feminist art—by deploying pregnancy as both a theme and an agent to neutralize painting as a gender-biased concept—this study selects three representative female artists: Yu Hong, Ji Jingning, and Xu Hualing. Each is commonly networked with a particular stream of painting. Yu is frequently labeled as a practitioner of academic realism or new realism in contemporary Chinese art; Ji Jingning is widely recognized for her work in Chinese painting, particularly ink-wash and urban ink-wash; and Xu Hualing, the youngest of the three, is known for her engagement with fine brushwork or new fine brushwork.

3. Yu Hong, Realism and New Realism

Yu Hong (b. 1966, Xi'an) is an artist initially known for her work in new realistic painting.[1] The adjective "new" signals a departure from the socialist realism and grand narratives that dominated the Maoist period (1949–1976), while "realistic" refers to Yu's academic training in realism at the Central Academy of Fine Arts (CAFA)[2] and her mastery of realist techniques.[3] As a female artist, she participated in several domestic exhibitions[4] in the 1990s that focused exclusively on women's art. This dual engagement situates Yu at the intersection of new realism and women's art.

Figure 1.

Yu Hong

China Pictorial, p.25, No.1, 1994, A Million Migrants from the Three Gorges

1994 Yu Hong, Twenty-eight Years Old, Pregnant, 2001

Left: inkjet print, 68x100 cm

Right: acrylic on canvas, 100x100 cm

© Yu Hong; Courtesy of Yu Hong

Witness to Growth (1999–) is a representative series by Yu Hong. It is a long-term autobiographical project consisting of successive diptychs or triptychs that juxtapose a self-representational painting of the artist at a particular moment each year with a news photograph documenting a major collective event from the same year—thereby paralleling personal and collective memory. By juxtaposing revolutionary history with private experience, the series reflects the post-socialist atmosphere of the 1990s and invites interpretation through a post-socialist lens, revealing the artist's implicit response to China's revolutionary past. Within the series, Yu depicts herself, her grandmother, her mother, and her daughter—while male family members are largely absent. From a feminist perspective, this matrilineal focus may be seen as a silent resistance to patrilineal inheritance.

Each year since 1966, the year of Yu's birth, is represented by a diptych or triptych, with the exception of 1994. That year marked the birth of her daughter, Liu Wa. Unlike the diptychs used to represent the years from 1966 to

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[1] Jerome Sans, (2020). 一个充满韧性的世界, [A World Full of Resilience]. *Art Panorama*, (7).

[2] Lili Zhang, (2010). 喻红绘画艺术探析 [The Art of Yu Hong]. (MA diss., Northwest Normal University), 2.

[3] Xiaoyun Zhao, (2018). 潘玉良和喻红女性题材绘画的比较研究 [A Comparative Study of Pan Yuliang and Yuhong's Female Works]. (MA diss., Zhejiang Sci-Tech University), 6.

[4] Examples such as *The World of Women Artists* (1990) (The World of Women Artists, Asia Art Archive, accessed July 3, 2025, https://aaa.org.hk/tc/collections/event-database/the-world-of-women-artists.) and Century-Woman Art Exhibition (1998) (Century · Woman Art Exhibition, Asia Art Archive, accessed July 3, 2025, https://aaa.org.hk/tc/collections/event-database/century-woman-art-exhibition.)

1993, a third panel is added from 1994 onward, depicting a specific moment from Liu Wa's life. Owing to the significance of her childbirth, 1994 is represented by both a diptych and a triptych: the diptych portrays Yu before childbirth, and the triptych captures moments before and after the delivery. The pregnancy-themed diptych consists of a news photo titled *A Million Migrants from the Three Gorges*, sourced from *China Pictorial*, and a painting titled *1994 Twenty-eight Years Old, Pregnant* (2001, Figure 1). The news image documents the mass relocation caused by the Three Gorges Project, which forced thousands of people to leave their homes and resulted in widespread geographic and emotional displacement. In the corresponding painting, pregnancy is the central theme. Yu's abdomen is placed at the center of the composition, drawing immediate attention. The figure of the mother-to-be is depicted with a downward, introspective gaze, her hands resting gently on her midsection—conveying deep concern, vulnerability, and a sense of wandering uncertainty in anticipation of the newborn. Her naked body, the barren desert backdrop, and the strong light contrast between brightness and shadow further intensify the atmosphere of emotional fluctuation and displacement, echoing the geographic upheaval of the Three Gorges Project migration. According to Yu, pregnancy made her fully recognize gender difference and fundamentally altered the trajectory of her life.[1] Through this work, Yu uses realist techniques not only to render her physical appearance but also to construct a symbolic, virtual environment that offers the viewer access to her inner emotional world during pregnancy.

By depicting pregnancy with personal sensibility, Yu renders women's private experience more visible and challenges the entrenched notion of pregnancy as a shameful or taboo subject. Her painting not only conveys her self-perception of the pregnant body—empowering women to reject the stigmatized, patriarchally defined view of pregnancy as merely a biological process—but also functions as an agent that revitalizes painting, particularly realist painting, in China. Since its introduction into China, realism has been closely tied to various ideological agendas: the pursuit of Western scientific accuracy in the late 19th and early 20th centuries; heroic imagery used to promote nationalism and war propaganda during the anti-Japanese and civil war periods; and revolutionary ideals during the Maoist era. After 1978, contemporary Chinese artists began to detach realism from grand narratives, instead using it to portray the ideological vacuum of the post-socialist condition—seen in well-known genres such as cynical realism and political pop—as well as to depict mundane daily life and collective experiences amid China's sweeping transformations in the 1990s.[2] [3] Notably, these new realist genres and movements have been largely dominated by male artists, whose perspectives have shaped the mainstream trajectory of realism in the post-1978 art scene. Consequently, female realist painters have remained on the margins, largely due to their limited access to power within China's art institutions and cultural networks. However, their marginalization does not imply a lack of agency or contribution. Yu's depiction of her naked maternal body connects realist techniques with two traditionally stigmatized themes—nudity and pregnancy—offering a compelling alternative to dominant interpretations of realism. Her approach provides viewers with a new lens through which to understand realism as a mode of representation. This reimagining of the genre stands in contrast to the more conventional and idealized portrayal of pregnancy seen in Li Zijian's *Pregnancy* (2015).

4. Ji Jingning, Ink-Wash Painting and Urban Ink-Wash

Ji Jingning (b. 1957, Nanjing) is generally categorized as an artist of ink-wash painting or Chinese painting. She studied ink-wash painting through a professional curriculum at Hebei Normal University and later at CAFA, refining her techniques under the guidance of Zhou Sicong (1939–1996) and Lu Chen (1935–2004), two esteemed ink artists known for their expressive styles.[4] Ji mastered expressive ink-wash techniques with notable skill. Her works, characterized by the depiction of mundane urban life using emotive brushwork, are frequently labeled as "urban ink-wash" or "expressive ink-wash,"[5] [6] embodying both her absorption of contemporary social and cultural themes and the influence of Western expressionism.

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[1] Zhang, "喻红绘画艺术探析," 14.

[2] Zhu Zhu, (2013). *灰色的狂歡節-2000 年以來的中國當代藝術* [*Gray Carnival: Chinese Contemporary Art since 2000*] (Taipei: Diancan Art & Collection), 105.

[3] Minglu Gao, (2006). *墙: 中国当代艺术的历史与边界* [*The Wall: Reshape Chinese Contemporary Art*] (Beijing: Renmin University of China,), 97.

[4] Rui Long, ed., (2007). *画品丛书: 纪京宁 [Paintings Series: Ji Jingning]* (Shijiazhuang: Hebei Fine Arts Press).

[5] Xiu Liu, (2013). 浅析都市水墨人物画的表现主义倾向. [A Brief Analysis of the Expressionist Tendency in Urban Ink Figure Painting]. *Literatures*.

[6] Bing Xu, (2013). 都市水墨人物画的表现主义倾向 [The Expressionist Tendency of Urban Ink-wash Figure Paintings]. *Art Panrama*.

Figure 2.

Ji Jingning

Pregnancy

Ink on paper, 180x96 cm, 2014

© Ji Jingning; Courtesy of Ji Jingning

Like Yu Hong, Ji also participated in the *Century-Woman Art Exhibition* (1998). Her potential classification as a "women's artist" can be inferred from her frequent depictions of everyday scenes involving maternal and familial duties, revealing her lived experience of motherhood and domestic labor.[1] Ji acknowledges that childcare and housework constitute significant parts of her daily life[2] and she presents a subtle resistance to traditional familial roles and their associated patriarchal norms by vividly portraying women fatigued by domestic responsibilities.

Pregnancy (2014, Figure 2) is a full-length portrait that exclusively depicts the frontal view of a pregnant woman. With no background to distract the viewer, the painting draws explicit focus to the subject. She appears to be a young woman, as suggested by her hairstyle and facial features. Her belly is rendered transparently, allowing the audience to observe the fetus inside the uterus. The fetus, curled within the womb, appears to be nurtured and protected by the mother-to-be. In stark contrast to the fetus's peaceful state, the woman herself looks exhausted—her head tilted, legs swollen, and eyes closed. Her contorted figure, painted with expressive brushstrokes, seems to dissolve into the surrounding aura, further emphasizing her emotional and physical fragility and her lack of readiness for the imminent birth. This visual juxtaposition—the vulnerable mother-to-be and the secure, developing fetus—reveals the inner conflict of the pregnant woman. On the one hand, as an inexperienced mother, she appears emotionally overwhelmed and physically drained by the process of pregnancy. On the other hand, she is intensely concerned about her child's well-being and safety.

By vividly portraying an exhausted pregnant woman, Ji subtly resists the "harmonious" view of the mother-child relationship as defined by patriarchal norms—one in which mothers are expected to embrace maternal duties with grace, skill, and joy, reinforcing the notion of a "natural" inclination toward caregiving roles. By representing a self-perceived image of pregnancy, Ji challenges this entrenched myth of harmony. Her approach parallels that of Yu Hong, who uses her female perspective on domestic life to counteract patriarchal interpretations of painting, particularly in the context of realism. Similarly, Ji contests orthodox understandings of ink-wash painting. Ink-wash painting—or Chinese painting more broadly—has been recognized as the

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[1] Weiwei Yang, (2022). 纪京宁水墨创作研究-兼论其创作的女性视角 [A Study on Ji Jingning's Ink Painting Creation-Also on the Female Perspective of His Creation] (MA diss., Hebei Normal University), 6.

[2] Shaojun Lang, (2015). *心路历程:21 世纪中国水墨艺术家创作探究系列. 纪京宁卷* [*Journey of the Mind: A Series on the Creation of Chinese Ink Artists in the 21st Century. Ji Jingning*] (Shijiazhuang: Hebei Fine Art Press), 96.

quintessential national genre of China since the early modern period. However, it bears the weight of historical expectations imposed by male cultural traditionalists, modernizers, and revolutionaries. Cultural traditionalists, in particular, are committed to preserving the canon of ink-wash painting, which includes the thematic focus on landscapes, expressive brushwork, and a spiritual pursuit of seclusion and tranquility. This canon, rooted in literati aesthetics, epitomizes the tastes and life experiences of (male) scholar-gentry elites. As patriarchs in their families, these men were typically unburdened by the repetitive and exhausting labor of childcare and domestic work, allowing them the privilege of connecting with nature and cultivating spiritual and moral refinement. Consequently, the traditional canon of ink-wash painting is phallocentric at its core. Likewise, during the Maoist period, the remolding of ink-wash painting to serve revolutionary ideals infused it with new dynamics such as realism and communist iconography, aligning it with a masculinized revolutionary culture. By boldly presenting the image of an overwhelmed pregnant woman, Ji disentangles expressive brush techniques from their conventional thematic associations and the spiritual aspirations of the literati, distancing her work from ideological uses of ink-wash painting. Instead, she offers a self-perceived experience of pregnancy as a fresh lens through which to reevaluate the legacy of traditional ink-wash techniques in contemporary contexts.

5. Xu Hualing, Fine Brushwork and New Fine Brushwork

Xu Hualing (b. 1975, Harbin) is an artist labelled with "new fine brushwork." The adjective "new" signals the contemporary inheritance and reinvention of the fine brushwork tradition. Simply put, fine brushwork is a subcategory of Chinese painting but is less representative of national cultural essence compared to freehand brushwork in contemporary China, which is often used interchangeably with ink-wash painting. Due to its emphasis on refined line drawing and realistic techniques, fine brushwork has traditionally been regarded, within the hierarchy of Chinese art, as a form of craftsmanship—thus considered inferior to ink-wash painting, which emphasizes seclusion and transcendence.[1] When the term "Chinese painting" is used discursively, it typically refers to ink-wash painting, which implicitly relegates fine brushwork to a peripheral position within the broader framework of Chinese painting. Xu herself studied in the Department of Chinese Painting at CAFA, where she completed her bachelor's, master's, and doctoral degrees. This academic trajectory underscores the significant overlap between Chinese painting and fine brushwork.[2]

As a new genre, new fine brushwork represents a creative continuation of fine brushwork's legacy by contemporary artists. Among those labeled with this term, He Jiaying is a prominent figure, known for his depictions of introspective and elegant young women in contemporary settings, rendered with exquisite brush lines and soft coloring.[3] Although He incorporates modern clothing and activities into his work, his portrayals largely reproduce the traditional image of women as beautified objects for the male gaze. Xu, too, pursues an aesthetic of elegance and softness, producing numerous paintings of young girls. However, what distinguishes Xu's representations is the girls' evident self-awareness and their introspective observation of their own bodies, rather than their objectification.

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[1] Jiaying He, (2009). 何家英美术作品集 [*He Jiaying's Art Collection*] (Changchun: Jilin Fine Arts Press), 10.

[2] "Xu Hualing, CAFA, accessed April 23, 2025, https://www.cafa.com.cn/en/figures/artists/details/8110524.

