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# A Comprehensive Categorization Framework for Interactive Fiction Games

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**Abstract**

A Comprehensive Categorization Framework for Interactive Fiction Games

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Interactive Fiction (IF) games are digital experiences that merge storytelling with interactive gameplay, allowing players to navigate and influence story-driven adventures. These games have evolved significantly, integrating advanced visual and interactive elements alongside traditional textual narratives, making them an intriguing area of study. However, currently, there are few structured frameworks designed for the systemic classification of IF games and it can be challenging to analyze these games holistically.

This thesis presents a comprehensive categorization framework for IF games, designed to facilitate systematic classification and analysis. Based on features derived from common video

game features, including human-computer interface, game genres, game mechanics, and business model, the framework supports the classification of IF games into distinct categories. This structured approach allows feature-based examination and facilitates the holistic analysis of IF games and their evolution.

Validation for the proposed framework involved three rounds of sampling and categorizing IF games. The first round sampled popular IF games developed based on well-established game engines to demonstrate the fundamental validity of the framework. The second round sampled popular IF games over time for insights into potential trends as IF games continue to develop and evolve. The third round was based on popular IF games developed by the same studio to examine the potential trend of IF games after removing the bias of developers.

The three rounds of sampling and categorizing reveal potential patterns and trends that enhance the understanding of IF games. Key insights include the trends from text-only to image-based or even animation-based output, from no or little towards more sophisticated support for stats and resource management, and the potential overlapping and merging of IF and action-adventure games. These insights can serve as references for future IF game development.

These findings demonstrate that the proposed framework is an effective tool for systematic analysis that can offer valuable insights into the development and trends of IF games. Since classification involves subjectivity, future work should repeat the process based on stakeholders with distinct backgrounds, e.g., publishers, developers, and gamers. Additionally, the proposed framework is but a first step and should be continuously reviewed and refined.

**Keywords:** Interactive Fiction, IF, Visual Novel, Game, Categorization, Framework

# TABLE OF CONTENTS

List of Figures .....	v
List of Tables .....	vi
Chapter 1. Introduction .....	1
1.1    The Research Goals .....	2
1.2    Paper Structure.....	4
Chapter 2. Related Work.....	5
2.1    Ad hoc Approach .....	5
2.2    Limited Scope Approach .....	6
2.3    Systematic Approach .....	7
2.4    Summary .....	8
Chapter 3. Guidelines and assessment criteria.....	10
3.1    Guideline for Development.....	10
3.1.1    Mutually Exclusive and Collectively Exhaustive .....	10
3.1.2    The Number should be Limited .....	11
3.1.3    Intuitive .....	11
3.2    Assessment Criteria .....	12
3.2.1    Inclusive.....	12
3.2.2    Support Systematic Analysis .....	12
3.2.3    Allow Insights into IF Games.....	12

Chapter 4. The Proposed Categorization System .....	14
4.1    Categorization Approach .....	14
4.2    Further Clarification.....	15
4.3    Descriptions of the Identified Features.....	16
4.3.1    User Input.....	16
4.3.2    Visual Output .....	16
4.3.3    Story Option.....	17
4.3.4    Story Ending .....	17
4.3.5    Time to Respond.....	18
4.3.6    Stats Management & Resource Management.....	18
4.3.7    Number of Players .....	19
4.3.8    Platform Compatibility .....	19
4.3.9    Monetization Model.....	20
4.4    Summary.....	20
Chapter 5. First Round: Categorization based on game engines .....	21
5.1    IF Game engines .....	21
5.2    Sampling Process and Results .....	23
5.3    Observation from Classification Results .....	24
5.3.1    Observation on “User Input” .....	24
5.3.2    Observation on “Visual Output”.....	25
5.3.3    Observation on “Story Option”.....	25
5.3.4    Observation on “Story Ending” .....	25

5.3.5	Observation on “Time to Respond” .....	25
5.3.6	Observation on “Stats Management and Resource Management” .....	26
5.3.7	Observation on “Number of Players” .....	26
5.3.8	Observation on “Platform Compatibility” .....	26
5.3.9	Observation on the “Monetization model” .....	26
5.4	Summary .....	27
Chapter 6. Second Round: Categorization based on time.....		28
6.1	Sampling Results .....	28
6.2	Observation from Classification Results .....	29
6.2.1	Observation on “User Input” .....	29
6.2.2	Observation on “Visual Output” .....	29
6.2.3	Observation on “Story Option” .....	30
6.2.4	Observation on “Story Ending” .....	30
6.2.5	Observation on “Time to Respond” .....	30
6.2.6	Observation on “Stats Management and Resource Management” .....	30
6.2.7	Observation on “Number of Players” .....	31
6.2.8	Observation on “Platform Compatibility” .....	31
6.2.9	Observation on “Monetization Model”.....	31
6.3	Summary .....	32
Chapter 7. Third Round: Categorization based on Game Studio.....		33
7.1	Sampling Results of IF Games by Infocom.....	33
7.2	Sampling Results of IF Games By Her Interactive.....	34

7.3	Summary .....	35
Chapter 8. Conclusion.....		37
8.1	Additional Contributions: Insights into IF Games.....	37
8.2	Limitations: The Framework .....	38
8.3	Limitations: The Analysis.....	39
8.4	Future work.....	39
Bibliography .....		41
Appendix A.....		44
Appendix B.....		47
Appendix C .....		50

## LIST OF FIGURES

Figure 1.1. The user interface of Zork [2] .....	1
Figure 1.2. The user interface of Doki Doki Literature Club! [4] .....	2

## LIST OF TABLES

Table 4.1. Features for IF games .....	15
Table 5.1. Classification of 100 Games (Categories – Game Engine) .....	24
Table 6.1. Selection of Games according to Publish Years .....	28
Table 6.2. Categorization of Games Selected based on Publish years .....	29
Table 7.1. Infocom.....	33
Table 7.2. Nancy Drew .....	35
Table A.1. IF games sampled in the first round.....	44
Table B.2. IF games sampled in the second round .....	47
Table C.1. IF games developed by Infocom.....	50
Table C.2. IF games developed by Her Interactive .....	50

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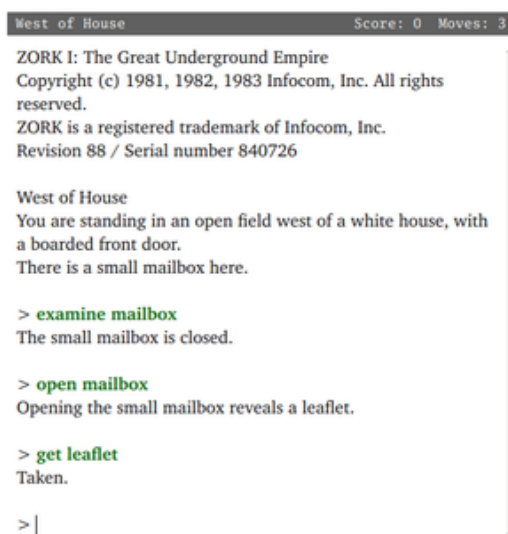
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## Chapter 1. INTRODUCTION

Interactive Fiction (IF) games [1] are digital experiences where players navigate and influence story-driven adventures. These games merge storytelling with interactive gameplay, creating an immersive and engaging experience that blurs the line between player and protagonist. Players' choices directly shape the outcomes, offering a sense of agency and involvement that enhances both entertainment and emotional engagement. Figure 1.1 shows a screenshot from one of the earlier and well-known examples, "Zork" [2], where players explore a fantasized world through textual commands.



```
West of House                               Score: 0  Moves: 3
ZORK I: The Great Underground Empire
Copyright (c) 1981, 1982, 1983 Infocom, Inc. All rights
reserved.
ZORK is a registered trademark of Infocom, Inc.
Revision 88 / Serial number 840726

West of House
You are standing in an open field west of a white house, with
a boarded front door.
There is a small mailbox here.

> examine mailbox
The small mailbox is closed.

> open mailbox
Opening the small mailbox reveals a leaflet.

> get leaflet
Taken.

> |
```

Figure 1.1. The user interface of Zork [2]

IF games first appeared in the early 1970s with "Colossal Cave Adventure [3]", a game where players explored and discovered a cave through text-only commands. Over the years, IF games have evolved significantly, with increased sophistication in storytelling and gameplay mechanics. This progression has also seen a shift from simple text parsers to more advanced systems incorporating visual elements, complex character interactions, and branching storylines. Figure 1.2 shows a screenshot from one of the popular IF games, "Doki Doki Literature Club!" [4] which consists of scenes with static two-dimensional images of characters in a first-person perspective, accompanied by occasional choices the player is required to make in order to advance the plot. IF games have transcended their niche status, becoming part of broader video game and storytelling

cultures. There are communities dedicated to creating, sharing, and experiencing IF across various platforms, including web browsers, mobile devices, and gaming consoles.



Figure 1.2. The user interface of Doki Doki Literature Club! [4]

Today, there is a wide variety of IF games, ranging from genres such as adventure, history, and romance [1]. These games differ in thematic content, player input modes, and output forms. To facilitate connections with players, IF communities have developed category tags for convenient searching based on familiar terms. While convenient for casual players, these ad-hoc search tags are not designed for systematic, in-depth analysis of existing games. For example, a game might be classified as both a "puzzle" and an "adventure" due to its mechanics and gameplay elements. These overlaps can lead to inconsistencies and confusion in scholarly discourse and among gaming communities, undermining effective analysis and discussion.

## 1.1 THE RESEARCH GOALS

This thesis presents a comprehensive categorization framework for IF games that can serve as the foundation for systematic investigations to classify and organize IF games and provide insights into patterns, trends, and potential directions for development. Based on a derived guideline, we propose a categorization system that classifies any given IF game, aiming to identify and compare the core features of all IF games.

The proposed categorization framework is validated by selecting more than 100 popular IF games from more than 10 popular IF game engines, and classifying these games based on the categorization framework. This exercise demonstrates that the proposed categorization framework can identify the core features of IF games and compare different IF games in a straightforward manner.

Additionally, and more importantly, apparent trends emerged when analyzing those IF games based on the proposed categorization system. For example, there seem to be trends of abandoning text-only input for mouse clicks, or replacing text-only output with more engaging images and animations.

To verify the observations of potential IF game trends over time, a second round of analysis is conducted to examine additional popular games selected based on their publication date. One interesting observation is that almost all the IF games we sampled only support single-player. It may be related to actual novel reading experience because novel reading often occurs in solitude. Another possibility is that there are obstacles to telling an interactive story when multiple players are involved. The results are somewhat surprising in that although IF games with image output are becoming more and more popular IF games with text-only output continue to exist. Additionally, animations are only beginning to appear and do not seem likely to replace image output in the near future. On the other hand, the popularity of IF games with more complex stats and resource management seems to indicate that there may be intersections between some IF and traditional action-adventure games.