[3] He, 何家英美术作品集, 6.

Figure 3.

Xu Hualing

Embroidery – Pregnant

Watercolor on silk, 160x80 cm, 2009

© Xu Hualing; Courtesy of Xu Hualing and Lin & Lin Gallery

Among Xu's oeuvre, *Pregnant* (2009, Figure 3), part of her *Embroidery* series, stands out as a bolder attempt. This fine brushwork piece mimics the reverse side of an embroidered cloth, visually representing an enlarged pregnant belly. According to Xu, she created this piece during her own pregnancy, a period marked by emotional ambivalence—an oscillation between joyful expectation for the baby's arrival and an overwhelming sense of unpreparedness.[1] The emotional dilemma presented in Xu's *Pregnant* resonates with that in Ji Jingning's *Pregnancy*, revealing a shared, self-perceived experience among mothers-to-be. In embroidery, the reverse side is typically more chaotic and unrefined compared to the neatly arranged front. By meticulously reproducing the disordered stitching of the backside with fine brush lines, Xu draws an intertextual connection between the inner turmoil of pregnancy and the unseen, less idealized side of embroidery. The piece may also metaphorically suggest that women's lived experience of pregnancy—the "backside"—is often concealed beneath the polished, idealized image of motherhood. The mirrored character "yùn (孕)," meaning pregnancy, further affirms her visual reference to the reverse side. Simultaneously, the work shows Xu's exceptional line-drawing technique.

Nevertheless, the unique value of this piece is not limited to increasing the visibility of pregnant women or showcasing sophisticated line-drawing skills. It also implies a silent resistance to the internal hierarchy of traditional Chinese art. Within this hierarchy—beyond the division between fine brushwork and freehand brushwork—craftwork, due to its perceived technical nature and association with artisanship, is traditionally regarded as secondary.[2] [3] Embroidery, labeled both as "craft" and as "women's work," has been particularly devalued in the patriarchal structure of Chinese art history. By integrating embroidery, fine brushwork, and the theme of pregnancy into a single composition, Xu disrupts not only the internal hierarchy of traditional Chinese art but also the thematic hierarchy imposed by the literati tradition, in which landscape is elevated as the ideal subject.

6. Conclusion

With the rise of feminist discourse, pregnancy as a subject reflecting the emotional and physical sensibility of pregnant women has become increasingly visible in China. In the field of painting—where patriarchal power remains more dominant than in new media art—examples of women's self-perceived depictions of pregnancy

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[1] Hualing Xu, (2010). 新工笔文献丛书: 徐华翎卷 [*New Fine Line Painting Literature Books: Xu hualing Volume*] (Hefei: Anhui Fine Arts Press), 68.

[2] Michael Sullivan, (1961). *An Introduction to Chinese Art* (Berkeley and Los Angeles: University of California Press), 79.

[3] Jie Yuan, (2020). 新工笔批评 [New Fine Ink brush] (MA diss., Nanjing University of Arts), 9.

are gradually emerging. In the cases of Yu Hong, Ji Jingning, and Xu Hualing, their pregnancy-themed works increase the visibility of women's voices during this transformative physical and spiritual process and challenge entrenched phallocentric perceptions of pregnancy. They also aestheticize pregnancy as a subject by innovating the canonical techniques they inherit, presenting a subtle resistance to the phallocentric definition of aesthetics and reaffirming the statement "pregnancy is art."

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Artificial Intelligence: Prospects and Challenges in Future Progression

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Abstract

Artificial intelligence (AI) is a branch of computer science that makes the computers to mimic the human behavior and assist humans for better performance in the field of science and technology. It refers to the ability of machines to perform cognitive tasks, such as thinking, perceiving, learning, problem solving, and decision making. The goal of it is to make a machine as smart as a human. Particular applications of AI are in advanced web search engines, internet, robotics, biometrics identification, speech recognition, natural language generation, virtual assistants, superhuman play, and to analysis in strategy games, autonomous vehicles, etc. At present many organizations are applying AI accurately and efficiently to provide security to their data and information systems. If AI system is not properly operated, it may face technical difficulties, data difficulties, security snags, etc. The purpose of this study is to discuss aspects of AI, and its present and future applications for the welfare of the global humanity.

Keywords: AI, ML, DL, speech recognition, biometrics, cyber-attacks, cyber-security

1. Introduction

Artificial intelligence (AI) is the capability of computational systems to perform tasks associated with human intelligence, such as learning, reasoning, problem-solving, perception, and decision-making (Agrawal et al., 2019). It is the study of how human brain thinks; and how humans learn, decide, and work while trying to solve a problem, and then using the outcomes of it as a basis of developing intelligent software and systems. The AI powered machine can perform many jobs at once with accurately and efficiently (Young et al., 2019). At present AI is impelling our daily lives, communities, and governmental structures more than ever before (Uzun et al., 2022).

The AI is a combination of science and technology that is based on **many subjects, such as** mathematics for developing algorithms, statistics for handling huge data, computer science to run the algorithm for implementing the concepts, neuroscience that studies human mind and its behavior, and some other subjects, such as philosophy, psychology, biology, engineering, and linguistics (Ghosh & Thirugnanam, 2021). It is an attempt to make a computer, a robot, and other piece of technology to think and process data in the same way as the humans do. It deals with bridging the gap of communication between the computer and human languages in a smart way. It can simulate human thought process, and can take actions based on these thoughts and even can draw conclusions (Aderibigbe et al., 2023).

Exponential growth of AI is observed globally. For example, in the USA the investment has increased by 20% in 2019 with $28.5 billion, and that of in The European Commission has reached to €20 billion in 2020 (Wirtz et al., 2019). It is expected that AI technological area will provide more than 2.5 million jobs by 2025. It is estimated that its economic size could generate to $13 trillion by 2030 (Bughin et al., 2018).

2. Literature Review

A literature review in research is a comprehensive analysis of existing published and unpublished academic works on a specific topic that provides an overview of the current state of knowledge that identifies key debates, and highlights gaps in the research (George et al., 2023). It synthesizes and evaluates previous research to provide context for a new study. It is often a part of a graduate and post-graduate requirement, such as in the preparation of a dissertation, or a journal article (Baglione, 2012). Sikender Mohsienuddin Mohammad has discussed different technologies in AI and how they apply to improve the performance of multiple sectors at present and future applications. He has observed that AI is the foundation of multiple concepts, such as computing, software creation, and data transmission (Mohammad, 2020). Parvinder Singh and Mandeep Singh have found that the fraud cases related to credit card, debit card, mobile banking and internet banking, online shopping, online bill payment, insurance premium, online recharges and online reservation of railways, bus, etc. are increasing, and it puts a great burden on the economy, affecting both customers and financial bodies (Singh & Singh, 2015). Cédric Beaulac and Fabrice Larribe have used Hidden Markov Models to build narrow AI that estimates the unknown position of a mobile target moving in a defined environment. They have used the Baum-Welch algorithm as a statistical learning tool to gain knowledge of the mobile target (Beaulac & Larribe, 2017).

Muhammet Damar and his coauthors have realized that the concepts of generative AI, super AI, and narrow AI have attracted considerable attention for the success of ChatGPT. They have estimated that AI could generate an economic size of \$13 trillion by 2030 (Damar et al., 2024). Rebecca Marrone and her coworkers have set four underpinning propositions that will help to guide the integration of AI and human creativity. They have shown that these propositions explain not only why AI is not independently creative, but also how AI can support and augment human creativity in areas, such as education (Marrone et al., 2024). Shruti Joshi and her coworkers have explained various voice recognition systems that are used various techniques to decode human speech. They have shown that the voice recognition module VR3 that is speaker dependent is the best suited for use in projects of making automated systems (Joshi et al., 2017).

Zahid Akhtar and his coworkers have addressed that biometrics the issues, such as identity theft and security threats, a continuously evolving technology is presently being deployed in a wide range of personal, government, and commercial applications. They have presented an overview of biometric research and more importantly the significant progresses, such as spoofing, evasion, obfuscation, face reconstruction from DNA, Big data issues in biometrics, etc. that have been attained over the recent years (Akhtar et al., 2018). Krupal Joshi has studied that AGI represents a significant leap in the field of AI, defined by its ability to perform any intellectual task that a human can that is characterized by versatility, adaptability, autonomy, and reasoning capabilities. He explores the defining features of AGI, such as its cognitive flexibility and capacity for autonomous decision-making and problem-solving. He has emphasized on ethical frameworks and governance structures in AGI development among scientists, policymakers, and society for the benefit of humanity (Joshi, 2024).

Karamjit S. Gill has thought that the new wave of super AI raises a number of serious societal concerns, such as the crises and shocks of the AI machine that will trigger fundamental change and how should we cope with the resulting transformation; the implication be if AI machine takes over and transforms the way we live and work; technology do to work, employment, economy, governance, state, democracy and professions; the social and political implications of employment if people are replaced by the machine; the state disappears, and so do economy, professions, employment, politics disappear; digital economy be regulated, measured, and controlled; the AI machine with its embedded machine learning algorithms be monitored and controlled; new politics emerge as another digital game, and what would the rules of this game be; and how would these rules change the playing field of the game of politics itself (Gill, 2016). Bartosz Kopka has studied the advantages and disadvantages of AI-based chatbots. He has listed the advantages of it as; facilitating access to information for citizens, reducing costs in providing services to citizens in the public sector, and making the chatbot system more attractive to users, thereby encouraging more active use. He has noted disadvantages of it as the time-consuming nature of regularly processing new data and the inability to fully mimic human brains and behaviors in emulation (Kopka, 2011).

3. Research Methodology of the Study

Research is a creative and systematic investigation and study of materials and sources in order to establish facts, and reach new conclusions for increasing the stock of knowledge through the generation of new concepts, methodologies, and understandings (Adams et al., 2007). It describes the *techniques and procedures used to identify and analyze information* regarding a specific research topic (Mohajan, 2018b). Three main forms of research are i) exploratory research that helps to identify and define a problem, ii) constructive research that tests theories and proposes solutions to a problem, and iii) empirical research that tests the feasibility of a solution using empirical evidence, which has two major types; qualitative research and quantitative research (Muijs,

2010; Mohajan, 2017). Qualitative research aims to gather and analyze non-numerical data in order to gain an understanding of individuals' social reality, including understanding their attitudes, beliefs, and motivation (King et al., 2021). Quantitative research is a research strategy that focuses on quantifying the collection and analysis of data that is formed from a deductive approach where emphasis is placed on the testing of theory, shaped by empiricist and positivist philosophies (Bryman, 2012; Mohajan, 2020).

Methodology is the systematic approach or set of methods used to conduct research, gather information, and achieve a specific goal that is the backbone of any study, providing a structured path for researchers to follow. It is a fundamental concept that plays a crucial role in various fields of study, guiding researchers and practitioners in their quest for knowledge and problem-solving (Herrman, 2009). Research methodology is the specific procedures used to identify, select, process, and analyze information about a topic. It describes the techniques and procedures used to identify and analyze information regarding a specific research topic (Howell, 2013).

4. Objective of the Study

When machines are equipped with man-made intelligence to perform intelligent tasks similar to humans is known as artificial intelligence (AI). It encompasses a wide range of approaches, methodologies, and techniques aimed at mimicking human intelligence in machines (Damar et al., 2024). Therefore, the AI is a study how the human brain thinks, learns, and makes decisions when it tries to solve problems. The aim of AI is to improve technology by adding functionality related to the human acts of reasoning, learning, and problem-solving (Bermudez, 2017). The AI is one of the fastest-growing technologies that is making human life much easier by providing solutions for complex problems. It should also be able to correct itself, if it makes a mistake that is able to make a decision in a given situation like human beings and in some cases even better (Anderljung et al., 2023). Main objective of this article is to provide introductory ideas of AI and its usefulness and drawbacks. Other minor objectives of the study are as follows (Mohajan, 2018a):

1) to highlight on overview of AI,

2) to focus on types and domains of AI, and

3) to discuss application of AI.

5. An Overview of AI

The artificial intelligence (AI) has no universally agreed definition. It is the advancement of computer systems that can execute tasks typically requiring human intelligence, and can perform human-like cognitive functions, such as learning, logical reasoning, problem-solving, decision-making, and language comprehension (Miller, 2024). The AI technologies are used in various sectors, such as voice assistants, navigation, translations, e-services, autonomous vehicles, and smart home devices (Serçemeli, 2018). Machine learning (ML) and deep learning (DL) are two subsets of AI, where ML deals with high performance algorithms, and DL deals with multilayer neural networks (Şentürk, 2023).

The AI technical landscape has evolved significantly from 1950 when English mathematician, computer scientist, logician, cryptanalyst, philosopher and theoretical biologist Alan Mathison Turing (1912-1954) first posed the question of whether machines can think (Williams, 1985). The term artificial intelligence was first coined by **American computer scientist and cognitive scientist** John McCarthy **(1927-2011)** in 1956, who is often referred to as the father of AI (Huang et al., 2022). It is said that AI is the greatest thing humankind has ever worked on. On the other hand, computer hacking and loss of data are some of the cyber-attacks issues (Dilek et al., 2015).

6. Types of AI

At present there are a lot of AI developments, and most of them are divided into different types. In this section, we discuss seven main types of AI as, i) narrow AI, ii) general AI, iii) super AI, iv) reactive machine AI, v) limited memory AI, vi) theory of mind AI, and vii) self-aware AI. Among these, first three are of capability types, and the rest four are of functionality types (Aderibigbe et al., 2023).

6.1 Narrow AI

Narrow AI is also known as weak AI or specialized AI that refers to AI systems which undergoes training using machine learning (ML) algorithms like supervised learning or reinforcement learning which are meticulously designed and trained to carry out very specific actions or commands intelligently (Agrawal et al., 2019). It is focused on one narrow task that represents a significant milestone in the field of AI. As it is exclusively educated for one single narrow activity, and cannot perform outside its field or boundaries and is known as "weak AI". When narrow AI reaches its boundaries, it might fail in unexpected ways (Rathod & Mishra, 2023). The narrow AI is the most frequent and currently accessible AI. It operates a specific task or set of tasks under a pre-defined set of rules by the programmer and cannot exhibit the same level of understanding or adaptability as a human, and many of present popular applications fall under this category (Babu & Banana, 2024).

The weak AI is built to serve and excel in one cognitive capability, and cannot independently learn skills beyond their design, and lack the general intelligence and adaptability of humans (Edelman, 2020). It often utilizes machine learning, natural language processing and neural network algorithms to complete specified tasks (Liu, 2021). Some examples of narrow AI are AlphaGo, Alexa, Apple Siri, Google assistant, Google translate, playing chess, robot systems, buying suggestions on an e-commerce site, self-driving cars, AI virtual assistants, image and facial recognition systems, chatbots and conversational assistants, speech recognition, picture identification, recommendation engines, predictive maintenance models, and language translation tools (Damar et al., 2024).

Weak AI and strong AI are two terms coined by *American philosopher* John Searle in the "Chinese room argument" entitled "Minds, Brains, and Programs" (John, 1980). This system can perform single tasks very well, and sometimes it can be done better than humans. For example, it can be designed to identify cancer from X-ray or ultrasound images faster and more accurately than a trained radiologist (Bory et al., 2024). It can only do what it is designed to do and can only make decisions based on its training data. It is sometimes dangerous if unreliable, and the behavior that it follows can become inconsistent (Kuleshov & Prokhorov, 2019).

6.2 General AI

General AI (AGI) is also known as strong AI that refers to AI systems which possess human-like intelligence, and potentially surpass human intelligence; and are capable of understanding, learning, reasoning, decision making, problem-solving, and performing a wide range of tasks (Anderljung et al., 2023). It is an advanced form of AI that is capable of creating new content, such as text, images, and sounds based on patterns and data acquired from a body of training material. It promises to revolutionize industries, enhance productivity, and solve complex global challenges (Joshi, 2024). It can understand, generalize and apply knowledge, transfer skills between domains, and solve novel problems without task-specific reprogramming (Goertzel, 2014). It remains theoretical and unrealized, encompasses the defining characteristics of intelligence across a broad array of cognitive activities (Young et al., 2019).

Key characteristics of AGI are (Russell & Norvig, 2021) i) adaptability that can adapt to new tasks and environments without extensive retraining, which reflects human cognitive flexibility, where individuals can apply their knowledge and skills to unfamiliar situations; ii) learning and reasoning that encompasses learning from experience and reasoning about new information that includes inductive learning and deductive reasoning (Muro et al., 2019); iii) transferability that can transfer knowledge from one domain to another, demonstrating an understanding of basic principles that apply across contexts, which is similar to how people use their learning in one domain to solve problems in another; and iv) autonomy that operates autonomously, making decisions and taking actions without human intervention (Akpan, 2025).

The AGI can take the form of generic large language model programs, such as Chat-GPT, Claude, Grok, Llama, Google Bard, Co-Pilot, AI Media, and Read AI (Peng et al., 2024). The ultimate goal of it is to create machines that are capable of versatile, human-like intelligence, functioning as highly adaptable assistants in everyday life. It is quiet being researched and emerging, and such systems will take a portion of work and time. In near future, the groundwork technologies, such as supercomputers, quantum hardware and generative AI products like ChatGPT will develop (Damar et al., 2024).

6.3 Super AI

Super AI is *defined as a form of AI that is capable of surpassing human intelligence by manifesting cognitive skills and developing thinking skills of its own* (Baum & Tonn, 2015). It is considered as the most advanced, powerful, autonomous, and much smarter intelligent type of AI that may overcome human level intelligence and capabilities in various domains, and execute any job better than humans with cognitive abilities (Wogu et al., 2018). It is truly appears in science fiction, and it possess abilities, such as self-awareness, creativity, emotional intelligence, and problem solving skills far beyond what humans can achieve (Damar et al., 2024). Some essential properties of super AI are the capacity to understand reason, solve puzzles, make judgments and idea, and learn and communicate independently (Agrawal et al., 2019).

Super AI may overtake human life and may lead to destruction of society. For example, it could get out of control, either in peacetime or during a war, could intentionally end humanity by destroying the planet's atmosphere or biosphere with self-replicating nanotechnology, could fire all of our nuclear weapons, unleash a robot apocalypse, and unleash some powers of physics that we do not even know about (Bostrom, 2014). It may potentially dominate humanity, become uncontrollable to the point of endangering humanity, and restrict freedom. Therefore, better control mechanisms must be developed through the strong research collaboration among AI researchers to keep the society safe (Sharkey, 2018).

6.4 Reactive Machine AI

Reactive machines AI are the most fundamental type of AI that can respond to immediate requests and tasks, but they cannot capable of storing memory, learning from past experiences, improving their functionality through

experiences, or performing more complex tasks to make decisions in the future (Damar et al., 2024). These can perform a narrowed range of pre-defined tasks, such as operate solely based on the present data, taking into account only the current situation, and cannot form inferences from the data to evaluate their future actions. These rely on rules and heuristics to make real-time decisions and adjust to changing environmental conditions. These continuously interact with their environment, without maintaining an internal representation of it (Kumar et al., 2010). These are operated based on predefined rules and patterns, responding to immediate inputs without the need for internal memory or past experiences. These are characterized by their deterministic and non-learning nature, lack of memory-based functionality that does not learn from past actions or experiences (Demetrescu et al., 2011). These can only respond to a limited combination of inputs and answer in the best way feasible and highly reliable but with limited scope. For any input these produce the same output ensuring predictability and consistency in the operations. For example, Deep Blue of IBM was able to beat Russian chess grandmaster Garry Kasparov in a 1997 chess match (Aoki, 2020).

Their predictability, reliability, and efficiency make them indispensable in specific applications. The applications of them are paramount in various fields where consistency and reliability are very strong. These are used in combination with other machine learning approaches, such as reinforcement learning and supervised learning to improve their adaptive and decision-making capabilities (Zhang et al., 2021). For example, robot control systems and autonomous navigation systems, basic customer service chatbots, industrial automation systems, and certain types of gaming AIs are performed successfully. However, these are limited by their lack of memory, and cannot handle complex and unstructured tasks that require learning, adaptation, and understanding of context (Yamcharoen et al., 2021).

6.5 Limited Memory AI

Limited memory AI has a short-lived or a temporary memory that can store past data and use that to make predictions, and can make informed and improved decisions by studying the past data from its memory. It can look into the past and monitor specific objects or situations over time (Baranidharan et al., 2023). It can actively build its own limited and short-term knowledge base, and performs tasks based on that knowledge. It can be applied in a broad range of scenarios, from smaller-scale applications, such as chatbots to self-driving cars and other advanced use cases (Damar et al., 2024). This allows a machine to absorb data from experiences, learn from them, and help them for improving the accuracy of its actions over time. The majority of the usually used apps in our daily lives are limited memory AI. For example, deep learning imitates the function of neurons in the human brain, where self-driving cars use sensors to identify civilians crossing the road, steep roads, traffic signals, and so on to make better driving decisions that help to prevent any future accident (Agrawal et al., 2019).

6.6 Theory of Mind AI

The ability for tracking other people's mental states is known as theory of mind (ToM). It is an evolving ability that significantly impacts core function of human learning and cognition. It is a more advanced type of AI that plays a major role in psychology and philosophy, and has ability to recognize and interpret the emotions of others (Apperly, 2012). It comes from the idea that we develop an explicit theory as part of the underlying cognitive process for representing minds (Apperly & Butterfill, 2009). It is considered as a substantial milestone in AI development, and makes a lot of positive changes to the tech world. It has not yet been fully developed but rigorous research is happening in this area (Damar et al., 2024). The two dominant approaches to ToM are theory-theory and simulation-theory (Harris, 1992).

The ToM is central to human social interactions from communication to social decision-making, and has long been of interest to developmental, social, and clinical psychologists. It refers to the capacity to understand other individuals through beliefs, desires, intentions, needs, reactions, emotions, and thoughts by ascribing mental states to them (Strachan et al., 2024). It can focus mainly on emotional intelligence so that human believes and thoughts can be better comprehended. It was first conceptualized in 1978 by researchers evaluating the presence of theory of mind in animals (Davis, 2007).

6.7 Self-Aware AI

Awareness is related to unique environment, existence, sensations, feelings, memories, surroundings, and thoughts. Self-aware AI represents a speculative and futuristic vision of AI, where machines would possess consciousness, self-awareness, and even sentience (Abbo et al., 2024). It has a major contribution both in psychology and philosophy. Philosophers investigate how mental states interconnect with physical processes in the mind-body problem, whereas psychology finds it closely linked to consciousness and investigates into different levels of awareness, such as from conscious to the subconscious and unconscious (Fodor, 1981). It has maturity to the point where it is so similar to the human mind that it has gained self-awareness. It can recognize others emotions, plus has sense of self- and human-level intelligence (Agrawal et al., 2019). It represents a stage

beyond theory of mind and is one of the ultimate goals in AI development. It will not only be able to recognize and generate feelings in individuals with whom it cooperates, but will also have its own feelings, wants, beliefs, and possibly goals. It is thought that once self-aware AI is reached, AI machines will be beyond our control (Damar et al., 2024).

7. Domains of AI

The domains of AI are machine learning, deep learning, biometrics, natural language processing, speech recognition, natural language understanding, natural language generation, and generative pre-trained transformers. These domains work together to create intelligent systems capable of various tasks (Young et al., 2019).

7.1 Machine Learning (ML)

Machine learning (ML) is a branch of AI that focuses on enabling computers and machines to imitate the way that humans learn to perform the tasks autonomously, and to improve their performance and accuracy through experience and exposure to more data (Alpaydin, 2020). It is a subset of AI that enables machines to improve at tasks with experience that enables machines to learn by themselves using the provided data and makes accurate decisions (Hao, 2018). The term machine learning was first coined in 1959 by American pioneer in the field of computer gaming and artificial intelligence Arthur Lee Samuel (1901-1990) (Samuel, 1959). The ML is about designing algorithms that allow a computer to learn. There are three kinds of models used in ML: i) supervised learning, ii) unsupervised learning, and iii) reinforcement learning (Mohajan, 2025). The ML helps to identify fraud, security threats, personalization and recommendations, automated customer service through the chatbots, transcription and translation, data analysis, etc. It opens an entirely new realm of what humans can do with computers and other machines (Russell & Norvig, 2015). It is used in web search, drug design, spam filters, credit scoring, fraud detection, recommender systems, ad placement, stock trading, and many other applications (Domingos, 2012).

7.2 Deep Learning (DL)

Deep learning (DL) is considered as the subdomain of ML and thereby the subset of AI. It can be denoted as the next level of ML where the system is similar to human nervous system and mimic the working of the neurons (Schmidhuber, 2015). It is the most advanced form of AI that mimics human intelligence. It enables software to train itself for performing tasks with vast amounts of data. In recent times, DL models can not only analyze large volumes of text but can also come up with services, such as those providing a summarization of text, language translation, context modeling, and even sentiment analysis (MadyMantha, 2019).

There are two types of DL algorithms: deep neural networks (DNN) and deep belief network (DBN). The DL deals with many layers of computation, where "deep" refers to a "large" number of layers. It can be 20 to 1,000 layers, but at least more than 2 layers (Aoki, 2020). The initial layer is called input layer, the last layer is called the output layer, and the intermediate layers are termed as the hidden layer, and all the layers are interconnected (Reggia, 1993). The DL helps to gain massive amounts of unstructured data that makes it strenuous for humans to process and understand (Al-Asmari, 2022).

7.3 Biometrics

Identification of theft and security threats is growing concerns in our digital society. Biometrics is the automated measurement, statistical analysis, and biological characteristics of people, such as fingerprint, iris, face, veins, etc., and behavioral characteristics, such as voice, signature, walking, etc. that can be used to identify individuals (Li & Jain, 2015). It is used to identify, measure, and analyze the physical aspects of the body structure and form through the natural forms of interactions between humans and machines, including touch, fingerprints, gait, speech, eye, and body language recognition. Personal identification can be done using one or more of biometric traits (Agrawal et al., 2019).

Many organizations need security of data systems as a priority basis, and biometric identification, and the AI system can provide top security to data systems and digital devices (Alrahawe et al., 2019). Biometric technology uses body traits, such as face and voice recognition, iris scan, fingerprint scan, and DNA matching, and the AI system can easily understand these (Maltoni et al., 2009). The AI can transform these visible traits into specific codes that the operation can easily do the work (Akhtar et al. 2018). Although, biometrics has several advantages over tokens or passwords, it suffers from false matches. The logical process of biometric can be done through surveillance operations, where recognition is required to acquire their identity for store it, and then use the stored data to identify the person as it needed (Uludag et al., 2004).

7.4 Speech Recognition

Speech recognition is a technology that recognizes speech and the systems capture the natural conversations with a human, analyze said data, and convert the same into readable information (Joshi et al., 2017). The concept of

speech recognition started in the 1940s. The first speech recognition program appeared in 1952 at the Bell Labs by the three researchers, Stephen Balashek, R. Biddulph, and K. H. Davis through the built a system called "Audrey" for single-speaker digit recognition (Juang & Rabiner, 2005). Its popularity is increasing very rapidly. It is an interdisciplinary subfield of computer science and computational linguistics that develops methodologies and technologies, which enable the recognition and translation of spoken language into text by computers (Gales, 2009).