These observations led to a third round of analysis focusing on popular IF games developed by the same company, including IF games developed by Infocom and the Nancy Drew Series. This last round of analysis shows that it may become increasingly challenging to differentiate between sophisticated IF games and traditional action-adventure games.

The contribution is a novel framework with intuitive and comprehensive features that is capable of identifying the historical evolution and potential future directions of IF games as a set of independent categories. The insights into the potential future directions might be helpful for developers to determine what kind of IF games to develop to gain bigger commercial success.

Moreover, this framework can serve as a convenient platform for classification, characterization, and systematic organization for wholistic understanding of and gaining insights into the IF genre. These capabilities are demonstrated in the validation process, where we are able

to classify a non-trivial number of IF games, discuss these games wholistically, draw observations, and gain insights. Our categorization might be able to incorporate machine learning algorithms to help recommend IF games for players.

It is important to recognize that this proposed categorization framework is an initial attempt. Even with special attention to details and processes, classification attempts can be relatively subjective. Nevertheless, the proposed framework can serve as an efficient and effective platform for systematic classification and organization. The framework facilitated three rounds of analysis, yielding observations substantiated by results from the classification. In this way, the proposed framework is a valid first step for classifying and organizing IF games. In the future, the categorization framework should be examined and refined by stakeholders from different backgrounds where the classifications could be performed independently multiple times by IF game publishers, developers, researchers, and other relevant parties.

## 1.2 PAPER STRUCTURE

In the rest of this thesis, section two provides a comprehensive survey of related work. Section three analyzes and proposes a set of features to evaluate the categorization and a set of criteria to evaluate the categorization framework. Section four presents the categorization framework for IF games. Sections five, six, and seven discuss the process and results from three subsequent rounds of sampling and classifying IF games based on the proposed framework. Section eight summarizes the classification results and concludes the thesis.

## Chapter 2. RELATED WORK

The origin of IF games dates back to the 1970s with "Colossal Cave Adventure" [3] by Will Crowther and Don Woods, often cited as the first IF game. This pioneering work introduced basic elements of IF, such as narrative prose intertwined with player input, setting the foundation for exploring virtual worlds in a gaming context. This was followed by a shift towards graphical adventure games in the late 1980s and 1990s [5]. Today's IF games, including titles like "80 Days" [6] by Inkle and "Her Story" [7] by Sam Barlow, showcase the genre's innovative potential. These modern IF games integrate narrative depth with interactive gameplay elements, including nonlinear storytelling and the inclusion of visual and audio components.

With the continuous evolution and so many categories, a comprehensive but also easy-to-understand categorization framework will be necessary so that any given IF game can be easily identified and compared. Over the past decades, many categorization methods have already been adopted and evolved, coming from IF game hosting websites, IF game developers, IF game researchers, etc. These previous works are important references where their strengths and shortcomings must be understood when developing a new categorization framework.

This chapter discusses previous IF game categorization results from three perspectives: ad hoc, limited scope, and, wholistic approach. By analyzing the pros and cons of these categorization results, we get inspiration about how to conduct the own categorization framework.

### 2.1 AD HOC APPROACH

An ad hoc approach to categorization is based on personal preferences and the specific needs of players or developers at the time. This method is flexible and adapts to changing trends and individual tastes.

On platforms like Steam [8], IF games are classified using broad genre and user-defined tags. These tags include narrative-focused labels like "Adventure" and "Story Rich" and gameplay mechanics tags like "Text-Based" or "Choices Matter." This ad hoc classification allows for a wide range but can be inconsistent and ambiguous. For instance, a game like "Zork" might be tagged as both "Adventure" and "Text-Based," where there is no definitive agreement on what "adventure" means. The broad tags often overlap, making it difficult for users to find specific types of games accurately. This method lacks precision and can lead to confusion.

The Interactive Fiction Database (IFDB) [9] offers a more refined categorization approach. It uses a mix of genre, gameplay, and narrative tags curated by the community. This leads to a comprehensive but sometimes complex system for classifying IF games, allowing users to filter by criteria such as “Puzzle,” “Fantasy,” or “Horror”. For example, the game “Photopia” [10] can be categorized under “Fantasy” and “Puzzle,” reflecting its multiple elements. However, the complexity of this system can be overwhelming for new users, and the extensive tagging can sometimes result in redundancy.

Forums like [intfiction.org](http://intfiction.org) [11] categorize IF games through discussion and community consensus. Dedicated threads discuss different types of IF games, game mechanics, and storytelling techniques. This grassroots approach creates a dynamic, evolving categorization system. For example, “Galatea” [12] might be categorized based on its unique conversation-driven mechanics and narrative style through community consensus. However, this method can be inconsistent and subjective, as it relies heavily on community participation and can vary with changes in community interest and focus.

## 2.2 LIMITED SCOPE APPROACH

An ad hoc approach helps IF game players find games quickly. However, due to the inherent potential for inconsistency and ambiguity, it does not align well with the needs of systematic analysis. Tags like “Adventure” and “Science Fiction” are useful but can also be ambiguous with the potential for inconsistency. A limited-scope approach targets precise analysis. This approach focuses on specific areas, enabling a clearer understanding of particular aspects of IF games.

Nick Montfort’s study, “Twisty Little Passages: An Approach to Interactive Fiction” [13], discusses how community categorizations reveal diverse criteria for genre classification. This highlights the multifaceted nature of narrative experiences in IF games, noting that genres range from traditional ones like Adventure and Drama to niche ones like Espionage and Horror. This research demonstrates a broad spectrum of storytelling possibilities within IF games. However, since it was research conducted in 2005, it failed to offer more updated insights, particularly since IF games are such a rapidly evolving field.

Michael F. Young's research paper, “Game Narrative, Interactive Fiction, and Storytelling: Creating a 'Time for Telling' in the Classroom” [14], presents a thoughtful framework of some considerations for educators aiming to incorporate IF games into their teaching methods. This

framework includes factors such as genre/theme, plot complexity, and game length. This research is very useful in the education environment. However, the scope is so focused that a bigger image fails to be discussed.

Emily Short's work [15] on interactive storytelling explores the intricacies of narrative design in IF games. Her research focuses on narrative techniques and player interaction, providing insights into how different storytelling methods impact player engagement. This approach emphasizes the importance of narrative depth and interactivity, offering a detailed analysis of storytelling within IF games. However, it doesn't cover other important aspects outside storytelling, such as user input and visual output.

### 2.3 SYSTEMATIC APPROACH

While a limited-scope approach provides an in-depth analysis of specific areas, the main limitation is not covering the full spectrum of IF games. In this way, the results from a limited scope also have limited applicability. For example, it is not possible to discuss Montfort results in the context of player interaction with the game, e.g., via text or mouse-click, or generalize Young's or Short's results to include trends toward graphical output.

Additionally, focusing on narrow aspects can result in fragmented knowledge and missed connections between different game types. For instance, Short mainly focuses on storytelling for IF games and fails to discuss other aspects that are also important for the success of an IF game. Therefore, a systematic approach is necessary for clear, distinct, and comprehensive categorization.

A systematic approach categorizes IF games intuitively, uniquely, and inclusively. It ensures each game fits into a single, well-defined category, where the categories do not overlap. This method allows researchers to study IF games' varieties and development trends more effectively. By providing a holistic view, it facilitates better analysis and comparison across different platforms and communities. Such a framework enhances research effectiveness and consistency, promoting a deeper understanding of IF games.

Wikipedia provides a categorization of IF games within the context of digital and video game history [1]. It emphasizes the evolution of the genre and notes significant titles and milestones. This perspective offers a historical categorization, grouping games by era, technological innovation, and impact on the genre. However, as a crowdsourcing platform, the accuracy and reliability of Wikipedia information can vary and may have some bias.

In the paper “Interactive Fiction” [16], Anthony J. Niesz explores important factors of IF games. However, it was published in 1984. Image-based IF games haven’t been popular back then. So such kinds of IF games are not fully discussed in this research.

In the paper “Toward a Theory of Interactive Fiction” [17], Nick Montfort explores the history and main aspects of IF games. However, it was published in 2011. IF games with complex resource management haven’t been popular back then. So such kinds of IF games are not fully discussed in this research.

In the paper "The Evolution of Interactive Fiction" [18], Gordon Howell explores the historical progression and categorization of IF games. Howell identifies several key types, including text-based adventures, graphic text-based adventure games, hypertext fiction, puzzle adventures, and games incorporating interactive movies. This research provides a clear framework for understanding different subgenres. However, it focuses primarily on historical and categorical aspects, potentially overlooking contemporary developments or player experiences in IF games.

## 2.4 SUMMARY

Ad hoc approaches to IF game categorization are guided by player communication and intuition rather than well-defined categories. This approach can lead to overlapping categories without clear delineation. Additionally, the lack of rigor in current methods results in arbitrary classifications without consistent criteria across platforms and communities. Many existing efforts do not include enough samples to validate their classifications. They often focus more on narrative development and game engine enhancement rather than rigorous analysis.

A limited-scope approach focuses on specific areas for in-depth analysis, enabling a clearer understanding of particular aspects of IF games. It highlights the multifaceted nature of narrative experiences and provides valuable insights into specific genres and educational applications. However, this approach does not attempt to cover the full spectrum of IF games, leading to an incomplete understanding of the genre.

In contrast, a systematic approach provides clear, distinct, and comprehensive categorization. It categorizes IF games intuitively and uniquely, ensuring each game fits into a single, well-defined category. This method allows researchers to study IF games’ varieties and development trends accurately. However, it can still be limited by the scope and predefined criteria used in the categorization process.

A comprehensive framework for categorization can streamline distinguishing between IF games, allowing researchers, players, and developers to navigate the diverse landscape by understanding each game's unique characteristics. This framework can serve as a valuable tool for developers, providing clear guidelines for clarifying the type of IF game they aim to develop. Understanding where their game fits within the broader ecosystem helps developers make informed decisions about human-computer interaction, game genre, game mechanics, and business models. Additionally, a comprehensive framework can guide developers in selecting the most appropriate game engine. Matching the specific requirements of their IF game with the capabilities of various engines optimizes the development process and enhances the player experience.

## Chapter 3. GUIDELINES AND ASSESSMENT CRITERIA

As discussed, the main concern with existing IF game categorization is the ad-hoc approach and limited scope. An effective IF game classification scheme should be purposefully defined and evolve as IF games continue to innovate and advance. Additionally, this evolution of the classification should be based on well-structured guidelines with systemic evaluation criteria to ensure that the resulting categorization framework remains focused on the objectives, being effective and consistent.