At present the speech recognition technology is using many organizations, such as Google, Amazon, Microsoft, and Facebook to improve the standards of their services and products (Jesus, 2019). It is applicable in phones, refrigerators, automobiles, and other vital devices in the form of smart speaker, smart home, and mobile device applications (Sarangi et al., 2020). The technology of recognizing speech is also used in the medical world, defense, home automation, gaming, and even in general robotics (Lifewire, 2019). Sometimes the speech recognition does not work properly. For example, when different people pronounce the same word in a totally different manner or when there is a great deal of background noise, the software will pick up the noise and may not be able to interpret it well (Suresh & Rao, 2015). Cortana is applied as a voice-activated virtual assistant released in 2017 by Microsoft to help online users to receive user reminders, store notes, and lists; and manage various applications (Agrawal et al., 2019).

7.5 Natural Language Processing (NLP)

The NLP is a subfield of computer science and AI that enables machines to both process and comprehends human language in the way it is written. It is closely related to information retrieval, knowledge representation, and computational linguistics (Aoki, 2020). It allows programs to read, write, and communicate in human languages through the processing of speech recognition, text classification, speech synthesis, machine translation, natural language understanding, information extraction, information retrieval, question answering, and natural language generation (NLG) (Russell & Norvig, 2021). English mathematician, computer scientist, logician, cryptanalyst, philosopher and theoretical biologist *Alan* Mathison *Turing* published an article titled "Computing Machinery and Intelligence" and it is called the "Turing Test" as a criterion of intelligence (Kurdi, 2016).

7.6 Natural Language Understanding (NLU)

The NLU is a branch of NLP that converts the natural language spoken by humans into structured data. It is used in computer software to understand input in the form of sentences using text or speech to automated reasoning, machine translation, question answering, news-gathering, text categorization, voice-activation, archiving, and large-scale content analysis (Hirschman & Gaizauskas, 2001). It can perform two tasks: intent classification and entity extraction. For example, when we read a sentence, we immediately understand the meaning or intent behind that sentence (Semaan, 2012).

The program "Student", written in 1964 by *American computer scientist* Daniel Bobrow (1935-2017) for his PhD dissertation at MIT, which is one of the earliest known attempts at NLU by a computer (Russell & Norvig, 2003). The NLU is considered as an umbrella term that can be applied to a diverse set of computer applications, ranging from small, relatively simple tasks, such as short commands issued to robots, to highly complex endeavors, such as the full comprehension of newspaper articles (Li et al., 2007).

7.7 Natural Language Generation (NLG)

The NLG is a sub-discipline function of AI that generates written or spoken speech from datasets in the text form, and converts it into a form which enables the computer system to communicate the data efficiently and accurately. It can mine numerical data, perform pattern identification, and share information for human understanding (Horacek, 2015). It is the process of constructing natural language outputs from nonlinguistic inputs. It is related to NLP, computational linguistics, and NLU. It is specifically used in the control of spam. Several email providers use similar NLG-based services to analyze the content of the emails to understand whether the mail is genuine or fake (Gatt & Krahmer, 2018).

The NLG can identify the message through the manually search data, comparing or scanning tables, analyze charts, metrics or maps, and then develop recurring status reports (Agrawal et al., 2019). The goal of NLG is to investigate how computer programs can be made to produce high-quality, expressive, uncomplicated, and natural language text from computer-internal sophisticated representations of information (Saliby, 2019). Common applications of NLG are production of various reports, such as weather and patient reports; image captions; and chatbots like ChatGPT (Portet et al., 2009).

7.8 Generative Pre-Trained Transformers (GPTs)

The GPTs are large language models (LLMs) that generate text based on the semantic relationships between words in sentences. Text-based GPT models are pre-trained on a large corpus of text that can be from the internet

(Smith, 2023). The GPT models accumulate knowledge about the world and can then generate human-like text by repeatedly predicting the next token (Metz & Weise, 2025). The subsequent training phase makes the model more truthful, useful, and harmless with reinforcement learning from human feedback (RLHF). Current GPT services are ChatGPT, Gemini, Grok, Claude, Copilot, and LLaMA (large language models (LLMs) released by Meta AI that can process different types of data, such as images, videos, sound, and text (Marmouyet, 2023).

8. AI Hardware and Software

Specialized computer hardware often used to execute AI programs faster with less energy are Lisp machines, neuromorphic engineering, event cameras, physical neural networks, central processing units (CPUs), system on a chip (SoC), and graphics processing units (GPUs) (Maxfield, 2020). Specialized programming languages, such as Prolog were used in early AI research; later general-purpose programming languages, such as R-language and Python have been using to run the AI activities (Damar et al., 2024). The R-language is a very prominent, free programming language that is used for statistical computing. Python is a platform-independent language that can work on different platforms, such as Windows, Mac, Linux, Raspberry Pi, etc. (Agrawal et al., 2019). It can be used for creating workflows, handling big data, connecting database systems, performing complex mathematical functions and rapid prototyping, reading and writing, and modifying files. Cloud computing is used in a robust network of remote servers to store, manage, and process data (Wodecki, 2023).

9. Application of AI

The AI can show human based skills, such as thinking, perceiving, learning, reasoning, solving logical problems, and decision making. It is trying to help humans with two types of technologies, such as manually in the form of robots, and digitally with chatbots that can perform risky, repetitive, and troublesome tasks (Aderibigbe et al., 2023). It has applications in all fields of human study, such as finance and economics, natural sciences, environmental engineering, chemistry, computer science, and so on. It is applied in many sectors, such as healthcare, assembling and manufacturing industries, business organizations, security, entertainment, and in the automotive industries (Mohammad, 2020).

The AI is widely used in machine learning (ML), deep learning (DL), advanced web search engines, recommendation systems, computer vision, internet, driving internet traffic, recommender systems, online advertisements, targeted advertising, biometrics identification, speech recognition, image labeling, virtual assistants, autonomous vehicles, reasoning, planning, knowledge representation, superhuman play and analysis in strategy games, facial recognition, perception, support for robotics, automatic language translation, and natural language generation (NLG) to improve human interaction with machines to facilitate most operations (Barfield & Pagallo, 2018; Russell & Norvig, 2021).

Virtual assistants of AI, such as Apple's Siri, Amazon's Alexa, Google Assistant, and Microsoft's Cortana are used to understand and respond voice commands, answer questions, perform tasks, and provide personalized recommendations (Agrawal et al., 2019). The AI can control self-driven vehicles and autonomous vehicles that can use commands from humans, can prevent cases of accidents, and can enable them to perceive their surroundings. It navigates safely, provides optimal routes, estimates arrival times, offers alternative routes to avoid congestion, makes real-time driving decisions based on sensor data and ML algorithms through the use of Google Maps and Waze leverage (Makridakis, 2017).

In healthcare, AI is used for medical imaging analysis, disease diagnosis, drug discovery, personalized treatment recommendations, and remote patient monitoring (Kakani et al., 2020). In online shopping and finance e-commerce platforms, such as Amazon and Alibaba are used in AI for product recommendations, dynamic pricing, fraud detection, credit scoring, risk assessment, algorithmic trading, inventory management, personalized financial advice, and customer service chatbots (Agrawal et al., 2019). The AI will contribute to an increase of up to 40% in the productivity of the industrial sector, reducing costs, and increasing the production of manufactures around the globe (Aderibigbe et al., 2023).

AI algorithms are used in social media platforms, such as Facebook, Instagram, and Twitter for content moderation, personalized content creation, targeted advertising, and sentiment analysis. AI-driven language translation services, such as Google Translate and Microsoft Translator use neural machine translation techniques to translate text and speech between multiple languages accurately (Aoki, 2020).

10. Advantages of AI

The AI is influencing daily lives, communities, and governmental structures more than ever before. For example, it may be personal assistant to schedule meetings, and other daily activities.

It plays a vital role in cyber-security. It enables the automation of repetitive and mundane tasks that focus on more creative and strategic activities, which leads to increased productivity and efficiency in both individual tasks and entire workflows (Uzun et al., 2022). It can process vast amounts of data with high accuracy and

precision, minimizing errors, and improving the quality of decision-making that is beneficial to data analysis, diagnostics, and quality control. It can operate continuously without the need for breaks. As a result, customer support, virtual assistants, and online transactions can enhance among users across different time zones (Aoki, 2020).

The AI fosters innovation by enabling the development of new products, services, and business models that were previously unfeasible. This includes applications, such as natural language processing, robotics, virtual reality, and augmented reality opening up new possibilities for creativity and exploration. For example, Chatbots use language to talk to people in a natural and pre-programmed way, recognize names and phone numbers and reproduce human behavior (Aderibigbe et al., 2023).

Use of AI in medical imaging analysis, disease diagnosis, drug discovery, personalized treatment planning, and remote patient monitoring can improve patient outcomes and reduce healthcare costs (Baranidharan et al., 2023). The AI can optimize resource allocation, scheduling, and logistics, leading to cost savings, reduced waste, and improved resource utilization in various sectors, such as transportation, manufacturing, and energy management. AI-powered systems enhance safety in various domains, such as autonomous vehicles, manufacturing, and cyber-security in internet banking by detecting anomalies, predicting potential hazards, and implementing preventive measures to mitigate risks (Ghosh & Thirugnanam, 2021).

11. Disadvantages and Risks of AI

Despite its many advantages, AI has some risk factors that may bring a negative impact on its use. The automation due to AI may cause job displacement; and consequently, the unemployment rate may increase that can affect routine tasks of the employees in some jobs, such as manufacturing, customer service, and administrative roles (Aderibigbe et al., 2023). For example, according to a Forbes article, it is predicted that by 2025 automation will cause a loss of 85 million jobs. Societal inequalities related to race, gender, ethnicity, and other factors may arise if not carefully monitored and mitigated when biases present in training data due to discriminatory decision-making processes. Vast amounts of personal data are used to function effectively that may raise concerns about privacy and data security. Therefore, unauthorized access, data breaches, and misuse of personal information may pose significant risks to privacy rights (Aoki, 2020).

The AI is prone to technical difficulties, security snags, data difficulties, and can cause accidents if users fail to understand the AI system (Cheatham et al., 2019). Data difficulties arise due to the increase in unstructured data, usually from various sources, such as social media and mobile devices, and sometimes security snags, such as fraud, loss of data, scamming, and hacking may happen due to carelessness (Singh & Singh, 2019). The use of virtual assistants and social robots may create social isolation and disconnection by reducing face-to-face interactions and interpersonal relationships. The use of autonomous weapons, surveillance technologies, and predictive policing algorithms may raise concerns about accountability, human rights violations, and the erosion of civil liberties (Anderljung et al., 2023).

12. Conclusions

The AI is a computing concept that helps a machine to think and solve complex problems as we do with our intelligence. It is the new way of living human with incredible and efficient impacts on almost every sector. It is a rapidly developing technology and it has made significant strides in recent years. But there are many unanswered questions about how it will evolve and impact society in near future. At present the AI has affected every branch of the society with digital revolution, such as security and defense, healthcare services, education, transportation and infrastructure, environmental and natural resource management, law and justice systems, etc. The policymakers should be aware of AI demerits, such as data difficulties, technological troubles, and security snags that may interfere with its performance. The AI technology is rapidly evolving, and we have to be ready to present successful accomplish and future potential applications for maximum benefit of global humanity.

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Narrative Migration from Music to Film: A Study on the Cross-Media Function of Leitmotif in *Rebecca* and *Once Upon a Time in America*

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Abstract

The leitmotif, a musical device, functions as a cross-media narrative strategy in cinema. This paper explores how leitmotif is applied in cinematic storytelling through Alfred Hitchcock's classic psychological thriller *Rebecca* and Sergio Leone's epic film *Once Upon a Time in America*. Given the discussion on recurring visual motifs, musical theme variations, and audiovisual narrative techniques and other leitmotif's symbolic manifestations in both films, it is found how this device reveals character psychology, advances plotlines, and intensifies thematic connotations.

Keywords: leitmotif, cross-media narrative, film semiotics, *Rebecca*, *Once Upon a Time in America*, nonlinear narrative

1. Introduction

The leitmotif, a creative technique intrinsically linked to specific characters, scenes, and emotions, plays a hand in how narratives unfold through sound. Richard Wagner, a German composer and conductor who is widely known for music dramas, did not invent this concept (Weber and others dabbled in similar techniques), but his epic opera cycle *Der Ring des Nibelungen* elevated it to an art form, where over two hundred leitmotifs were introduced throughout the work, advancing the plot through dual narrative. In a sense, Wagner is universally recognized as the pioneer of this technique due to his systematic innovations and far-reaching influence.

Cinema inherited this secret weapon. When stories jumped from stage to screen, the leitmotif significantly enhances the expression in accordance with cinematic demands. Now this device could fuse with visuals, creating psychological depth no playwright could match. Take *Rebecca* as an example. The recurring "R" insignia paired with a chromatic musical theme creates an omnipresent ghostly figure, constructing the protagonist's psychological repression and identity crisis. Similarly, Deborah's theme in *Once Upon a Time in America* undergoes harmonic, orchestral, and rhythmic variations, mirroring Noodles' nostalgic yearning and disillusionment with the past, thus serving as the emotional anchor of the film's nonlinear narrative. Further research confirms that cinematic leitmotifs preserve Wagner's tradition of symbolic musical themes, while unifying emotional metaphor and story structure through audiovisual narratives.

This study contributes to film narratology by expanding the theoretical framework of leitmotifs through analyses of *Rebecca* and *Once Upon a Time in America*, while focusing on its methodological significance in interdisciplinary narrative research. By examining how and why leitmotifs make a difference in cinema, this paper deepens understanding of filmic storytelling techniques and provides new theoretical perspectives for future researches.

2. What Are Leitmotifs? Start from *Der Ring des Nibelungen*

Proposed by music historian Wilhelm Ambros, the term "leitmotif" (from the German Leitmotiv) is closely

related to the musical concepts. After analyzing Wagner's operas and Liszt's symphonic poems, Ambros observed how these works achieved structural unity through recurring musical elements, and later termed "leitmotifs" for short, and recurring musical phrase. The concept was further developed by critic Hans von Wolzogen in his 1876 thematic guide to Der Ring des Nibelungen, where he defined the leitmotif as Wagner's signature technique: melodies, harmonies, or rhythms repeatedly associated with characters, objects, or ideas to embed symbolic meaning.