### 3.1 GUIDELINE FOR DEVELOPMENT

Establishing a set of guidelines for categorization development and evolution is essential as it can serve to ensure that the results align with the established norm in general taxonomy work, such as ensuring categorization is mutually exclusive and collectively exhaustive, benefiting both theoretical research and practical application [19]. To identify appropriate criteria, we conducted a comprehensive review of existing categorization methodologies across various fields, including consulting industry [19], information science [20], and design [21]. This interdisciplinary approach helped in formulating solid criteria. Once established, these criteria can be used to assess the effectiveness of the categorizations, ensuring they meet the specific needs of IF research and development.

#### 3.1.1 *Mutually Exclusive and Collectively Exhaustive*

We aim for the categorization system to have clarity and precision.

The mutually exclusive and collectively exhaustive (MECE) criterion is crucial for the categorization, ensuring clarity and precision. The consulting industry proposed MECE, which is used to define categories without overlap and ensure comprehensive coverage [19]. In the categorization framework, the mutually exclusive criterion ensures each IF game is placed into a single, well-defined category without overlap. Collectively exhaustive guarantees that the system encompasses all existing IF games, leaving non-unclassified. To apply this criterion, each game is evaluated against predefined category definitions covering all known IF features and themes. This

prevents ambiguity and redundancy, facilitating clearer analysis and comparison across IF games and engines.

The method, adapted from consulting practices, facilitates a clear and comprehensive categorization system, aiding in the analysis and comparison of IF games. For example, without this criterion, the categorization system can degenerate into the Ad Hoc approach, where new categories can be introduced that overlap with an existing one.

### 3.1.2 *The Number should be Limited*

We want the categorization system to be manageable and practical.

In the subject of information science, Robert J. Glushko proposed that the number of features and the number of categories under each feature should be limited to a manageable number [20]. In any categorization framework, too many categorizations are approximately equal to no categorization because the large number hinders efficient comparisons. Each category must be distinct yet comprehensive to include a diverse range of IF games. To apply this criterion, one must balance granularity with practical usability, typically limiting categories to a number that allows for effective analysis and comparison without overwhelming users. Working with a set of manageable numbers avoids diluting analytical value and enhances usability for researchers, developers, and players. This facilitates clearer communication and understanding of the IF domain.

We utilize this criterion to limit the features and categories we proposed to a reasonable number. For example, without this criterion, we may have too many categories which overwhelm the game players and game developers.

### 3.1.3 *Intuitive*

We want the categorization system to be manageable and practical.

The design industry proposed the criterion of “Intuitive” [21]. In the framework, we hope that the categorization system should be based on terms that are intuitive where typical players and developers can understand it quickly and correctly. The criterion of intuitiveness requires that categories within the classification system be immediately understandable. To apply this criterion, categories should have clear, descriptive labels and definitions reflecting common terminology and conceptual frameworks used in IF and game design. Intuitive categories ensure that the system

is user-friendly and effective in communicating complex information. This facilitates broader adoption and application across different areas of research and development in IF.

We utilized this criterion to ensure the framework is user-friendly and effective. For example, without this criterion, we may use some technical jargon or overly complex terms such as “Ludonarrative Dissonance” or “Procedural Rhetoric.” These terms may confuse users who are not familiar with advanced game design concepts, reducing the system’s effectiveness.

## 3.2 ASSESSMENT CRITERIA

In addition to deriving the guidelines for developing the features and their characteristics, we also need criteria to assess the categorization framework. The effectiveness of this framework depends on its ability to encompass diverse game types, facilitate systematic analysis, and offer insights into interactive fiction games.

### 3.2.1 *Inclusive*

This criterion ensures the categorization framework can support the classification of a large number of games. It must be broad enough to include a wide range of interactive fiction games, from text-based adventures to graphically rich IF games. By being inclusive, the framework can serve as a comprehensive tool for researchers, developers, and players, providing a solid basis for analyzing various game elements and trends.

### 3.2.2 *Support Systematic Analysis*

This criterion facilitates systematic analysis of many games, enabling the grouping of similar games, comparing and contrasting them, and providing categorical summaries. A systematic approach ensures that each game is evaluated consistently, based on clearly defined parameters. This allows for the identification of patterns and trends across different types of interactive fiction games, thereby contributing to a deeper understanding of the genre as a whole.

### 3.2.3 *Allow Insights into IF Games*

This criterion enables us to gain valuable insights into interactive fiction games. By categorizing games based on their core features and gameplay mechanics, we can uncover significant trends

and patterns that might not be apparent through casual observation. These insights can inform future game development, highlight areas for innovation, and deepen the understanding of player preferences and engagement within the genre.

## Chapter 4. THE PROPOSED CATEGORIZATION SYSTEM

This chapter introduces the approach to identifying core features of IF games and how to characterize these identified features.

### 4.1 CATEGORIZATION APPROACH

There are different strategies to categorize. One strategy is to compartmentalize and divide the domain into categories. This strategy is widely adopted in many disciplines, including biology [22] where the domain is organized according to non-overlapping characteristics into a taxonomic hierarchy. In this way, the characteristics of an entity dictate and identify distinct branches in the hierarchy. This approach is excellent for identifying uniqueness in a well-defined field [23]. An alternative strategy is to describe the domain by identifying the shared common features. This strategy is widely adopted in the machine learning field [24] where categorization is based on distinctions in the shared features [25]. In this way, all entities in a domain are characterized by the same set of features and categorization is based on differences in these features. This approach is excellent for comparing, contrasting, and identifying changes in an evolving field [24].

IF games are evolving with dynamically changing characteristics where new additions may appear unexpected. For example, IF games start with text output only. Later, image output appeared. In the past decade, animation also appeared in the visual output. So, a rigid taxonomic hierarchy is not appropriate. For this research, with the objectives of analyzing and gaining insights, comparisons of the IF games will be important and we choose to categorize based on describing the features.

We examined categorization strategies for general video games [26] to identify relevant features for interactive fiction (IF) games.

1. Human-Computer Interaction (HCI): HCI is crucial as it influences player engagement. We considered how player interaction with the game affects the overall experience.
2. Game Genres: We translated general game genres into IF-specific categories, such as story options and endings, to better fit the unique aspects of IF games.
3. Game Mechanics: We examined game mechanics from an IF context, focusing on elements that determine the playability and interactive nature of the games.

4. Business Model: We included the business model as a feature, considering its impact on the sustainability and development of IF games.

Additional features such as length of gameplay, targeted player demography, or narrative complexity that can also influence the classification and analysis of IF games are not considered based on the described guidelines. Additionally, we acknowledged the importance of story genres (e.g., romance, historical) but chose not to include them due to the evaluation criteria (MECE and the need to limit the number of categories).

Table 4.1 presents the features for IF games derived from general video game features. It explains why these features are vital for categorization. Each feature is crucial for different stakeholders, including players, developers, and hosting platforms. We limit the number of features to maintain manageability and practicality. Each feature has three categories to ensure distinct classification for every game. This structured approach facilitates clear and comprehensive categorization, making it easier to analyze and compare different IF games.

Table 4.1. Features for IF games

<b>General Video Game Features</b>	<b>IF games Features</b>
Human-Computer Interaction	<i>User Input</i>
	<i>Visual Output</i>
Game Genres	<i>Story Option</i>
	<i>Story Ending</i>
Game Mechanics	<i>Time to Respond</i>
	<i>Stats Management &amp; Resource Management</i>
	<i>Number of Players</i>
Business Model	<i>Platform Compatibility</i>
	<i>Monetization Model</i>

Similar to limiting the number of features, we limit the number of categories under each feature. We define three categories to classify each feature to simplify qualitative descriptions and allow distinct classification for every game. Each game will fall into one of the three categories for all nine features, ensuring a clear and structured classification system. This decision is flexible and can vary per feature in the future.

## 4.2 FURTHER CLARIFICATION

In the categorization of interactive fiction (IF) games, the following features are explicitly excluded for the following reasons:

1. Subjective features: Such features include “Story Topics”, “Narrative Styles” and so on. They’re excluded because it’s hard for them to satisfy the guideline, MECE.
2. Implementation-related features: Such features include “Dialogue System”, “Battle System” and so on. They’re excluded because it’s hard for them to satisfy the guideline, MECE.
3. Niche features: Such features include “Voice Controlled”, “VR/AR” and so on. They’re excluded because we want to control the total number of features and categories of our framework under the guideline, “Number should be limited”.

These exclusions represent a limitation of the proposed system and are excellent directions for future work.

### 4.3 DESCRIPTIONS OF THE IDENTIFIED FEATURES

#### 4.3.1 *User Input*

The first feature is ‘User input,’ modalities within IF games, emphasizing the variety of interfaces through which players interact with the game environment. This feature is classified into the following three categories.

1. Keyboard input only
2. Support keyboard input and mouse click
3. Mouse click only

The mode of interaction is pivotal as it profoundly influences player engagement and accessibility. By dissecting these interaction mechanisms, developers can enhance the gaming experience, making HCI a critical component of game design and categorization.

#### 4.3.2 *Visual Output*

Feature 2, termed ‘Visual Output,’ assesses the range and type of visual elements incorporated into IF games. This criterion focuses on how these visual components contribute to deepening the narrative and enhancing player engagement. This feature is classified into the following three categories.

1. Text output only
2. Change image output based on gamer input
3. Change animation output based on gamer input

Visual Support is crucial as it directly impacts player immersion and narrative comprehension, making games more accessible and engaging.

#### 4.3.3 *Story Option*

Feature 3, termed 'Story Option,' evaluates the structure of decision-making within IF games. This feature is classified into the following three categories.

1. *Linear limited options.* The narrative progresses in a predetermined sequence with a few branching choices that do not significantly alter the story's outcome. Players follow a mostly linear path, with limited decision points.
2. *Non-linear limited options.* The story offers multiple branching paths, each leading to different outcomes, but the choices are confined within set boundaries. While players have more freedom than in linear narratives, their options are still somewhat restricted.
3. *Non-linear open options.* The narrative is highly flexible, with numerous decision points that can lead to a wide variety of outcomes. Players have significant freedom to influence the story's direction, resulting in diverse and personalized gameplay experiences.

The structuring of game options affects player agency and engagement, influencing storytelling dynamics and the potential for diverse gameplay experiences. The degree of freedom in decision-making significantly impacts player satisfaction and the game's perceived success.

#### 4.3.4 *Story Ending*

Feature 4, 'Story Ending,' examines the type of narrative closure provided by IF games. This feature is classified into the following three categories.