Der Ring des Nibelungen by Wagner has elevated this technique to unprecedented heights. Distinct musical signatures were designed for every character, object, scene, and even abstract concepts, which became a cohesive musical "language". Through this early attempt, Wagner introduced music and drama into an entirely new art form, redefining operatic storytelling.

Specifically, the leitmotif in *Der Ring des Nibelungen* is a musical theme representing both the physical ring and its curse through distinct harmonic tension. First introduced in *Das Rheingold*, this motif is composed of a compact melodic cell built on a diminished seventh chord in E minor, its inherent instability mirroring the destructive nature of the curse itself. Deryck Cooke, a British musician, musicologist, articulated in his book *The Language of Music*, proposes music functions as a language, where melodic contours, harmonic progressions and rhythmic patterns collectively convey psychological states. Given this, in this passage, the inner voices trace a chromatic descent and subsequent ascent through the minor scale, intensifying the musical unease.

On top of symbolic meanings, this leitmotif serves as the cycle's structural backbone. Its metamorphoses across the tetralogy provide audiences with musical signposts to track narrative developments and character dynamics. Through such attempts, Wagner inspired use of characteristic melodies or musical phrases to signal particular figures or objects in the on-stage action; and his leitmotif technique is widely adopted for narration in the films.

With analytical annotations, a detailed breakdown of the Ring's leitmotif notated in the score:

E♭ - G - B♭ - E♭

Musical Example 1. Ring Motif from Das Rheingold

The leitmotif changes according to different scenes, yet its core harmonic half-diminished seventh chord structure remains intact, providing an agreed musical theme for the entire opera cycle. This compositional approach epitomizes Wagner's music-dramatic innovation, where motifs function not merely as symbolic tags but as active narrative agents that guide audiences through complex character relationships and plot developments.

Likewise, the "Sword" leitmotif in *Der Ring des Nibelungen* embodies both Siegfried and his weapon Nothung. Built in C minor, its opening lowered sixth interval establishes a profoundly ambivalence between heroic and elegiac. This deliberate tonal ambiguity foreshadows Götterdämmerung's tragic conclusion, echoing Wagner's original conception of the cycle as *Siegfried's Tod* (*Siegfried's Death*). Such prescient musical storytelling demonstrates Wagner's mastery of thematic foreshadowing, where motivic variations create dramatic tension.

The leitmotif's second phrase reveals Siegfried's essential feature through its ascending fifth leap to the tonic, then rising further to the minor third. This upward trajectory musically incarnates what philosopher Bryan Magee described as "heroism in its purest tragic form"; in other words, the courage to advance relentlessly despite knowing one's fate. The melodic surge toward the minor third particularly captures this paradoxical blend of radiant bravery and impending doom, sonically mirroring Siegfried's mythology where triumph and catastrophe prove inseparable.

With analytical annotations, a detailed breakdown of the Sword's leitmotif notated in the score:

C - A♭ - E♭ - G - C

Musical Example 2. Sword Motif from Das Rheingold

As John Blacking explores the role of music in society and culture in *How Musical Is Man?*, he finds that music operates not as a language to be deciphered, but as a metaphorical device for emotional communication. This expression can be sound and clear when contextualized within specific narrative frameworks.

The leitmotif's minimalist construction is designed for immediate recognition and mnemonic potency, and it has paradoxically created maximal adaptation across art forms. Nowadays, film music scholars have examined how these musical signatures function as cinematic semiotics, analyzing their dynamic relationship with the film as a whole. In cinematic scoring, the leitmotif emerges as an acoustic signifier, representing musical and dramatic elements that debut in opera before cinematic applications. Generally speaking, this narrative migration from music to film indicates leitmotif can be used to enhance emotional impact and provide deeper narrative

understanding.

3. How Does a Leitmotif Relate to the Character Rebecca?

3.1 Explicit Characterization of Rebecca

Rebecca (1940), directed by Alfred Hitchcock, was adapted from Daphne du Maurier's novel of the same name. The film is considered one of the Hitchcock classics for its sophisticated psychological descriptions and masterful narrative structure.

The story follows a young, unnamed woman (played by Joan Fontaine) who meets the wealthy widower Maxim de Winter (Laurence Olivier) in Monte Carlo and quickly marries him. Upon returning to his estate, Manderley, she finds herself haunted by the lingering presence of his first wife, Rebecca. Mrs. Danvers (Judith Anderson), the estate's devoted housekeeper, worships Rebecca's memory, intensifying the new bride's insecurity and unease. As the story unfolds, the audience gradually uncovers the truth about Rebecca, a sham rather than the idealized figure she appears to be. The narrative reaches its climax when Maxim confesses that Rebecca's death was no accident, but the accidental result of a fatal confrontation. This revelation marks a turning point, allowing the new Mrs. de Winter to finally emerge from Rebecca's oppressive shadow.

Rebecca, intriguingly, though never physically appearing onscreen—looms as a pervasive, spectral force between the protagonist and Maxim. Like a ghost, she haunts the young wife's psyche, her presence seeping into every corner of Manderley. The heroine's ignorance about Maxim's true feelings, the nature of his marriage to Rebecca, and the circumstances of her death traps her in a psychological limbo of self-doubt and imagined threats. Hitchcock keeps this tension through symbolic visual language and narrative restraint on purpose, turning Rebecca into an entity felt not just through story beats but through recurring motifs—both musical and visual—that enhances her oppressive aura.

Hitchcock materialized Rebecca's invisible influence through charged symbolic objects in the film. His brilliant semiotic strategy can be seen from the recurring appearance of item, such as personal stationery, lace handkerchiefs, and monogrammed pillowcases, with her embroidered initial "R". Each "R"-marked artifact is both forensic evidence of Rebecca's physical absence and psychological landmines triggering the protagonist's anxiety. Their cumulative effect makes Rebecca more palpably present than any physical portrayal could achieve. Through this, Hitchcock demonstrates how absence, when properly signified, can exert greater dramatic force than presence.

Figure 1. Rebecca's symbolic "R"

However, as a composite art form combining visual and auditory elements, cinema has certain inherent limitations in its expressive means when it comes to presenting static thoughts and abstract concepts. Compared to written language, films struggle to directly convey characters' inner monologues and abstract emotions. Since Rebecca's external actions and psychological activities cannot be depicted explicitly through cinematography, Hitchcock ingeniously uses music as a parallel narrative device, including dialogues, behaviors of other characters, and symbolic musical motifs, to indirectly portray this complex and enigmatic figure. To compensate for this, Hitchcock reinforces Rebecca's symbolic presence through the use of leitmotifs. The recurring Rebecca's leitmotif consistently paired with visual imagery, in which this symbolic representation is fully realized both visually and aurally. This audiovisual synergy strengthens the semiotic persuasiveness, while further elucidating its metaphorical connotation in the psychological state of the female protagonist.

Musical Example 3. Rebecca's Leitmotif

The *Rebecca*'s leitmotif is specifically constructed from ascending and descending chromatic progressions as shown in Musical Example 3. This chromatic melodic line, supported by equally chromatic harmonic language, embodies the haunting, curse-like presence of Rebecca's spectral figure. The chromaticism renders an unsettling emotional effect. In the meantime, through its unstable melodic structure, this musical design hints at the contradictions and complexity in Rebecca's character. Therefore, the motif successfully symbolizes Rebecca herself, and with repetition and variation, it pushes the narrative forward and intensifies the emotional buildup.

As previously mentioned, whenever Rebecca's name is mentioned or objects associated with her are highlighted on screen, this thematic melody resurfaces, growing more pronounced as the story unfolds. In the film's first half, Rebecca is portrayed as an elegant, flawless figure, her marriage to Maxim appearing blissful. However, as the narrative progresses, the audience gradually learns from Maxim the truth about Rebecca's character—a libertine with a demonic nature. This duality is reflected profoundly in the musical transformation of the motif. Early in the film, the motif is presented as a graceful, flowing melody, symbolizing Rebecca's façade of perfection, while in the latter half, dissonant intervals and intricate textures gradually expose her inner darkness and complexity.

The sonic quality of the *Rebecca* motif is performed on the Novachord, an early synthesizer, producing a timbre that is both nostalgic and ghostly. This sound suggests Rebecca's intangible presence, and builds up her lingering image on the characters. Even after her death, the motif lingers like a specter in every corner of Manderley, shaping the psychological states of the heroine and Maxim. This auditory design heightens the film's psychological tension while using musical language to further disclose the enigma and domineering nature of Rebecca.

Moreover, the motif, with distinct intervallic and rhythmic design, implies the contradictions within Rebecca's personality. For instance, its dissonant intervals and complex rhythmic patterns mirror her inner conflicts while musically reinforcing her psychological dominance over Maxim and the heroine. This compositional approach enables the Rebecca motif transcend the simple symbolism; its sonic impact shows her pervasive, unseen presence throughout the film.

2.2 Implicit Characterization of Rebecca

Classical Hollywood cinema uses psychological portrayal of characters in the narration, driving the plot forward. As an essential auxiliary tool in film storytelling, music can profoundly reveal characters' mental states, emotional shifts, and their impact on the narrative, thereby achieving implicit characterization.

Rebecca's Leitmotif recurs throughout the film in various transformed iterations throughout the entire narrative structure. Through variations in instrumentation, tempo, tonality, and textural accompaniment, the composer tightly integrates Rebecca's Leitmotif with the plot development. For instance, in the "confession scene", Rebecca's Leitmotif emerges in different forms, revealing her latent influence in the story.

Table 1. Variations of Rebecca's Leitmotif in the "Confession Scene"

Scene	Depiction of Rebecca's Leitmotif	Instrumentation	Tempo	Key	Background Texture	Symbolic Meaning
"Everything is over, the truth is revealed."	Increased rhythmic tension	Low strings	Lento	C	Harmonic combination with repetitive single notes	Foreshadows that the revealed truth is about Rebecca, carrying a sense of ominous premonition.
"People think I am the most	Complete statement of	Middle-range flute	Adagio	E	Tremolo in strings	Highlights Rebecca's

beautiful and glamorous woman in the world."	Rebecca's leitmotif					deception, presenting her as elegant but ultimately insubstantial
"You thought you could defeat me, didn't you?"	Complete statement of Rebecca's leitmotif	Repeated low-pitched tremolos in the piano	Adagio	F# minor	Low-pitched tremolos in the piano and strings	Gradually exposes Rebecca's deceptive nature and reveals her dominance.
"I suggested that I was pregnant, and Maxim couldn't tolerate it."	Motivic transformation	Low strings → transition to high-range section	Andante	D# minor	Ostinato figures in the low strings → intense harmonic texture	Represents Maxim's growing psychological collapse under Rebecca's manipulation
"You hate me, don't you?"	Motivic transformation	Low strings	Adagio	F	Sustained tremolo chords	Marks the revelation of Rebecca's true death.
Maxim's confession about Rebecca's death	Final variation of Rebecca's leitmotif (most intense form)	Low strings and dramatic brass strikes	Adagio	F	Harmonic progression and climactic strikes	Uses deep and intense tones to express the devastating impact Rebecca had on Maxim

Furthermore, the complete Rebecca's Leitmotif further presents its core characteristics. As the melodic line is fluid yet tinged with an ominous quality, particularly in the low-register string section, repetitive figures create a sense of tension heightened by arpeggiated ascending phrases, intensifying the suspense and reinforcing Rebecca's presence.

The harmonic treatment in Rebecca's leitmotif which carries profound symbolic significance takes the second place. To be specific, in its original iteration, the motif employs a minor tonality, and the use of augmented sixth chords imbues the music with instability; which is a direct metaphor for Rebecca's character. Her existence exerts a persistent influence over Maxim and Manderley, an influence that persists even after her death. The film score also utilizes tempo modulation to accentuate the transformation of Rebecca's leitmotif. During climactic moments, the motif's tempo gradually accelerates, coupled with an increase in dissonance, fabricating an oppressive circumstance that mirrors Maxim's breakdown and aggravates the narrative tension.

Music Example 4. The complete Rebecca's leitmotif

The critical turning point in the narrative, also the golden ratio point of the film, is that Rebecca's leitmotif often

resurfaces in varied forms. In particular, when the protagonist Mrs. de Winter enters the boat house and Maxim recounts Rebecca's story, revealing the truth about her death, the shifting music mirrors the escalating tension of the scene. In the first half of the film, Rebecca's motif primarily manifests as a mysterious, lingering melody, with low-register strings lending her presence an eerie and elusive quality.

As the plot progresses, the motif becomes increasingly fragmented with heightened harmonies, rhythms, and dynamic shifts in pivotal scenes to illustrate her invisible yet pervasive control over the characters. The composer applies diverse textural techniques to render Rebecca's leitmotif—such as introducing low strings with timpani in the latter half of the film, creating a rhythmic intensity that underlines Maxim's eventual breakdown and the revelation of Rebecca's sham. In addition to depicting Rebecca's characterization, these musical elements propelled the story forward.

Though Rebecca never physically appears on screen, her leitmotif permeates the entire film as the driving force behind the plot. Those transformations in different scenes have shown her changes from enigmatic and elegant to cunning and manipulative, and finally to its devastating climax. In the film's crescendo, her motif reaches its most dissonant iteration, punctuated by the tremolo of low strings, allowing the audience to viscerally grasp her enduring impact on Maxim and the very foundations of Manderley.

The leitmotif in Rebecca transcends its traditional role as mere musical accompaniment, becoming instead a vital narrative force that breathes life into the story. Rebecca's haunting theme functions as an invisible yet effective storyteller, crafting her enigmatic presence while driving the film's dramatic momentum. Through subtle manipulation of instrumentation, pacing, harmonic color and musical texture, the score paints Rebecca's complex character in shifting hues that reflect the evolving plot. Though never appearing onscreen, this musical embodiment renders her the most unforgettable and unsettling presence as a ghostly specter whose influence permeates every frame in the film.

3. What Does Deborah's Theme Represent in *Once Upon a Time in America*?

This section focuses on Ennio Morricone's score for Sergio Leone's 1984 film *Once Upon a Time in America*, exploring the use of thematic motifs and the unique role of music in shaping the film's temporal structure, psychological characterization, and emotional storytelling. This part analyzes the recurring themes like "Deborah's Theme" and the evocative use of instruments such as pan flute, trumpet, and harmonica, the discussion reveals how Morricone employs variations of leitmotifs to narrate Noodles' lifelong journey of memory, regret, and disillusionment.

Ennio Morricone's Deborah's Theme, the central musical motif of *Once Upon a Time in America*, holds profound nostalgia, lost innocence, and unattainable love. With his distinctive musical language, Morricone constructs an auditory space of memory that resonates with the fragmented narrative, deepening its meditation on time, remembrance, and sorrow.

Composed in E major, Deborah's Theme subverts traditional Western classical associations with this key. While works like Liszt's *Mephisto Waltz* or Charpentier's *Te Deum* often employ E major to evoke brightness, grandeur, or triumph, Morricone cleverly defies such expectations. Rather than infusing the theme with exuberance or vitality, his orchestration and harmonic progression imbue it with a profound melancholy and yearning.

Music Example 5. Deborah' theme (the leitmotif)

At the opening of the composition, the recurring Deborah's Theme emerges through sparse orchestration, with strings delicately conveying the main melody in restrained tones. The slow harmonic rhythm combined with sustained pedal tones creates a sense of suspension, as if the music drifts from a distant, unreachable past. This treatment works in concert with the narrative structure of the film, allowing memories to surface through fragmented imagery and evoking a dreamlike fluidity of time and space.

Deborah's Theme transcends its role as mere character leitmotif; it also represent the emotions of the protagonist

Noodles (Robert De Niro) and his memories. Throughout the film, the theme traverses the 1920s, 1930s, and 1960s alongside Noodles' recollections, strengthening the meditation on time passage and irretrievable loss in the film.

The nonlinear narrative of the film finds its counterpart in the theme's musical treatment. Variations in instrumentation, texture, and harmony reflect the subjectivity of memory. In early flashbacks, the melody appears light and unadorned, symbolizing Noodles' youthful idealism. As the story progresses, the theme grows richer and more dissonant, its destabilized harmonies mirroring his shattered illusions. This musical evolution not only maps Noodles' psyche but also deepens the major tension between past and present in the film.

Across the three key eras, namely 1920s, 1930s, 1960s, Deborah's Theme undergoes distinct transformations. These variations chronicle both temporal progression and Noodles' psychological metamorphosis, with each iteration a palimpsest of longing and regret.

The 1920s marks innocence and first love. In Noodles' childhood memories, Deborah's Theme makes its first appearance. Here, the melody is carried by a solitary violin or light string ensemble, its tender timbre adorned with lyrical vibrato to create a dreamlike warmth. This musical treatment symbolizes Noodles' budding infatuation with Deborah and his idealized visions of the future.

The 1930s witnesses disillusionment and harsh reality. As the narrative shifts to Noodles' adulthood, the theme undergoes a transformation. The string textures grow denser, the rhythm deliberately sluggish, while unstable chromatic harmonies seep into the progression—mirroring his descent from innocence into complexity. During the violent car and other pivotal emotional clashes, the theme resurfaces in the lower register: darkened in timbre, weighed down with anguish, sonically amplifying the wreckage of shattered love.

The 1960s sees ghosts of memory and irretrievable loss. By the 1960s timeline, Deborah's Theme no longer appears as a complete melody but flickers intermittently in the background like a half-remembered echo. The orchestration turns skeletal, dynamics hushed to whispers; at times, the theme fractures into brief string sighs, sonically mimicking the remoteness and fragmentation of memory. When Noodles finally reunites with Deborah, the theme returns transposed higher, a gesture of emotional sublimation that paradoxically points out the irreparable void between them.

The defining feature of Deborah's Theme lies in its progressive melodic transformation—throughout the film, the motif undergoes continuous variation, with its orchestration expanding from intimate string solos to full symphonic textures, while its dynamic intensity gradually amplifies. Notably, when the theme reappears in the film's final act, it is performed an octave higher than its original pitch. It symbolizes the elevation of emotions, and at the same time intensifies the sense of unbridgeable regret felt by the characters.
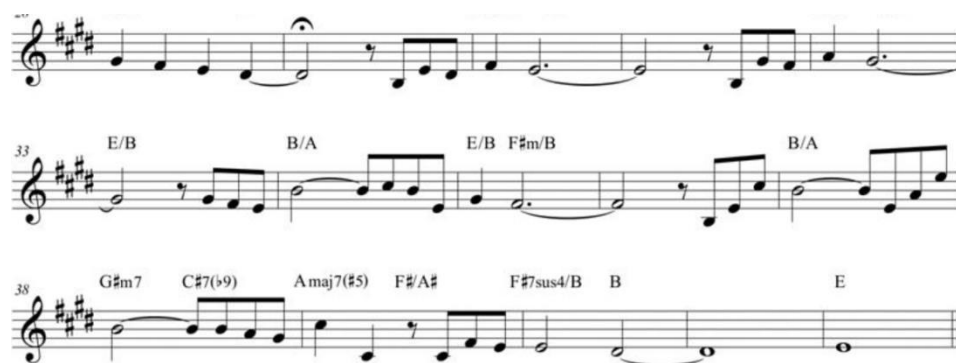
Music Example 6. The Complete Deborah's Theme

In the middle section of the film, Noodles returns to his old neighborhood. Here the theme reappears with richer orchestration. The dense symphonic textures heighten the music's dramatic impact, drawing viewers deeper into his subjective recollections; thereby, the film constructs, with repetitive iterations of this motif, a cyclical memory structure that indicating Noodles' confinement to the past.

Morricone's Deborah's Theme goes more than a character motif. It embodies the very soul of *Once Upon a Time in America*. Its tonal ambiguity, orchestral development, and cyclical recurrence mirror the fragmented storytelling in the film, transforming the music into an active narrative force rather than passive accompaniment. By subverting traditional tonal expectations and applying skillful orchestration to cultivate emotional depth, Morricone conceived a musical idea that simultaneously represents Deborah herself and symbolizes the central

themes: it is an elegy for vanished youth, a lament for relentless time, and a poignant nostalgia for an America that no longer exists.

4. Conclusion

First, leitmotifs function as a cross-media narrative strategy in these films, where visual symbols and musical themes work in concert to establish emotional undertones and narrative logic. In *Rebecca*, the recurring letter "R" and the chromatic Rebecca motif reinforce each other, transforming an unseen character into the central driving force of the story. Similarly, in *Once Upon a Time in America*, Deborah's Theme, through variations in instrumentation and tonality, links Noodles' fragmented memories into a cohesive emotional story.

Second, leitmotifs play an intangible yet pivotal role in characterization. Both Rebecca and Deborah, though physically absent, become fully realized through their motifs' symbolic repetitions. This technique demonstrates the aesthetic value of blank space in film art, highlighting leitmotifs' unique advantage for psychological depth.

Finally, the variations of these motifs serve as metaphors for temporality and memory. In *Once Upon a Time in America*, the non-linear narrative accompanied with each recurrence of Deborah's Theme, such as shifting orchestration, tempo, and tonality, mapped Noodles' changing emotional states toward the past. Such music-narrative interaction elevates leitmotifs beyond mere background elements, making them an integral part for thematic expression.

This study aims to expand the theoretical exploration boundaries of the dominant motivation in film narrative, and also provides some new perspectives for cross-media narrative studies. As we enter the digital-intelligent era, further exploration into the evolution of leitmotifs, particularly their potential applications in interactive narratives or virtual reality film-making, has become both urgent and necessary.

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"AI Implementation Journey" of SMEs in Germany — 10 Main Obstacles

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Abstract

Small and medium-sized enterprises (SMEs) are significantly less likely to use artificial intelligence (AI) technologies than large companies. However, company size has little to no influence on companies' acceptance of AI technologies. There must therefore be barriers and obstacles that specifically prevent SMEs from using such tools. This study identifies and structures the "10 main obstacles" in the form of an "SME implementation journey" based on the current state of research and derives recommendations for action.

Keywords: artificial intelligence, SME, digital transformation

1. Introduction

Around 80% of SMEs do not yet use AI — what prevents them?

According to the Federal Statistical Office, an average of 20% of German companies used artificial intelligence (AI) in 2024, significantly more than in the previous year (12%). This figure was 48% for large companies, 28% for medium-sized companies, and only 17% for the many small companies (Destatis, 2023; Destatis, 2024). Apparently, many of these small and medium sized enterprises (SMEs) are trying to solve their AI projects solely internally rather than handing over (some) control to external service providers (Reder et al., 2018).

The current range of AI tools and technologies, which includes machine learning, robotics, and artificial neural networks among others, promises positive effects in terms of increased efficiency, innovation, risk management, and optimization of business processes in many areas (Friedl, 2019; Mehta & Senn-Kalb, 2023; Nuhiu & Aliu, 2024; Berg, 2022). In controlling, for example, the use of AI enables enterprises to create budgets that go far beyond traditional corporate planning and dynamically take market changes into account in real time (Dillerup et al., 2020; Friedl, 2019). Interestingly, company size appears to have little to no influence on companies' acceptance of AI technologies (Reder et al., 2018).

Consequently, barriers and obstacles must exist, that specifically prevent SMEs from using AI technologies. Although some studies have investigated possible causes, the results of these studies vary considerably (Destatis, 2024; Raab, 2022). The following section systematizes possible barriers and obstacles, including specific starting points for SMEs to overcome them.

Some of the most commonly used large language models (LLMs) were asked: "What specific reasons prevent small and medium-sized enterprises from using AI technologies on a larger scale?". The following Table 1 shows the results.

Table 1. LLM search for 10 main obstacles (own search from February 13, 2025)[1]

Obstacle	Large Language Model (LLM)		
	OpenAI GPT-4o	Microsoft Copilot	Google Gemini
1. Legal and regulatory framework	x		x
2. Data security	x		x
3. Objective			x
4. Skills	x	x	x
5. Teamwork and culture	x	x	x
6. Data availability and structure	x		x
7. The "right tool"			x
8. Black box risk	x		
9. Gradual implementation	x		x
10. Cost-benefit analysis	x	x	x

It is interesting to note that some of the models listed a comprehensive number of specific reasons. For better illustration, these have been transferred to the scheme of "10 main reasons" in Figure 1. However, none of the models succeeds in listing all particularly relevant reasons, let alone presenting them in a logically structured form.

Based on current studies, however, the "10 main obstacles" can be identified and logically structured in the form of an "SME implementation journey":
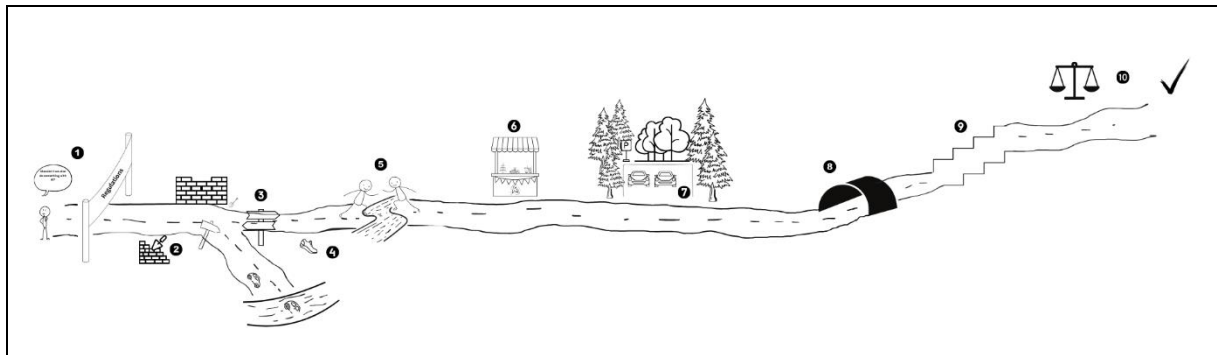

Figure 1. Implementation journey (own representation, visualization revised using Canva)

1: Legal and regulatory framework; 2: Data security; 3: Objective; 4: Skills; 5: Teamwork and culture; 6: "Provisions": Data availability and structure; 7: Not seeing the forest for the trees — the "right" tool; 8: Black box risk; 9: Gradual implementation; 10: Cost-benefit analysis.

2. Main Obstacles

Obstacle 1 "Legal and regulatory framework" and 2 "Data security"

Over 60% of companies refrain from using AI and related technologies due to regulatory requirements and IT security concerns, among other reasons (Wintergerst, 2023a; Berg, 2022; Raab, 2022). Often, there is a lack of knowledge about how to deal with potential security vulnerabilities and how to remedy them (Reder et al., 2018). Unauthorized access and manipulation pose a direct risk in this regard. In addition, companies are often interconnected with suppliers or customers and across the value chain, which further intensifies this problem (Ottersböck et al., 2023). According to a VDE study from 2019, however, the main cause of data protection problems, including those relating to AI systems, lies in human error (VDE, 2019). Special employee training can offer significant added value here, particularly for SMEs with smaller IT departments.

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[1] The shown results have to be understood as illustration and do not claim to be exhaustive. Please note that repeated use LLMs may produce different results.

The hurdle of regulation and data security affects all companies almost equally, regardless of their size (Destatis, 2024). Although this places extensive demands on companies, these risks are generally well assessable and therefor manageable. Of course, the associated costs must be fully taken into account in a cost-benefit analysis (see obstacle 10).