1. *Single defined ending.* The game concludes with one predetermined outcome regardless of the player's choices throughout the game. This type of ending provides a clear and definitive closure to the narrative, ensuring that all players experience the same conclusion.
2. *Multiple defined endings.* The game offers several different possible endings based on the player's decisions and actions. This category enhances replay value by encouraging players to explore various paths and make different choices to see all possible outcomes.
3. *No defined ending.* The game does not have a specific conclusion, allowing the story to continue indefinitely or leaving the ending ambiguous. This approach can foster a sense of

ongoing adventure or leave the story open to interpretation, appealing to players who enjoy continuous exploration and open-ended narratives.

The type of ending influences player satisfaction and narrative perception, providing closure or enhancing replay value by encouraging exploration and different gameplay styles. These distinctions are valuable for identifying potential areas for innovation in game development.

#### 4.3.5 *Time to Respond*

Feature 5, 'Time to Respond,' evaluates the temporal constraints on player actions within IF games. This criterion examines how time limits influence gameplay dynamics and decision-making. This feature is classified into the following three categories.

1. *Limited time to respond.* Players must make decisions within a fixed, often short, timeframe. This creates a sense of urgency and can increase tension, requiring quick thinking and rapid decision-making.
2. *Mix of limited and unlimited time to respond.* The game includes both scenarios with time constraints and those without. This approach provides a balance, allowing moments of intense decision-making alongside more reflective, unhurried choices.
3. *Unlimited time to respond.* Players can take as much time as they need to make decisions, fostering a more relaxed and contemplative gameplay experience. This can reduce stress and allow for deeper engagement with the narrative.

Understanding 'Time to Respond' is crucial as it affects tension, pacing, and overall player experience, significantly impacting engagement and emotional intensity.

#### 4.3.6 *Stats Management & Resource Management*

Feature 6, 'Stats Management and Resource Management,' evaluates the incorporation of systems for tracking character statistics and managing resources. This feature is classified into the following three categories.

1. *No support for stats and resource management.* The game does not include any mechanisms for tracking character statistics (e.g., health, skills) or managing resources (e.g., inventory, currency). The focus is solely on the narrative, with minimal gameplay elements influencing the story.

2. *Support only stats management or only resource management.* The game tracks character statistics, allowing players to monitor and influence attributes such as health, skills, and experience points. However, it does not include systems for managing resources like inventory or currency. Or vice versa.
3. *Support both stats and resource management.* The game includes comprehensive systems for both tracking character statistics and managing resources. Players can monitor and influence character attributes while also managing inventory, currency, and other resources that impact gameplay and the narrative.

This criterion enhances game interactivity and player engagement, affecting strategies and decision-making processes in the narrative context.

#### 4.3.7 *Number of Players*

Feature 7, 'Number of Players,' categorizes IF games based on the number of players they accommodate. This feature is classified into the following three categories.

1. Single-player
2. Two players
3. Three or more players

The Number of Players impacts game design, narrative structure, and interactive storytelling, influencing gameplay mechanics and user experience, and determining the game's appeal and success.

#### 4.3.8 *Platform Compatibility*

Feature 8, 'Platform Compatibility,' evaluates the variety of hardware and software environments for IF games. This feature is classified into the following three categories.

1. Single platform on PC/phone
2. Single platform on console
3. Multiple platforms

Platform compatibility impacts game distribution, availability, and market penetration, affecting both developers and players by enhancing accessibility and convenience.

#### 4.3.9 *Monetization Model*

Feature 9, 'Monetization Model,' examines how IF games generate revenue. This feature is classified into the following three categories.

1. Free to play
2. Purchase before playing
3. In-game ad or in-game purchase

Understanding the monetization model influences game development decisions, player engagement, and overall game sustainability, directly impacting economic success and community acceptance.

## 4.4 SUMMARY

The proposed features and categories are derived based on the guidelines established in Section 3.1. For the guideline "Mutually exclusive and collectively exhaustive" (MECE), the features and categories cover distinct aspects of IF games without overlap. Following the guideline "The number should be limited", we have limited the number of features to nine and the categories for each feature to three, ensuring they are manageable and not overly complex. For "Intuitive", all feature and category titles are based on well-established vocabularies. It is unfortunate and unavoidable that the exact interpretations of terms can be subjective. The remedy would involve categorization attempts by diverse stakeholders and long-term gradual refinement.

We acknowledge that there are limitations in the feature sets. In particular, we avoided defining features related to story content, such as "Story Topic", because the general context of humanities is inherently ambiguous. For example, an IF game's story topic can be regarded as "Historic" by one player but as "Romance" by another, or even fall into both categories. In the near term, we do not have a solution for this complex issue. In order to follow the MECE guidelines, we have chosen to exclude this feature. An important consequence is that the categorization results will not be able to inform players about the actual story contents. This is a potentially significant limitation of the categorization system. However, it is also the case that the involved issue is complicated and that this is a first attempt. As the categorization framework matures, this complex issue can be examined and integrated to meet player expectations better.

## Chapter 5. FIRST ROUND: CATEGORIZATION BASED ON GAME ENGINES

We aim to verify that it is indeed possible to categorize IF games using the framework and, more importantly, that systematic analysis can be conducted for insights. This is crucial for demonstrating that the framework facilitates structured investigation in enhancing the understanding of IF games.

To verify the effectiveness of the categorization framework, we need to classify a diverse set of games. A diverse set of games as defined by wide-ranging parameters including developer experience, budgets, targeted audience, genres, etc. While there are many ways to find such a set, we chose to base the sampling on the game engine used. The reason is that game engines serve as objective tools for development, selecting games based on this tool can avoid subjective biases such as developer reputation or player rankings.

The approach in choosing IF games for categorization is as follows:

1. Identify ten popular game engines.
2. Select nine popular IF games developed based on each engine.
3. Include ten additional IF games developed with other or unknown game engines.

This approach attempts to identify a comprehensively diverse set from the IF game landscape. Please refer to Appendix A for the complete list of games sampled.

### 5.1 IF GAME ENGINES

IF game engines are software frameworks that support the development and management of game environments and storytelling mechanisms. Game engines with varied sophistication levels are designed to support different developers to cater to distinct types of games. In this way, popular games from these engines would cover a diverse spectrum. In the approach, we identify and sample the most popular games from influential IF game engines. The 10 game engines selected for the study are summarized as follows, in the order of their release dates. For each engine, we briefly introduce their publication year, business model, and potential learning curve, and articulate the types of games that are likely to be produced.

1. Text Adventure Development System (TADS in Table 5.1) [27]: Initially released in 1988, TADS is a popular platform that offers a comprehensive toolkit for creating sophisticated IF. It is free to use, with professional-grade tools that present a higher learning curve, aimed more at experienced IF developers. Example games include "Curses," "The Golden Skull," and "Return to Ditch Day."
2. Quest (Quest in Table 5.1) [28]: First published in 1998, Quest provides a dual approach to game creation, offering a code-free interface alongside an advanced scripting language. This engine is free and caters to both non-programmers and experienced developers, making it versatile in its accessibility. Example games include "The Uninvited," "Moquette," and "Escape the Room."
3. Adrift (Adrift in Table 5.1) [29]: First introduced in 1999, Adrift caters specifically to non-programmers, offering a graphical interface to develop text adventures and IF. It is free for personal use, with a straightforward design that makes it easy to learn and use, ideal for those new to game development. Example games include "The PK Girl," "To Hell in a Hamper," and "The Party Line."
4. Ren'Py (RenPy in Table 5.1) [30]: First published in 2004, Ren'Py is a visual novel engine that combines images, text, and sound to create engaging stories and character-driven narratives. It is freely available and boasts a gentle learning curve, making it a favorite among indie developers and hobbyists interested in visual storytelling. Example games include "Katawa Shoujo," "Doki Doki Literature Club," and "The Letter."
5. Unity (Unity in Table 5.1) [31]: While predominantly known for 3D game development, Unity, first released in 2005, also supports creating IF experiences. It is free for personal use with a tiered licensing model for professional use. Unity offers a vast asset library and a strong community, but its complex capabilities mean a significant learning curve. Example games include "The Stanley Parable," "Gone Home," and "80 Days."
6. Inform 7 (Inform in Table 5.1) [32]: Introduced in 2006, Inform 7 is a sophisticated development environment for crafting parser-based IF games based on a natural language programming core. It is free to use, though its powerful features come with a steeper learning curve compared to other engines, attracting those who wish to develop complex text adventures. Example games include "Bronze," "Alabaster," and "Counterfeit Monkey."

7. Twine (Twine in Table 5.1) [33]: First released in 2009, Twine is an open-source tool that simplifies creating interactive, nonlinear stories, making it highly accessible for beginners. The system is free and requires minimal technical skills, allowing individuals without a programming background to create text-based games easily. Games from this engine are typically simpler and from newer developers or hobbyists. Example games include *Wayfarer*, *A Tale of Crowns*, and *Scout: An Apocalypse Story*.
8. ChoiceScript (Choice in Table 5.1) [34]: Developed by Choice of Games and first released in 2010, ChoiceScript is a scripting language supporting the development of multiple-choice-based IF games. Although not a game engine, it is a popular development tool for IF game developers. It is free to use for personal projects with revenue-sharing requirements for commercial projects. Its simplicity makes it accessible to novices. Example games include "Choice of Robots," "Choice of the Dragon," and "Heroes Rise."
9. Inklewriter (Inkle in Table 5.1) [35]: Launched in 2012, Inklewriter is a web-based tool designed for easy writing and publishing of interactive stories. It is free and focuses on branching narratives, offering an intuitive design that is easy to manage without prior programming knowledge. Example games include "The Intercept," "Out There Chronicles," and "Frankenstein."
10. StoryNexus (Nexus in Table 5.1) [36]: Created by Failbetter Games and released in 2012, StoryNexus allows for rich, multimedia interactive stories with unique card-based storytelling elements. It is accessible online without charge, but its specialized features require some learning to fully exploit its capabilities. Example games include "Fallen London," "Sunless Sea," and "Black Crown Project."
11. Others (Others in Table 5.1): This is meant to capture popular IF games that are unclear or game engines from other cultures, such as 66RPG [37], which only supports the Chinese language.

## 5.2 SAMPLING PROCESS AND RESULTS

A total of 100 IF games are examined and categorized by the same researcher, the author of this thesis, according to the following procedure. For every IF game:

- Find and follow the online demo screenshots or demo videos provided by the developers or the players

- If the game is free to play, spend 5 to 10 minutes testing and playing the game

It is important to note that in all cases, by reviewing the demos or playtesting the games, it can be challenging to determine the story endings without actually completing the game. For this reason, the story endings are typically derived indirectly, e.g., based on online comments from the players, the game descriptions, Wikipedia information, etc. We acknowledge the potential inaccuracy of the categorization under the feature “Story Ending”.