Obstacle 3: "Objectives"

As in all other areas, the same applies to the introduction of AI: First, the focus is on definition and clarification of your own business needs: "What do we want to achieve or improve?" Only then the market situation in terms of potential providers and technologies is to be analysed. Furthermore, a detailed examination of the company's own data situation has to be conducted (Metternich et al., 2021). Following this chronology ensures a well-founded strategic decision for a specific AI tool instead of blindly following a trend and possibly making economically irrational decisions.

Obstacle 4: "Skills" and 5: "Teamwork and culture"

Digital transformation requires new skills that employees must learn. However, the focus is less on "hard" skills such as programming or statistics but rather on "soft" skills such as interpretation with contextual knowledge, emotional intelligence and communication (Egle & Keimer, 2021; Reder et al., 2018).

In addition to empowering individuals, interdisciplinary teams can contribute significantly to success, as the criteria for successfully introducing and working with AI tools go far beyond specific technical skills (Reder et al., 2018). For SMEs, this often means reorganizing their existing organizational structure in a less line-oriented and more project-oriented or matrix-based manner. In addition, it seems necessary for many SMEs to undergo a significant cultural change toward "boldly trying out" new technologies and approaches (Reder et al., 2018). Such a cultural change could have the positive side effect of making SMEs more attractive as employers for younger generations and thereby counteracting the current shortage of skilled workers.

Obstacle 6: "Data availability and structure"

AI tools are highly dependent on the quality of the data with which they are trained. If the data is incorrect, incomplete, or outdated, the results of AI models can provide inaccurate or misleading recommendations (Braun & Follwarczny, 2021; Gläß, 2018; HORIZONT Online, 2023). Especially when real-time data analysis is used and automated decisions are made, it is almost impossible to spot and fix errors in the database retroactively (Kajüter et al., 2019). Both, high design quality (which data in which quantity etc.) and high conformity quality (up-to-date, complete etc.) are essential for good results (Heinrich & Klier, 2009; Gronau et al., 2016; Schäffer & Weber, 2016). Companies can particularly face challenges in this context, when transferring data from external sources into a usable database for AI tools (Dillerup et al, 2020).

The lack of data alone can often be a reason for companies not to use AI tools (Raab, 2022). Beyond that, the described interrelated aspects of data management often represent the decisive hurdle to the successful introduction of AI (Berger, 2024).

Obstacle 7: "The right tool"

Even if data quality is not an obstacle, it is clear that many companies do not know which technologies are required for their specific projects — also because the terms used in the field of AI are often not clearly defined (Reder et al., 2018). At this point, it can be useful to seek external assistance in navigating the rapidly developing and changing market. At least until a certain level of market maturity and consolidation has been achieved and AI providers also focus on SMEs as a potential customer group. However, it is important not to completely commit to a single technology (yet), as the market is subject to significant change (see f. ex. Klein et al., 2023; Lee & Whitaker, 2022).

Obstacle 8: "Black box risk"

The "black box risk" refers to the opacity and unclear responsibilities within an algorithm, which often occurs in the field of deep learning. That makes it difficult to interpret how AI works, as decision-making processes in self-learning systems are often not traceable (HORIZONT Online, 2023; Metha, 2023; Wigmore, 2021; Kreutzer & Sirrenberg, 2019).

There is a risk that unnoticed errors in the algorithm can lead to incorrect results, which can be particularly problematic for companies with specific accountability obligations. In addition, the software may be unintentionally biased due to its programming (Märki & Johannssen, 2020; Wigmore, 2021; Mehta, 2023). However, it is important to note that human employees also make mistakes and are not always impartial and unbiased.

One possible solution to this problem is explainable AI (XAI), which promises transparent decision-making for the black box problem (Buxmann & Schmidt, 2021; Mehta, 2023). However, this approach inevitably requires

compromises between model complexity and explainability (Mehta, 2023).

Obstacle 9: "Gradual implementation"

Pilot projects and training courses on how to use AI can help to counteract the problems described above. It is advisable to start with less complex use cases in order to get familiarized with machine learning (Manage it, 2020). The extent to which external support is used must always be weighed up on a case-by-case basis, given that the data involved is sometimes highly sensitive (Meyer & Seiz, 2020)[1].

Obstacle 10: "Cost-benefit analysis"

There is a clear upward trend in companies investing in artificial intelligence and related technologies (Meyer & Seiz, 2020). However, compared to other investments, these are often complex decision situations with potentially high investments. This is a major problem for SMEs in particular, in addition to the lack of expertise and the associated need for new, specially trained employees (Egle & Keimer, 2021). Future savings, especially in the form of personnel cost savings, are generally cited as expected payback. However, it remains to be seen whether future developments will confirm the often high expectations (Wintergerst, 2023b). For example, a 2021 study suggests that AI systems may not lead to job cuts in controlling departments, but rather to an expansion of the departments (Egle & Keimer, 2021).

Ultimately, investments in AI technologies must also exceed their costs. This basic economic principle must be kept in sight besides all the euphoria.

3. Takeaways

As with many technological innovations, it is important for all companies to take a structured approach to the topic of AI implementation. Euphoria, fear of missing out, and blind activism will not lead to success when introducing AI technologies. The implementation path outlined above, with its 10 main obstacles, can help SMEs in particular to consider important success criteria and not lose sight of economic success as a target.

As of today, many companies are trying to solve their AI projects internally for the reasons mentioned above and are not handing over control to external service providers (Reder et al., 2018). This often leads to AI implementations stalling and being postponed. However, a clear distinction should be made in which situations these reasons are valid and in which they are not. Non-profit institutions, such as universities or Fraunhofer Institutes for example, should also be considered as external consultants. This could, especially for SMEs, be a key to success, as limited economic resources and a lack of expert knowledge often put them at a disadvantage due to their size.

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[1] At this point, reference should also be made to the guidelines for the introduction of AI tools published by the German Academy of Science and Engineering (acatech) in cooperation with the Technical University of Darmstadt, which propose a three-step approach. See Metternich et al., 2021, among others.

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Achieving Climate Governance in Cameroon: Challenges and Prospects

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Abstract

Climate change poses risks including economic output losses, heightened poverty, food insecurity, and increased vulnerability of communities, which are compounded by institutional weaknesses and policy gaps. The research problem centers on Cameroon's fragmented and insufficient climate governance framework, characterized by weak legal regulations, poor coordination among institutions, inadequate integration of climate concerns into public financial management, and limited resources for climate action. The main objective is to identify key challenges obstructing effective climate governance while exploring prospects and strategies for improvement. The study employs a qualitative approach, analyzing climate policies, legal frameworks, and stakeholder engagements to assess governance dynamics. Major findings reveal institutional capacity deficits, lack of comprehensive regulatory frameworks, fragmented policy implementation, limited climate finance, and coordination challenges across levels of government. The study concludes that despite notable progress in policy development and international commitments, Cameroon's climate governance remains hindered by systemic barriers. It recommends strengthening institutional capacities, enacting binding climate laws, enhancing coordination mechanisms, mainstreaming climate change into public finance and development planning, and mobilizing diversified climate finance to build resilience and promote sustainable development in the face of climate change.

Keywords: climate, governance, climate governance, challenges, prospects

1. Introduction

The effectiveness of strategies implemented to achieve climate governance in Cameroon is a critical area of inquiry given the country's vulnerability to climate change and its significant socio-economic impacts. Cameroon, often described as "Africa in miniature" due to its diverse geography and climate zones, faces increasing challenges such as floods, landslides, and agricultural disruptions that threaten development and livelihoods for over 70% of its population dependent on agriculture. The government has recognized climate change as a key challenge within its National Development Strategy (SND30) and Vision 2035, emphasizing adaptation and mitigation as essential for sustainable and inclusive growth. Despite important steps in establishing institutional frameworks such as the National Climate Change Adaptation Plan and updated Nationally Determined Contributions (NDC) and sectoral strategies in forestry, agriculture, energy, and waste, Cameroon still grapples with gaps including the absence of comprehensive climate legislation, limited regulatory

enforcement at local levels, and challenges in coordination and financing.

2. Challenges Encounter in Achieving Climate Governance in Cameroon

Cameroon faces significant challenges in climate governance, including weak institutional frameworks, limited private sector involvement in climate financing, and the need for better integration of climate considerations into public financial management.[1] However, there are also prospects for improvement, such as the country's commitment to reducing greenhouse gas emissions, ongoing efforts to build resilient infrastructure and agriculture, and increasing awareness of the need for climate action.

2.1 Weak Legal and Institutional Frameworks

Despite some progress, Cameroon lacks a comprehensive regulatory framework for integrating climate change into public policies, planning, and budgeting.[2] There is still a lack of a comprehensive legal and regulatory framework governing climate reforms. Climate considerations are yet to be effectively integrated in the Public Financial Management (PFM) framework, including in fiscal planning and public investment management.[3] The government also faces capacity constraints and lacks an effective coordination mechanism; it is yet to operationalize its institutional and governance frameworks to respond to climate challenges.[4] Cameroon's current legal framework addresses climate change issues only implicitly and in an unstructured manner. Existing laws are insufficient to comprehensively tackle climate challenges, which hinders effective and immediate responses to climate impacts. However, this gap also presents an opportunity to develop new, more coherent, and targeted climate legislation.[5]

Even where laws exist, weak enforcement, corruption, and lack of coordination among government agencies significantly undermine climate governance. There is no effective institutional framework to integrate climate change into public financial management, planning, or investment decisions, leading to duplication of efforts and poor resource allocation.[6] The effectiveness of climate governance in Cameroon is undermined by weak institutional capacity, fragmented responsibilities among government agencies, and limited coordination between local and national levels.

2.2 Limited Private Sector Participation

The private sector's contribution to climate financing remains low, with public funds and international sources dominating. Achieving climate governance will not be possible without private sector involvement. Going forward, mobilization of private sector financing will be key to address climate related challenges. Climate Policy Initiative estimates that in 2019-20, private financing only accounted for about 2.6 percent of total mobilized climate financing.[7] Therefore, participation of the private sector poses a significant challenge to implementing climate policies in Cameroon. Moreover, partnerships with businesses and industry associations can promote sustainable practices, technological innovation, and investment in low-carbon solutions[8]. There is a need for a dynamic and competitive private sector to achieve long-term economic growth and support the country's climate agenda. However, private sector's involvement in climate considerations has so far been limited.[9]

Among other obstacles, private sector has been constrained by weaknesses in the national Public - Private - Partnerships (PPP) framework. Although the legal framework for PPPs has been in place for over a decade, management of PPPs varies among sectors, with some line ministries and agencies conducting PPPs autonomously without involvement of national PPP structures.[10] Sectoral governance issues, such as in the

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[1]   MINPT, (2020). Presentation du reseau routier Camerounais au 30 Juillet 2020. https://www.mintp.cm/fr/projets-realisations/presentation-du-reseau-routier (Accessed on 15/6/2025)

[2] African Development Bank Group, (2023). Rapport Pays 2023 - Cameroun - Mobiliser les financements du secteur prive en faveur du climat et de la croissance verte. African Development Bank Group. https://www.afdb.org/ (Accessed on 18/6/2025)

[3] Beck, H., Zimmermann, N., McVicar, T. et al., (2018). Present and future Koppen-Geiger climate classification maps at 1-km resolution. *Scientific Data*, 5, pp. 18-34, 30.

[4] *Ibid.*

[5] Bottom-up climate. https://cdkn.org/sites/default/files/files/Cameroon_Booklet_WEB.1-1.pdf (Accessed on the 18/6/2025)

[6] *Ibid.*

[7] AfDB (2023).

[8] Agence Française de Developpement. Cameroon. https://www.afd.fr/en/page-region-pays/cameroon (accessed: 11/6/2025)

[9] *Ibid.*

[10] UNDRR and CIMA (2019). Cameroon Disaster Risk Profile. And MINTP (2020).

energy sector and ports, may send negative signals to prospective investors. Therefore, a comprehensive review of the PPP framework and its implementation, including funding for the Support Council for the Realization of Partnership Contracts, the PPP unit, would support the development of climate-smart infrastructure projects.[1] It will be critical to ensure a uniform and efficient implementation based on the capacity and convening power of the national PPP structure, line ministries, and agencies, as well as developing a PPP pipeline based on sector assessments, to create a roadmap for mobilizing private financing.[2]

2.3 Corruption

Corruption undermines the enforcement and implementation of climate laws and policies in Cameroon. Legal frameworks are weakened by abuse of power and lack of transparency, which lead to mismanagement of climate funds and ineffective regulatory oversight. Corruption erodes public trust and deters stakeholder participation, further weakening climate governance. The absence of strong anti-corruption measures within climate legislation and enforcement mechanisms contributes to this challenge.[3]

2.4 Inadequate Integration of Climate into Public Financial Management

Climate change considerations are not adequately integrated into public investment management and project cycles. From a legal standpoint, Cameroon lacks a regulatory framework that requires the integration of climate change considerations into its PFM system. Climate risks are not incorporated into fiscal planning,[4] budgeting, or public investment management. Laws do not mandate the classification or monitoring of climate-related expenditures, nor do they require climate risk assessments in project selection or procurement processes.[5] This legal gap prevents effective prioritization and tracking of climate finance, limiting transparency and accountability in public spending on climate actions.[6]

2.5 Deforestation

Rapid deforestation hinders Cameroon's ability to achieve its mitigation goals. Rapid deforestation hampers Cameroon's ability to achieve its mitigation objectives. Cameroon has large areas of rainforests of the Congo Basin, the second largest rainforest in the world. It covers about 40 percent of its territory, but unfortunately is subject to considerable deforestation problems related to logging and farming, ineffective forest management, climate change, and growing population. Despite the authorities' conservation efforts, annual rate of deforestation is around 0.6 percent and exceed the rate of reforestation of only 0.1 percent.[7] Given the role of the rainforest in mitigating the climate change, protecting the rainforest and reforestation policies can play a crucial role in addressing climate challenges. Forest conservation and sustainable forest management are also components of Cameroon's NDC. Further strengthening forestry governance and law enforcement against illegal logging would support the policies to reduce deforestation. Promoting ecotourism would also make the rainforest more valuable and be part of the conservation strategy.[8]

2.6 Climate Risks

Intensifying climate risks, including rising temperatures, increased extreme weather events, and their impact on livelihoods, food security, and displacement, pose significant challenges. Climate change is an imminent threat to the people and the economy of Cameroon[9]. It is expected to result in significant output losses, exacerbate

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[1] *Ibid.*

[2] Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung. Cameroon. https://www.bmz.de/en/countries/cameroon (accessed: 11/6/2025)

[3] Bottom-up climate legislation in Cameroon. https://legalresponse.org/wp-content/uploads/2018/05/Cameroon_Booklet.pdf (Accessed on 22/6/2025)

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[6] climate change in Cameroon - IMF eLibrary. https://www.elibrary.imf.org/downloadpdf/journals/002/2024/052/article-A003-en.pdf (Accessed on 18/6/2025)

[7] NDC 2021, FAO 2020.

[8] Trisos, C. H., Adelekan, I. O., *et al.*, (2022). *Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, p. 123.

[9] *Ibid.*

poverty and inequality, food insecurity and conflict risk, leading to increased population displacement.[1] Climate-related losses in output would impede export capacity, and may increase imports either to cope with food, sanitation and health needs during crises or to invest in rebuilding after crises. Therefore, climate change will also increase balance of payments needs and require fiscal space. Social and economic impact would affect human capital accumulation, jeopardize development, and hinder inclusive growth.[2]

Cameroon is ranked 16th most vulnerable to impacts of climate change globally. Climate hazards are getting more severe in Cameroon. Temperatures are getting progressively warmer, with the temperature increase especially pronounced in recent years, and this trend is projected to continue. While precipitation projections are less certain, models predict an increase in the number of heavy precipitation days.[3] Extreme weather events, such as droughts and floods, are increasingly reported-with the number of recorded events doubling in the past three decades.[4] These changes have a significant impact on the society and the economy, causing both immediate damages and long-term output losses. Climate change is projected to cause a GDP loss between 4 to 10 percent by 2050, with larger output losses in the most pessimistic scenario and if no adaptation action is taken- according to the World Bank CCDR.[5]

While some areas are less vulnerable to climate risks, all regions face their specific challenges, and failing to address them may lead to spillovers to other regions and the economy as a whole. Northern regions in the desert and semi-arid areas are most vulnerable to climate change and exposed to droughts and desertification. Historically, between 20 and 50 percent of the Extreme North's population has been affected by droughts.[6] Central and coastal regions experience heavy rainfalls and floods, which often take lives and damage vital infrastructure. The sea-level rise damages Cameroon's coastline and will continue causing coastal erosion. South Cameroon is the least affected by climate events, but deforestation and mining activities undermine conservation efforts of the second largest carbon sink of the world, the Congo Basin.[7]

2.7 Low Adaptation and Mitigation Efforts

World Bank Climate Change and Development Report (CCDR) estimates that Cameroon will incur GDP loss ranging from 4 to 10 percent in the most pessimistic scenario by 2050 due to climate change if no adaptation action is taken.[8] Cameroon is vulnerable to climate change and natural disasters, in particular, through its impact on human capital and economic sectors such as agriculture and infrastructure.[9] Being a hydrocarbon producer and exporter, the country should also advance its mitigation efforts and reforms to further energy transition, as the global low carbon transition could lead to spillovers risks, including to the country's financial stability.

2.8 Mobilizing Climate Finance Is a Serious Challenge for the Authorities

In the near term, the main source of climate-related financing will likely remain donor financing. Going forward, Cameroon needs to develop its capital markets to harvest the potential private funding for climate investments and engage the private sector in supporting its climate agenda.

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[1] Tomalka, J., Lange, S., Gleixner, S., Gornott, C., (2022). *Climate Risk Profile*: Cameroon (Climate Risk Profiles for Sub-Saharan Africa), Potsdam: A joint publication by the Potsdam Institute for Climate Impact Research (PIK), the German Federal Ministry for Economic Cooperation and Development (BMZ), the Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH and the KfW Development Bank, p.12.

[2] *Ibid.*

[3] Potsdam Institute for Climate Impact Research, 2022, Climate Risk Profile: Cameroon.

[4] IDMC (Internal displacement monitoring center). Cameroon | IDMC - Internal Displacement Monitoring Centre (internal-displacement.org); EM-DAT.

[5] *Ibid.*

[6] Pathway for Net Zero Policies: Aligning Nationally Determined... http://www.globalscientificjournal.com/researchpaper/Pathway_for_Net_Zero_Policies_Aligning_Nationally_Determined_Contributions_NDCs_for_Holistic_Sustainable_Development_in_Cameroon.pdf (Accessed on 18/6/2025)

[7] World Bank CCDR, (2022). The results are reported for three Representative Concentration Pathways—RCP2.6, RCP4.5 and RCP8.5, the largest effect being under RCP8.5.

[8] United Nations Office for the Coordination of Humanitarian Affairs (OCHA), (2022). Cameroon: Humanitarian Dashboard. https://reliefweb.int/report/cameroon/cameroon-humanitarian-dashboard-january-march-2023 (Accessed on 17/6/2025)

[9] World Bank Group, Climate Change Knowledge Portal, (2023). URL: https://climateknowledgeportal.worldbank.org/. (Accessed: 17/6/2025)

Mobilizing adequate climate finance remains a serious legal and institutional challenge. Cameroon's NDC[1] estimates adaptation financing needs at over US\$32 billion until 2030, but the lack of a comprehensive legal framework to facilitate access to international climate funds and to regulate domestic climate finance flows hinders mobilization. Weak legal provisions for financial incentives, public-private partnerships, and climate budgeting limit the authorities' ability to attract, manage, and deploy sufficient resources for climate projects. Furthermore, the absence of clear legal mandates for climate finance coordination and accountability complicates effective fund management.[2]

2.9 Resource Constraints and Dependence on External Funding

First, both central and local governments face resource and technical capacity constraints in implementing adopted plans. Second, there is still no comprehensive regulatory framework that would require to integrate climate change into the government's policy, planning instruments and processes[3]. Finally, there is a lack of an effective coordination mechanism across arms and levels of government. This leads to duplication of functions and mandates with other agencies, which warrants clearly defining roles and responsibilities across ministries and designing appropriate coordination processes.[4] Cameroon's climate governance is hindered by limited financial and technical resources at both central and local government levels, which impairs the implementation of climate policies and plans.[5] The absence of a comprehensive legal framework mandating resource allocation for climate action exacerbates this problem. Without legally binding obligations to allocate sufficient budgetary and technical support, climate initiatives remain underfunded and poorly executed, undermining adaptation and mitigation efforts.[6]

Mobilizing adequate climate finance remains a critical challenge. Cameroon heavily relies on donor funding, with limited domestic capital markets and private sector engagement for climate investments[7]. Weak public-private partnership frameworks and fuel subsidies further complicate mitigation efforts. This financial gap restricts the scaling up of adaptation and mitigation initiatives necessary to meet national and international commitments.[8]

2.10 Governance Challenge at Local and Upon Level

Governance issues such as inadequate urban planning, bureaucratic inefficiencies, corruption, and limited local autonomy increase vulnerability to climate risks like floods and landslides in Cameroon's cities. These challenges reduce resilience and complicate the implementation of climate adaptation strategies at the grassroots level, highlighting the need for decentralization and improved local governance capacity.[9]

Many climate-related policies and programs in Cameroon do not explicitly address climate change or are poorly coordinated across ministries and stakeholders. Interaction between government and NGOs is limited, and public participation is low.[10] This fragmentation, coupled with weak enforcement and communication, undermines the effectiveness of climate governance and adaptation efforts. Inclusive, transparent, and participatory governance is essential to build resilience and ensure equitable climate action.[11]

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[1] Challenges and barriers to implementing cameroon's ndc insights... https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5181225 (Accessed on 18/6/2025)

[2] *Ibid.*

[3] Centre for Research on the Epidemiology of Disasters (CRED), (2023). EM-DAT: The Emergency Events Database. https://www.emdat.be/ (Accessed on 18/6/2025)

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[5] Bottom-up climate. https://cdkn.org/sites/default/files/files/Cameroon_Booklet_WEB.1-1.pdf (Accessed on 18/6/2025)

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[11] Climate change / Cameroon | Interactive Country Fiches. https://dicf.unepgrid.ch/cameroon/climate-change (Accessed on 22/4/2025)

3. Prospects for Climate Governance in Cameroon

Cameroon has made significant progress towards achieving climate governance in Cameroon. These progress stems from the various strategies adopted so far as discussed under the chapter three of this research work. However, below are some of the Prospects for achieving effective climate governance in Cameroon.

3.1 Commitment to Emission Reduction

Cameroon has committed to a 35% reduction in greenhouse gas emissions by 2030 as part of its updated Nationally Determined Contributions (NDCs). However, this commitment is conditional on the availability of financing, which remains a significant challenge. Legally, Cameroon lacks a comprehensive regulatory framework mandating public institutions to integrate climate change into policy, planning, and budgeting processes[1]. Most sectors also lack legislation supporting adaptation and decarbonization goals, which weakens enforcement and accountability mechanisms for emission reductions. Strengthening laws to require climate integration in public policy and establishing clear legal mandates for emission reduction are critical to making hi hi vi this commitment effective.[2]

3.2 Focus on Adaptation

Cameroon emphasizes enhancing adaptation efforts in agriculture and infrastructure, recognizing their importance for long-term economic health. Adaptation is recognized as a key pillar in Cameroon's climate strategy, with the National Climate Change Adaptation Plan (2015-2019) and sectoral strategies addressing agriculture, forestry, and water. Legally, the institutional framework is evolving, with the Ministry of Environment and its agencies playing central roles.[3] However, there is no overarching law that compels sectors to mainstream adaptation into their policies. The absence of formal mechanisms for consultation and monitoring limits adaptive governance. Legal reforms to institutionalize adaptation planning and ensure cross-sectoral integration, backed by enforceable mandates, would enhance resilience to climate impacts.

3.3 Legal and Institutional Reforms

There is a push for legal and institutional reforms to improve policy coordination, monitoring, and the enabling environment for private sector involvement in climate action[4]. Cameroon took important steps towards building its institutional framework governing climate policies[5]. The key climate change policy documents are the National Climate Change Adaptation Plan 2015-19, which is accompanied by a costed implementation plan, and Nationally Determined Contribution (NDC) updated in 2021[6]. Cameroon had signed key international conventions on climate change, has developed strategies in some sectors, e g., in agriculture and water. Several regional and municipal governments adopted local Climate Change Action Plans (CCAP).[7] The central role in Cameroon's NDC institutional mechanism was given to the Ministry of Environment, Nature Protection and Sustainable Development (MINEPDED) and its agency, the National Observatory on Climate Change (ONACC).[8] Cameroon has established a range of national policies aimed at addressing climate change, including the National Climate Change Adaptation Strategy, which highlights the need for integrated approaches to climate governance.

3.4 Territorial Focus

Inclusive climate action requires a territorial focus, considering regional vulnerabilities and building the capacity of regional and local institutions. Cameroon's climate governance recognizes the importance of local and regional actions, with several regional and municipal governments adopting local Climate Change Action Plans (CCAPs). Legally, decentralization is part of the National Development Strategy (SND30), which could empower territorial authorities in climate governance. However, the effectiveness of territorial focus depends on

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[1] World Bank Document. https://documents1.worldbank.org/curated/en/099950111012212064/pdf (Accessed on 17/6/2026)

[2] Urban Governance and Climate Resilience in Cameroon. https://revues.imist.ma/index.php/AJLP-GS/article/view/52589 (Accessed on 18/6/2025)

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[4] UNICEF, (2021). The Climate Crisis Is a Child Rights Crisis: Introducing the Children's Climate Risk Index.

[5] *Ibid.*

[6] Osano, P., (2022). *Climate change amplifies the risks for violent conflicts in Africa*, p. 89.

[7] OECD, (2023). Development Assistance Committee (DAC) Statistics Database. https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/ (Accessed on 12/6/2025)

[8] *Ibid.*

clear legal frameworks that define roles, responsibilities, and resource allocation at sub-national levels. Without such legal clarity and capacity building, territorial initiatives risk fragmentation and underperformance. Strengthening laws to support decentralized climate governance and ensuring coordination between national and local levels is essential.[1]

3.5 Private Sector Engagement

Mobilizing the private sector is crucial for climate financing, requiring a change in the public-private partnership framework and access to long-term funding. The private sector's role in climate governance in Cameroon is currently marginal, contributing only about 2.6% of climate financing.[2] Legally, the existing Public-Private Partnership (PPP) framework is weak and inconsistently implemented across sectors, limiting private investment in climate projects. Institutional weaknesses and regulatory uncertainties deter private sector participation. To unlock private sector potential, Cameroon needs to strengthen its PPP legal framework, develop financial instruments such as green bonds, and create incentives for private investment in renewable energy, sustainable agriculture, and climate innovation. Legal reforms should also promote transparency, accountability, and risk mitigation to attract private capital.[3]

4. Conclusion

In conclusion, the effectiveness of the strategies implemented to achieve climate governance is a critical determinant of a country's ability to respond to the escalating challenges of climate change. While various policies, plans, and institutional frameworks have been established to guide climate action, their success largely depends on robust legal backing, clear coordination mechanisms, adequate resource allocation, and active stakeholder engagement. Effective climate governance requires not only setting ambitious targets but also ensuring transparency, accountability, and inclusiveness in implementation. The strategies must be adaptable to evolving climate realities and integrated across sectors and governance levels to maximize impact. Ultimately, continuous monitoring, evaluation, and reform of these strategies are essential to bridge gaps between policy intent and practical outcomes, thereby fostering sustainable development and resilience in the face of climate change.

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