The categorization results of these games are presented in Table 5.1, relating the features and categories to the game engines used for their development. The columns are features and categories, while the row enumerates the number of games from the corresponding game engines. For example, the first row is all games developed based on TADS, and the first column of the first row indicates that all 9 games developed only support keyboard input.

Table 5.1. Classification of 100 Games (Categories – Game Engine)

	User Input			Visual Output			Story Option			Story Ending			Time to Respond			Stats & Resource			Number of Players			Platform Supported			Business Model					
	Keyboard only	Keyboard & mouse	Mouse only	Text output only	Image output	Animation output	Linear limited	Non-linear limited	Non-linear open	Single ending	Multiple ending	No defined ending	Limited time	Mix	Unlimited time	No support	Stats only or resource only	Support both	Single player	Two players	Three or more	PC/Phone	Console	Multiple platform	Free to play	Purchase before playing	Ad or in-game purchase			
TADS	9	0	0	9	0	0	0	9	0	1	8	0	0	0	9	9	0	0	9	0	0	9	0	0	9	0	0	9	0	0
Quest	0	9	0	0	9	0	0	9	0	0	9	0	0	0	9	9	0	0	9	0	0	9	0	0	9	0	0	9	0	0
Adrift	0	9	0	9	0	0	0	8	1	1	8	0	0	0	9	7	0	2	9	0	0	9	0	0	9	0	0	9	0	0
RenPy	0	9	0	3	6	0	0	8	1	0	9	0	0	0	9	6	1	2	9	0	0	7	0	2	5	4	0	0	0	0
Unity	0	9	0	0	9	0	0	9	0	1	8	0	0	0	9	9	0	0	9	0	0	0	0	9	7	2	0	0	0	0
Inform	9	0	0	9	0	0	0	8	1	3	6	0	0	0	9	8	1	0	9	0	0	9	0	0	7	2	0	0	0	0
Twine	9	0	0	9	0	0	0	9	0	1	8	0	0	0	9	8	1	0	9	0	0	0	0	9	8	1	0	0	0	0
Choice	9	0	0	9	0	0	0	9	0	0	9	0	0	0	9	9	0	0	9	0	0	0	0	9	1	8	0	0	0	0
Inkle	0	9	0	0	9	0	0	7	2	0	9	0	0	0	9	7	0	2	9	0	0	7	0	2	7	2	0	0	0	0
Nexus	0	9	0	7	2	0	0	7	2	0	8	1	0	0	9	7	0	2	9	0	0	7	0	2	7	1	1	0	0	0
Others	0	6	4	2	2	6	0	7	3	0	9	1	0	3	7	5	1	4	9	0	1	8	0	2	3	4	3	0	0	0

### 5.3 OBSERVATION FROM CLASSIFICATION RESULTS

#### 5.3.1 Observation on “User Input”

Along the first column, “User Input”, most of the games are in the middle category of supporting both keyboards and mouse clicks. This distribution suggests the mainstream input mechanism of IF games. As mouse-click is a friendlier input mechanic, this observation leads to the question of

whether there is a continuous trend in user input moving away from keyboard-only interfaces. Since such time-based information is not captured in this wholistic analysis, this question suggests a follow-up time-based analysis may be in order.

### 5.3.2 *Observation on “Visual Output”*

The "Visual Output" feature includes a mix of text-based, image-based, and animation-based IF games. Text- and image-based IF games appear to be dominant, while animation-based games are less common. For IF game engines, such as Inform or Choice, that do not support image and animation interactivity, this may indicate a focus on storytelling rather than multimedia elements, reflecting the genre's historical roots in text-based adventures. Conversely, it may also be true that as the cost of media creation decreases, there may be a trend of IF games evolving from text-based to image-based and then to animation-based visuals. Once again, this insight suggests a follow-up time-based categorization and analysis.

### 5.3.3 *Observation on “Story Option”*

The "Story Option" feature shows that non-linear options, either limited or open, are widely supported across most IF game engines. The prevalence of non-linear options may indicate that more complex and branching narratives could enrich the gameplay experience, making it more engaging and immersive.

### 5.3.4 *Observation on “Story Ending”*

The "Story Ending" feature reveals that multiple defined endings are common in IF games. The presence of multiple endings might allow for richer storytelling, where player decisions significantly impact the outcome. This feature could encourage players to explore different paths and outcomes, increasing engagement. Multiple endings seemingly promote both replayability and narrative complexity.

### 5.3.5 *Observation on “Time to Respond”*

The "Time to Respond" feature indicates that most IF games support unlimited time to respond, which caters to narrative exploration. This feature might allow players to immerse themselves in the story without the pressure of time constraints, enhancing accessibility and inclusivity by

accommodating diverse player preferences and paces, reflecting a desire to create more leisure and reflective gaming experiences. Unlimited time to respond possibly supports deeper narrative engagement.

### 5.3.6 *Observation on “Stats Management and Resource Management”*

The "Stats Management and Resource Management" column indicates limited support for these features and may suggest a design preference for simplicity and accessibility, indicating that resource management is not a core component of most IF games. This observation suggests the genre's emphasis on narrative and choice rather than gameplay complexity, focusing more on storytelling than on complex game mechanics. This is yet another observation that raises the question of if there is a potential trend over time toward gameplay complexity.

### 5.3.7 *Observation on “Number of Players”*

The “Number of Players” feature shows that almost all IF games are designed for single-player experiences. The single-player format might allow for deeper narrative exploration and personal connection to the story, reflecting the genre’s roots in solo narrative experiences. This observation raises the interesting question that, even though traditional novel reading is an activity by individuals, is there potential to turn interactive exploration of a story development into an engaging multi-person endeavor?

### 5.3.8 *Observation on “Platform Compatibility”*

The “Platform Compatibility” feature shows that some IF games are compatible with multiple platforms while others only support PC or smartphones. Multi-platform compatibility might ensure that games can reach a wider audience, irrespective of their device preferences, demonstrating the adaptability and versatility of modern IF game engines. Once again, this observation raises the question of whether there is a trend from single-platform towards multiple-platform.

### 5.3.9 *Observation on the “Monetization model”*

The “Monetization Model” feature reveals that many IF games either are free or require purchase before playing. The prevalence of this monetization strategy suggests players are willing to pay for engaging and immersive experiences.

## 5.4 SUMMARY

Based on the categorization results of the 100 IF games, we have validated the effectiveness of the categorization system based on the criteria listed in Section 3.2. First, the system is “Inclusive” as 100 IF games chosen from more than 10 popular IF game engines can be classified in a straightforward manner. Second, the results presented in Table 5.1 are a demonstration of the “Systematic Analysis” of popular IF games from popular IF game engines. In this analysis, we have demonstrated that it is possible to systematically select and analyze IF games based on defined objectives. Third, “Insights into IF games” are gained in the forms of verified intuitions, surprising observations, and additional questions that deserve further studies.

Through the analysis of the classification results, we have verified several intuitions:

1. Mouse click is a popular user input method
2. Image output is a popular visual output method
3. The multiple-defined ending is a popular story ending style.

It is also surprising to observe that almost all IF games are single-player. This observation is surprising because multiple players are common for general video games. These insights can serve as valuable references for new IF game development.

Many of the observations also lead to speculations about potential trends in the evolution of IF games over time. Understanding these trends is crucial as they can provide a historical perspective and offer references for its future trajectory. More specifically, it is interesting to investigate potential trends in features including User Input, Visual Output, Story Ending, game complexity (Stats and Resource Management), and Platform Support.

To investigate trends of IF games over time, we sampled an additional 100 IF games according to their publication years. This approach allowed us to trace the evolutionary path of IF games over time. By selecting games developed using a variety of game engines, we aim to ensure diverse and comprehensive coverage, which will enhance the validity of the analysis.

## Chapter 6. SECOND ROUND: CATEGORIZATION BASED ON TIME

The relatively modest scale of IF game communities and limited advertising budgets attributed to slower visibility and popularity growth which resulted in slower recognitions. The older games have had more time to establish popularity and influence. For these reasons, the game selection approach based on popular games from well-established game engines inevitably resulted in a sampling bias towards older games. To mitigate this temporal bias and to gain a comprehensive understanding of the evolution of IF games, a second round of categorization is conducted with game sampling based on time.

To achieve a balanced sampling in time, popular IF games from well-established game engines are selected based on even distribution over their publishing dates. This approach aimed to include at least one popular game every few years based on the lifespan of each engine, thereby minimizing the bias towards older games. In this way, a more comprehensive and representative sample over time can be ensured enabling observations of the potential trends of IF games. Please refer to Appendix A for the titles of games sampled in the second round.

### 6.1 SAMPLING RESULTS

The second-round sampling results are recorded in Table 6.1. This table organizes the game engines employed (column) for developing the selected IF games and the years of their publication (row).

Table 6.1. Selection of Games according to Publish Years

	TADS	Quest	Adrift	RenPy	Unity	Inform	Twine	Choice	Inkle	Nexus	Others
Before 2000	1	0	0	0	0	0	0	0	0	0	1
2000-2002	1	1	1	0	0	0	0	0	0	0	0
2003-2005	1	1	1	0	0	1	0	0	0	0	1
2006-2008	1	1	1	0	0	1	0	0	0	0	0
2009-2011	1	1	1	2	0	2	0	2	0	2	0
2012-2014	1	1	1	1	2	1	2	1	3	1	4
2015-2017	1	1	1	2	2	1	2	2	2	2	0
2018-2020	1	1	1	2	3	1	2	2	2	2	4
2021-2023	1	2	2	2	2	2	3	2	2	2	0

As can be seen in Table 6.1, after the release years of the corresponding game engines, e.g., 2009 for Twine, the sampling is almost uniformly distributed across the years, ensuring a representative selection of games over time. This game-sampling approach allows observations of potential trends in IF games.

The second-round sampling results are presented in Table 6.2 which organizes the features of IF games (columns) according to their respective publication years (rows). The table entries are the count of games with a specific feature category during a given time period.

Table 6.2. Categorization of Games Selected based on Publish years

	User Input			Visual Output		Story Option			Story Ending			Time to Respond			Stats & Resource			Number of Players			Platform Supported			Business Model			
	Keyboard only	Keyboard & mouse	Mouse only	Text output only	Image output	Animation output	Linear limited	Non-linear limited	Non-linear open	Single ending	Multiple ending	No defined ending	Limited time	Mix	Unlimited time	No support	Stats only or resource only	Support both	Single player	Two players	Three or more	PC/Phone	Console	Multiple platform	Free to play	Purchase before playing	Ad or in-game purchase
Before 2000	2	0	0	2	0	0	0	1	1	0	2	0	0	0	2	2	0	0	2	0	0	1	0	1	2	0	0
2000~2002	2	1	0	3	0	0	0	3	0	1	2	0	0	0	3	3	0	0	3	0	0	3	0	0	3	0	0
2003~2005	2	2	0	3	0	1	0	3	2	1	3	0	0	1	3	2	2	0	4	0	0	4	0	0	3	1	0
2006~2008	4	2	0	5	1	0	1	5	0	4	2	0	0	0	6	5	1	0	6	0	0	6	0	0	5	1	0
2009~2011	5	7	0	11	1	0	1	6	3	2	8	2	0	3	9	5	2	5	12	0	0	8	0	4	10	2	0
2012~2014	4	12	2	8	9	1	0	15	4	4	14	0	0	5	13	5	11	2	17	0	1	10	0	8	9	9	0
2015~2017	4	10	1	7	7	1	0	7	8	2	13	0	0	2	13	4	7	4	15	0	0	7	0	8	6	9	0
2018~2020	3	14	3	9	7	4	0	11	9	1	18	1	0	4	16	4	12	4	20	0	0	11	0	9	6	13	1
2021~2023	4	14	2	9	9	2	0	9	11	2	17	1	0	3	17	6	11	3	20	0	0	12	0	8	10	10	0

## 6.2 OBSERVATION FROM CLASSIFICATION RESULTS

### 6.2.1 Observation on “User Input”

In the early years, e.g., before 2000, IF games relied solely on keyboard inputs, reflecting early technological constraints and user interaction models. As technology advanced, game developers began incorporating mouse clicks, providing a more intuitive and user-friendly experience. It is interesting that the shift towards the mouse does not result in the keyboard being abandoned entirely. This shift may be driven by the increasing popularity of graphical user interfaces (GUIs) and the need to attract a broader audience while retaining those comfortable with text-based inputs.

### 6.2.2 Observation on “Visual Output”

Early IF games predominantly featured text-only outputs, requiring players to visualize the game

world through descriptive narratives. Over time, the integration of graphical elements became more prevalent, with games starting to incorporate images. This trend suggests advancements in graphical technology and growing expectations for more visually engaging content, highlighting the importance of visual storytelling in complementing textual narratives. It is interesting that IF games with animation output have yet to become dominant. As the cost continues to decrease, IF games with animation might increase in popularity. In all cases, as in the previous case, the fact that text-only IF games continue to exist might reflect that pure text storytelling can still draw a significant audience.

### 6.2.3 *Observation on “Story Option”*

In earlier games players were presented with a restricted set of choices, guiding the narrative within certain boundaries. Over time, developers started offering more open-ended options, allowing players greater freedom to influence the storyline. This evolution may reflect the growing demand for more interactive and personalized gaming experiences, enabling more complex and diverse narratives.

### 6.2.4 *Observation on “Story Ending”*

Independent from other changes, there is a clear trend toward multiple-defined endings. Multiple endings provide varied outcomes based on player choices, encouraging exploration and repeated playthroughs. This design element might satisfy players' desire for control over the narrative and the opportunity to see different story arcs.

### 6.2.5 *Observation on “Time to Respond”*

Clearly many IF games do not favor limited-time decisions where this feature only exists some of the time in a relatively small number of games. This observation aligns well with the leisurely pace of early text-based adventures. The introduction of time-limited actions may add a layer of challenge and urgency, enhancing gameplay dynamics. This mix might cater to different player preferences, increasing the strategic depth of games.

### 6.2.6 *Observation on “Stats Management and Resource Management”*

The incorporation of stats and resource management occurred after 2010 and has become more

prevalent. Early IF games often lacked these features, focusing solely on narrative progression. However, modern IF games increasingly include stat management, adding a strategic layer to gameplay. This shift may cater to players who enjoy more complex and interactive experiences, where managing resources and character stats influences the story's direction. This observation suggests a blurring between IF games and general action-adventure games. This is especially the case for IF games that support animations and sophisticated resource management vs action-adventure games that emphasize story development and narration.

#### 6.2.7 *Observation on “Number of Players”*

Without any surprise, as observed previously, there is a general absence of multi-player IF games. This observation leads to the question of whether this is a potential opportunity or if it is the case that the interactive development of story narrations based on multi-person collaboration is simply not fun and impractical.

#### 6.2.8 *Observation on “Platform Compatibility”*

The platform compatibility of IF games has expanded significantly over time. With advancements in technology and increasing demand for cross-platform accessibility, many recent IF games have been developed for multiple platforms. This expansion suggests the industry's adaptation to changing consumer behaviors and the importance of accessibility in the modern gaming landscape. Considering the high cost and extensive support for 3D graphical capabilities, the complete absence of IF games on dedicated gaming consoles is not a surprise. The consoles with their dedicated interface hardware are simply not designed to support engaging story development.

#### 6.2.9 *Observation on “Monetization Model”*

Many of the earlier IF games are free. However, it has become more common for recent IF games to require purchasing, suggesting potential business values. There is an interesting lack of in-game advertisements suggesting players may not appreciate the annoying interruptions while reading stories.

### 6.3 SUMMARY

It is reassuring that the categorization system can straightforwardly classify the IF games selected based on specific criteria, time-based in this case. Once again, this demonstrates inclusiveness, where the categorization system is suitable for classifying diverse ranges of games. From the systematic analysis of the categorization results, we observed several key trends in the evolution of IF games. There is a noticeable increase in the use of mouse-click inputs, a growing incorporation of images, a shift towards more non-linear and open-ended exploration with multiple story endings, and increasing sophistication in stat and resource management. These trends reflect significant advancements in user interaction, visual presentation, and narrative complexity.

There are two intriguing questions raised by these observations. First, do the observed trends in IF game evolution imply similar types of stories are being narrated with increased sophistication? The answer to this question may be a reference for the future directions of IF game development. Where, independent from story content, the increase in complexity and cost may be necessary of producing IF games may be necessary. Second, how to examine the potential blurring between complex IF games and traditional action-adventure games? The answer to this question can direct future game developers to seek collaborations during their development process.

To address the first question, we conducted a third round of categorization focusing specifically on the IF games developed by the same studio. This approach allows us to examine the evolution of IF games within a consistent development context and gain further insights into long-term trends and changes in the genre. The second question is much more involved and will be discussed as part of the conclusion of the work.

## Chapter 7. THIRD ROUND: CATEGORIZATION BASED ON GAME STUDIO

We note that the games sampled in the second round are from studios with different resources and backgrounds. We are interested in examining if similar trends can be observed for IF games developed from the same studio. Such curiosity leads us to conduct the third round of sampling, focusing specifically on the longitudinal development of the IF games released by the same game studio. We selected two well-known studios and analyzed all published IF games by them. We organize the findings based on the publication year.

### 7.1 SAMPLING RESULTS OF IF GAMES BY INFOCOM

We chose to research Infocom [38] first because it is the company that developed Zork [2], which is one of the most influential IF games in the history of interactive fiction (IF) games, known for pioneering the genre with its text-based adventures. Analyzing IF games developed by Infocom allows us to understand the origin of IF games and how they have influenced contemporary game design.

Table 7.1. Infocom

	User Input			Visual Output			Story Option			Story Ending			Time to Respond			Stats & Resource			Number of Players			Platform Supported			Business Model		
	Keyboard only	Keyboard & mouse	Mouse only	Text output only	Image output	Animation output	Linear limited	Non-linear limited	Non-linear open	Single ending	Multiple ending	No defined ending	Limited time	Mix	Unlimited time	No support	Stats only or resource only	Support both	Single player	Two players	Three or more	PC/Phone	Console	Multiple platform	Free to play	Purchase before playing	Ad or in-game purchase
<b>1980-1981</b>	2	0	0	2	0	0	0	2	0	2	0	0	0	0	2	2	0	0	2	0	0	2	0	0	0	2	0
<b>1982</b>	3	0	0	3	0	0	0	3	0	2	1	0	0	1	2	3	0	0	3	0	0	1	0	2	0	3	0
<b>1983</b>	5	0	0	5	0	0	0	5	0	3	2	0	0	3	2	5	0	0	5	0	0	1	0	4	0	5	0
<b>1984</b>	5	0	0	5	0	0	0	5	0	2	3	0	0	2	3	5	0	0	5	0	0	1	0	4	0	5	0
<b>1985</b>	3	0	0	3	0	0	0	2	1	1	2	0	0	0	3	3	0	0	3	0	0	1	0	2	0	3	0
<b>1986</b>	5	0	0	5	0	0	0	5	0	1	4	0	0	0	5	5	0	0	5	0	0	0	0	5	0	5	0
<b>1987</b>	8	0	0	8	0	0	0	7	1	2	6	0	0	2	6	7	0	1	8	0	0	2	0	6	1	7	0
<b>1988</b>	2	0	0	1	1	0	0	2	0	1	1	0	0	0	2	2	0	0	2	0	0	1	0	1	0	2	0
<b>1989</b>	3	0	0	3	0	0	0	2	1	0	2	1	0	0	3	3	0	0	3	0	0	0	0	3	0	3	0

Table 7.1 is the categorization of the 33 IF games from Infocom. The results show that most of the categories remained stable over time, indicating consistency in Infocom's game design

approach. The stability suggests a strong adherence to established design principles and audience expectations. This consistency could be due to Infocom's focus on maintaining a recognizable style and gameplay experience. The trends of Story Ending, towards multiple endings, and Platform Supported, towards multiple platforms, agree with the previous observations. Along the Time to Respond column, it appears that timed responses were experimented and abandoned. Overall, Infocom's games appear to have a well-defined structure that has stood the test of time, contributing to their enduring popularity.

Conversely, it is intriguing that the previously observed trends of increasing in mouse-clicks, multimedia output, and stats management were all absent. Infocom merged into Activision in 1986 and was closed in 1989. Adapting to technology advances and player sophistication may be factors for consideration.

## 7.2 SAMPLING RESULTS OF IF GAMES BY HER INTERACTIVE

We selected Her Interactive for the Nancy Drew series [39] due to its long-standing presence. With 35 titles where the first game, "Secrets Can Kill" was released in 1998, and the latest, "Mystery of the Seven Keys" was published recently in 2024. This extensive series provides a rich dataset for examining the evolution of visual elements, narrative structures, and gameplay mechanics within a single franchise over two decades. By analyzing these games, we aim to identify trends and shifts that reflect broader changes in the IF genre and player preferences over time.

Table 7.2. Nancy Drew

	User Input			Visual Output			Story Option			Story Ending			Time to Respond			Stats & Resource			Number of Players			Platform Supported			Business Model		
	Keyboard only	Keyboard & mouse	Mouse only	Text output only	Image output	Animation output	Linear limited	Non-linear limited	Non-linear open	Single ending	Multiple ending	No defined ending	Limited time	Mix	Unlimited time	No support	Stats only or resource only	Support both	Single player	Two players	Three or more	PC/Phone	Console	Multiple platform	Free to play	Purchase before playing	Ad or in-game purchase
Before 2000	0	0	2	0	1	1	0	2	0	2	0	0	0	0	2	0	2	0	2	0	0	2	0	0	0	2	0
2000~2002	0	0	5	0	0	5	0	5	0	5	0	0	0	0	5	0	5	0	5	0	0	5	0	0	0	5	0
2003~2005	0	0	6	0	0	6	0	6	0	6	0	0	0	1	5	0	6	0	6	0	0	6	0	0	0	6	0
2006~2008	0	0	6	0	0	6	0	6	0	6	0	0	0	0	6	0	6	0	6	0	0	6	0	0	0	6	0
2009~2011	0	0	7	0	0	7	0	7	0	7	0	0	0	1	6	0	7	0	7	0	0	3	0	4	0	7	0
2012~2014	0	0	6	0	0	6	0	6	0	6	0	0	0	0	6	0	6	0	6	0	0	0	0	6	0	6	0
2015~2017	0	0	1	0	0	1	0	1	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	1	0	1	0
2018~2020	0	0	1	0	0	1	0	1	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	1	0	1	0
2021~2024	0	0	1	0	0	1	0	1	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	1	0	1	0

The results from the categorization of the Nancy Drew series are presented in Table 7.2. It is interesting to note that similar to the case of Infocom games the categories of all the features, with the exception of platforms supported, remain relatively stable over the years. Based on the number of games released, there is a clear decline after 2015. These observations pose the question of whether the pattern of constant feature sets over time leading to demise is being repeated.

When comparing Tables 7.1 and 7.2, a clear shift in User Input from keyboard to mouse, Visual Output from text only to animations, and, support of stat and resource management can be observed. Additionally, and very importantly, besides the 10-year gap, the release dates are almost continuous—it is as though Table 7.2 is a continuation of Table 7.1 in time with the increased complexity and sophistication. It is as though the history of Infocom is repeating with Her Interactive under the exact same conditions with updated parameters.

### 7.3 SUMMARY

While looking for narrative changes to the same type of stories over time, this last round of categorization unveiled surprising observations. First, a limitation of the categorization framework.

Though accomplishing Mutual Exclusion, the binary nature of the feature categories implies detailed incremental progressions cannot be captured. For example, the scope and complexity of animation integration into the Nancy Drew series occurred gradually over time. However, the categorization framework was only capable of indicating that this integration process began early in the Nancy Drew series but is unable to capture the details of the progression over the years. This limitation of the categorization framework results in constant feature set observations for both Tables 7.1 and 7.2. The second surprising observation is intuitive and can serve as a potential cautionary. In this highly competitive and innovative field, a relatively constant feature set over time is indeed a serious concern.

In the end, this third round of categorization has revealed a limitation of the proposed categorization system where the details of the progression of features cannot be captured. It is also true that proper and systematic analysis based on the framework can reveal large-scale comprehensive insights such as repeating patterns in history.

## Chapter 8. CONCLUSION

There is a need for a comprehensive categorization system for IF games to support systematic analysis. We approach the development of such a system by first deriving a guideline for designing a categorization system and the corresponding evaluation criteria. The foundation for the proposed categorization system is articulated based on examining the existing classification of general video games. The approach of identifying common features is adopted to categorize IF games into mutually exclusive sets and a categorization system consisting of 9 feature sets with three categories per feature is derived to support systematic classification of IF games.

To verify the effectiveness of the categorization framework, three rounds of systematic selection and analysis of IF games were carried out. The first round of analyzing popular IF games resulted in the verification of common intuitions and insights that triggered a second round of time-based analysis. The ability to straightforwardly classify 100 IF games demonstrates the “Inclusive” aspect of the framework, while the “Support Systematic Analysis”, and “Allow insights into IF games” are demonstrated by the fact that the analysis is based on systematic game selection, the intuitions verified, and insights that trigger the second round of analysis.

After the second round of sampling and categorization, we verified the insights on trends of increasing mouse clicks, multimedia output, and sophistication of narrative structure. Additional observations further trigger the interest in understanding how the same type of IF games evolve over time, and whether IF games are merging with traditional action-adventure games.

We have proposed and demonstrated the effectiveness of an IF game categorization framework that can systematically analyze selected games resulting in the verification of intuitions and gaining insights.

### 8.1 ADDITIONAL CONTRIBUTIONS: INSIGHTS INTO IF GAMES

IF games may have a trend shifting from text output to image output. Animation output began to appear in a recent decade but hasn't dominated the market yet. It might be caused by the fact that creating animation is still significantly more expensive. Additionally, text output IF games will likely continue to exist. It might be because reading simple text continues to be engaging to a non-trivial group of audience.

There may be a continued experimentation of timed responses in IF games. Traditionally, IF games focus on storytelling and give players unlimited time to make decisions. However, time-sensitive options such as a simple fighting mechanism, make a certain part of the game more intense and engaging. The inclusion of timed responses can potentially blur the boundary between IF games and traditional action-adventure games.

There seems to be a trend that more IF games begin to provide support for stats management and resource management. Such support can significantly increase the complexity of IF games and pivot the genre towards traditional action-adventure games. In concert with the trend of mixing unlimited time and limited time to respond, this trend has the potential of merging the two genres.

Lastly and very significantly, almost all IF games are single-player, which is in contrast to all the other genres of video games. This observation can be an intrinsic limitation of the IF genre or an incredible opportunity for future development.

These insights could serve as potential future directions of IF games, which could guide future IF games to continual success.

## 8.2 LIMITATIONS: THE FRAMEWORK

Ensuring that the features and categories align with the MECE guidelines has resulted in challenging design decisions. The importance of MECE lies in its ability to create clear, non-overlapping categories that fully capture all aspects of a subject, providing a structured and comprehensive framework. However, applying this principle to a humanities field, particularly IF games, where the subject matter is often complex and ambiguous, presents significant challenges.

A significant limitation of the framework is the exclusion of story content. For instance, we do not include "Story Topic" as one of the features in the framework. As discussed in Section 4.5, this omission arises because of the inherent subjectivity and complexity of storytelling elements in IF games. One can argue that story content is the core experience of IF games. By excluding this core element, the framework may not align with player expectations regarding game choices and narrative depth. This limitation could result in a framework that, while systematic and objective, does not fully meet the needs and preferences of one of its primary audiences—the players.

The framework also restricts the number of categories under each feature to three, in line with the guideline that "The number should be limited" for manageability. However, this constraint means some details are inevitably lost. For instance, while we capture the presence of animation in an IF game, we do not account for the extent of animation used. In this way, the categorization results cannot distinguish between an IF game that includes a single animation and one that features extensive animation sequences. Similarly, we can identify whether time-sensitive elements, such as fighting mechanics, are included but cannot measure the extent of the integration. This binary approach to categorization—where features are simply present or not—can result in a lack of granularity that may be critical for a detailed analysis over time.

### 8.3 LIMITATIONS: THE ANALYSIS

Even though we sampled more than 100 IF games developed by more than 10 IF game engines. Though seemingly a large number, the sample size of 100 is still relatively insignificant considering the total number of IF games. A more extensive collection of IF games would provide a more representative understanding of the genre and its technological underpinnings.

The unavoidable subjectivity involved may influence the categorization and the subsequent analysis. Such subjectivity inherent in the categorization process presents a challenge, as personal biases and varying perspectives can affect the classification framework. It is the case that we did not have the chance to complete all IF games categorized where some categorization efforts are based on best approximations.

Finally, we mainly utilize IFDB to determine the year an IF game was published and the game engine an IF game was developed. This information could be inaccurate.

### 8.4 FUTURE WORK

We could aim to sample and categorize a larger set of IF games developed by a wider range of IF game engines, ensuring a more comprehensive and diverse dataset for analysis. This broader sampling would enhance the validity of the insights and provide a firmer basis for generalizing the findings across the entire genre of interactive fiction. Expanding the dataset would allow us to capture a wider variety of game mechanics, storytelling techniques, and player interactions, thereby enriching the understanding of the genre's diversity and evolution.

Moreover, dedicating additional time to thoroughly categorize each game will be essential to ensure the accuracy of the assigned categories, thus mitigating the risk of subjective bias in the categorization process. This meticulous approach would involve a detailed analysis of each game's features and mechanics, allowing for a more nuanced and precise classification. Furthermore, we could invest in more researchers to cross-validate the categorization of IF games. This cross-validation process, involving multiple researchers independently categorizing the same games, would help identify and correct any inconsistencies or biases, ensuring the reliability and validity of the categorization framework.

In addition, we could pursue the investigation of the blurring boundaries between IF games and traditional action-adventure games. One approach would be to systematically select games from both genres that exhibit overlapping features, such as IF games with complex stat/resource management and limited-time responses, and action-adventure games with strong narrative elements. By categorizing and comparing these games using the framework, we can identify similarities and differences that highlight the convergence of these genres. Additionally, we can track the evolution of action-adventure games by analyzing long-running series like "Zelda" and "Final Fantasy" in the same way we analyze IF games like "Infocom" and "Nancy Drew". These analyses might provide insights into the historical development and potential future directions of both genres.

Finally, we could develop an ID system to quantitatively analyze any given IF game. For example, using an ID system common in the engineering field, we could assign each category a unique ID, creating a structured and systematic classification method. This approach would allow us to holistically compare IF games based on all the features we summarized, providing more specific and meaningful comparisons. The current categorization framework can give any IF game a unique ID, potentially enabling us to calculate the similarity between different IF games. Based on these similarities, we could recommend games to players, enhancing their experience by suggesting titles that align with their preferences and past gaming experiences. This ID system could significantly contribute to personalized game recommendations and deeper insights into game design and player engagement.

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## APPENDIX A

The game list of IF games we sampled in the first round is as follows. In addition, more details can be found on GitHub [40].

Table A.1. IF games sampled in the first round

Game Name	Game Engine	Game Name	Game Engine	Game Name	Game Engine
Worlds Apart	TADS	Silicon and Cells	Unity	80 DAYS	inklewriter
Babel	TADS	Tragic	Unity	Sorcery! 2	inklewriter
According to Cain	TADS	Secret Little Haven	Unity	Abgesang: Der Tag der Toten	inklewriter
Gun Mute	TADS	The House Abandon	Unity	A Face Like Mine	inklewriter
To Hell in a Hamper	TADS	Ulterior Spirits	Unity	Tainted	inklewriter
How Prince Quisborne the Feckless Shook His Title	TADS	Paris Aires	Unity	Düstere Dickichte 1: Schurken-Alarm!	inklewriter
First Things First	TADS	Heaven Will Be Mine	Unity	Virtue	inklewriter
Blighted Isle	TADS	Unearthed Stories	Unity	Snake's Game	inklewriter
Return to Ditch Day	TADS	Language Arts	Unity	The Man Who Killed Time	inklewriter
Whitefield Academy of Witchcraft	Quest	Counterfeit Monkey	Inform 7	Sunless Sea	StoryNexus
Jacqueline, Jungle Queen!	Quest	Anchorhead	Inform 7	Fallen London	StoryNexus
The Zen Garden	Quest	Superluminal Vagrant Twin	Inform 7	The Frequently Deceased	StoryNexus
The House on Highfield Lane	Quest	Hadean Lands	Inform 7	Cricket, Anyone?	StoryNexus
Basilica de Sangre	Quest	The Wizard Sniffer	Inform 7	Final Girl	StoryNexus
Poppet	Quest	Toby's Nose	Inform 7	Por Una Cabeza	StoryNexus
Night House	Quest	Eat Me	Inform 7	The Bloody Wallpaper	StoryNexus

Guttersnipe: Carnival of Regrets	Quest	Violet	Inform 7	Lost Reflections in	StoryNexus
First Times	Quest	Coloratura	Inform 7	Caveat Emptor	StoryNexus
To Hell in a Hamper	Adrift	Open Sorcery	Twine	Nancy Drew®: Mystery of the Seven Keys™	Others
Skybreak!	Adrift	Will Not Let Me Go	Twine	AI Dungeon	Others
Pirate's Plunder!	Adrift	Birdland	Twine	A Dark Room	Others
A Fine Day for Reaping	Adrift	A Long Way to the Nearest Star	Twine	Façade	Others
Renegade Brainwave	Adrift	Known Unknowns	Twine	太吾绘卷	Others
Goldilocks is a FOX!	Adrift	With Those We Love Alive	Twine	潜伏之赤途	Others
Six Silver Bullets	Adrift	SPY INTRIGUE	Twine	隐形守护者	Others
The Axe of Kolt [2014 ADRIFT version]	Adrift	Bogeyman	Twine	皇帝成长计划	Others
Unauthorized Termination	Adrift	Erstwhile	Twine	明月依旧	Others
Digital: A Love Story	Ren'Py	Turandot	ChoiceScript	中国式家长	Others
Analogue: A Hate Story	Ren'Py	Choice of Robots	ChoiceScript		
Hate Plus	Ren'Py	A Study in Steampunk: Choice by Gaslight	ChoiceScript		
Our Life: Beginnings & Always	Ren'Py	Creatures Such As We	ChoiceScript		
Save the Date	Ren'Py	Wayhaven Chronicles: Book One	ChoiceScript		
Doki Doki Literature Club	Ren'Py	Fallen Hero: Rebirth	ChoiceScript		
Long Live the Queen	Ren'Py	Tally Ho	ChoiceScript		

God is in the Radio	Ren'Py	Jolly Good: Cakes and Ale	ChoiceScript	
Black Closet	Ren'Py	Heart of the House	ChoiceScript	

## APPENDIX B

The game list of IF games we sampled in the second round is as follows. In addition, more details can be found on GitHub [40].

Table B.2. IF games sampled in the second round

Game Name	Publish Year	Game Engine	Game Name	Publish Year	Game Engine	Game Name	Publish Year	Game Engine
The Golden Fleece	1989	TADS	Hyper Rift	2015	Unity	The Intercept	2012	inklewriter
Desert Heat	2000	TADS	The House Abandon	2016	Unity	Sorcery! 2	2013	inklewriter
Who Created That Monster?	2004	TADS	Prison of Word	2017	Unity	80 Days	2014	inklewriter
Gun Mute	2008	TADS	Secret Little Haven	2018	Unity	The Man Who Killed Time	2015	inklewriter
Indigo	2011	TADS	Language Arts	2019	Unity	Li You's Secret Admirer	2016	inklewriter
Slasher Swamp	2014	TADS	Homebound	2020	Unity	Heaven's Vault	2019	inklewriter
Fake News	2017	TADS	Silicon and Cells	2021	Unity	Pendragon	2020	inklewriter
Jay Schilling's Edge of Chaos	2020	TADS	Celestial Tear Experince	2022	Unity	Overboard!	2021	inklewriter
How Prince Quisborne the Feckless Shook His Title	2023	TADS	Speakeasy	2023	Unity	A Highland Song	2023	inklewriter
The Hobbit: Vol I	2000	Quest	Child's Play	2006	Inform 7	Fallen London	2009	StoryNexus
Mitchell Quest	2003	Quest	Rendition	2007	Inform 7	Samsara	2012	StoryNexus
Beam	2006	Quest	The King of Shreds and Patches	2009	Inform 7	Dragon Age: The Last Court	2014	StoryNexus
Beyond Exile	2009	Quest	Kerkerkruip	2011	Inform 7	Sunless Sea	2015	StoryNexus
Poisonous Rainbow: The Power of Memories	2012	Quest	Coloratura	2013	Inform 7	HOJOTOHO!	2017	StoryNexus
Dysnomia	2015	Quest	Toby's Nose	2015	Inform 7	Sunless Skies	2019	StoryNexus
Dream Pieces 2	2018	Quest	Out	2019	Inform 7	Paisley	2020	StoryNexus

I Contain Multitudes	2021	Quest	What Heart Heard Of, Ghost Gussed	2021	Inform 7	Codename: Sugarplum	2022	StoryNexus
Alone in the Void	2023	Quest	Never Gives Up Her Dead	2023	Inform 7	The Bloody Wallpaper	2023	StoryNexus
House of the Damned	2000	Adrift	Afternoon in the House of Secrets	2009	Twine	Zork	1980	Others
Sophie's Adventure	2003	Adrift	The Uncle Who Works for Nintendo	2014	Twine	AI Dungeon	2014	Others
The Sisters	2006	Adrift	Harrison Squared Dies Early	2015	Twine	A Dark Room	2019	Others
Yon Astounding Castle! of some sort	2009	Adrift	The Temple of No	2017	Twine	Façade	2019	Others
Irvine Quik & the Search for the Fish of Traglea	2012	Adrift	Night City 2020	2019	Twine	太吾绘卷	2013	Others
The Spectre of Castle Coris [2015 ADRIFT version]	2015	Adrift	Tavern Crawler	2020	Twine	潜伏之赤途	2005	Others
Six Silver Bullets	2018	Adrift	Fish & Dagger	2021	Twine	隐形守护者	2018	Others
Grandpa's Ranch	2021	Adrift	The Good Ghost	2022	Twine	皇帝成长计划	2012	Others
Magor Investigates...	2023	Adrift	Dysfluent	2023	Twine	明月依旧	2014	Others
Digital: A Love Story	2010	Ren'Py	Choice of the Dragon	2010	ChoiceScript	中国式家长	2018	Others
Save the Date	2013	Ren'Py	Marine Raider	2011	ChoiceScript			
13 Minutes of Light	2014	Ren'Py	Treasure Seekers of Lady Luck	2013	ChoiceScript			
Grimm's Godfather	2015	Ren'Py	The Hero of Kendrickstone	2015	ChoiceScript			

Rough Draft	2016	Ren'Py	Runt of the Litter	2017	ChoiceScript	
Doki Doki Literature Club	2017	Ren'Py	Chronicon Apocalyptica	2019	ChoiceScript	
Heart of the Woods	2019	Ren'Py	Pirates of Donkey Island	2020	ChoiceScript	
Budacanta	2021	Ren'Py	The nascent Necromancer	2022	ChoiceScript	
The Moon Looks Beautiful Tonight	2023	Ren'Py	Bali B&B	2023	ChoiceScript	

## APPENDIX C

The game lists of IF games we sampled in the third round are as follows. In addition, more details can be found on GitHub [40].

Table C.1. IF games developed by Infocom

Game Name	Published Year	Game Name	Published Year
Zork I: The Great Underground Empire	1980	Cutthroats	1984
Zork II: The Wizard of Frobozz	1981	The Hitchhiker's Guide to the Galaxy	1984
Zork III: The Dungeon Master	1982	Suspect	1984
Enchanter	1983	A Mind Forever Voyaging	1985
Sorcerer	1984	Wishbringer: The Magick Stone of Dreams	1985
Spellbreaker	1985	Ballyhoo	1986
Mini Zork I: The Great Underground Empire	1987	Hollywood Hijinx	1986
Beyond Zork: The Coconut of Quendor	1987	Leather Goddesses of Phobos	1986
Zork Zero: The Revenge of Megaboz	1988	Moonmist	1986
Zork: The Undiscovered Underground	1997	Trinity	1986
Planetfall	1983	Border Zone	1987
Stationfall	1987	Bureaucracy	1987
Deadline	1982	The Lurking Horror	1987
Starcross	1982	Nord and Bert Couldn't Make Head or Tail of It	1987
Suspended: A Cryogenic Nightmare	1983	Plundered Hearts	1987
The Witness	1983	Sherlock: The Riddle of the Crown Jewels	1988
Infidel	1983	Arthur: The Quest for Excalibur	1989
Seastalker	1984	James Clavell's Shogun	1989
		Journey	1989

Table C.2. IF games developed by Her Interactive

Game Name	Published Year	Game Name	Published Year
Secrets Can Kill	1998	The Phantom of Venice	2008
Secrets Can Kill Remastered	2010	The Haunting of Castle Malloy	2008
Stay Tuned for Danger	1999	Ransom of the Seven Ships	2009
Message in a Haunted Mansion	2000	Warnings at Waverly Academy	2009
Treasure in the Royal Tower	2001	Trail of the Twister	2010
The Final Scene	2001	Shadow at the Water's Edge	2010

Secret of the Scarlet Hand	2002	The Captive Curse	2011
Ghost Dogs of Moon Lake	2002	Alibi in Ashes	2011
The Haunted Carousel	2003	Tomb of the Lost Queen	2012
Danger on Deception Island	2003	The Deadly Device	2012
The Secret of Shadow Ranch	2004	Ghost of Thornton Hall	2013
Curse of Blackmoor Manor	2004	The Silent Spy	2013
Secret of the Old Clock	2005	The Shattered Medallion	2014
Last Train to Blue Moon Canyon	2005	Labyrinth of Lies	2014
Danger by Design	2006	Sea of Darkness	2015
The Creature of Kapu Cave	2006	Midnight in Salem	2019
The White Wolf of Icicle Creek	2007	Mystery of the Seven Keys	2024
Legend of the Crystal Skull	2007		