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Current attitudes on digital interactive fiction and text adventure games within learning contexts: A systematic literature review

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Abstract: Interactive fiction (IF) is a type of textual work that allows an exchange between the user and computer, providing some meaningful human input to progress the story. There is substantial evidence to suggest that text adventure game development and readership yields rich learning potential across disciplines, however exhaustive research into this phenomenon is sorely lacking at present. This systematic literature review investigates 10 years of scholarly literature (2012-2022) referencing "interactive fiction" and "text adventure" within educational or learning contexts. A systematic review protocol containing the following steps was adopted: a) database search with parameters; b) full-text article screening; c) data extraction; and d) thematic analysis. Seven unique themes emerged from a thematic analysis of 63 high-quality scholarly articles: a) the immersive potential of IF; b) IF as a creative writing medium; c) improving reading literacy through IF; d) history instruction facilitated through IF; e) learning technology through IF; f) introducing complex topics and issues through IF; and g) building a community around IF. Results of this study suggest that reading and writing in the nonlinear tradition results in rich, multidisciplinary learning outcomes. Educators across disciplines are encouraged to consider ways in which they might integrate IF into their curricula to take advantage of the unique and broad benefits of practice.

Keywords: interactive fiction, text adventures, digital storytelling, game development, multidisciplinary learning

Introduction

It has long been argued that text adventure games belong to a "dead genre" (Heron, 2013; p. 55), representing a phenomenon from the distant past that was replaced by titles with more sophisticated gameplay and visually appealing graphics. A closer look at the literature suggests that text adventure game development persists well into the present for the rich learning potential that interactive fiction (IF) provides within and outside of educational settings. The benefactors of this genre are not merely a small niche community of enthusiasts chasing bygone pastimes, as one might suspect. IF has been referred to as a "new literacy" (Kozdras et al., 2006; p. 519), and a pedagogy that occupies different educational domains and learning contexts. The varied learning applications of digital IF validates a need for further research into this phenomenon across existing publications—an approach which is currently lacking from recent discussions on the state of IF.

Given the demonstrable success of digital IF authorship as a popular introductory computer programming exercise (Ladd, 2006), on top of being a viable approach to delivering creative writing instruction (Terry & Dusenberry, 2018), this study is interested in exploring what literature over the last 10 years has to say regarding the educational possibilities that IF offers to its players and developers. Additionally, by understanding the best practices and resources associated with text adventure game development, educators may find greater success when integrating these types of projects into curricula and individualized learning plans. No such study exists which effectively synthesizes findings across a body of IF literature.

There is also the matter of grumblings within gaming communities that the traditional text adventure is a thing of the past, despite evidence that it has simply evolved as a vehicle for personal creative expression and educational

implementation in coding and writing circles. Adventure games are often declared a dead artistic genre, however Roberta Williams (creator of the *King's Quest* series), makes the point that adventure games have just evolved over the years (Salter, 2009) instead of fizzling out. A study of this scope and recency is important to resolve lasting proclamations of IF's status within the modern society; although it must be stated upfront that this study's aim is to do so without bias favoring the "dead genre" argument or that of the more optimistic persuasion.

To better explore the state of current research on digital interactive fiction within the context of education and learning, a systematic literature review was conducted to answer the following question: *What is the scope of literature published within the last 10 years that describes the learning benefits of developing and playing digital interactive fiction?*

Literature Review

"IF" and "Text Adventure" Defined

Interactive fiction is a type of textual work that allows an exchange between the user and computer, providing some meaningful human input to progress the story (Montfort, 2005). A work of IF, also referred to as a "text adventure," sometimes employs graphics, but the central element that makes it a game is that it requires textual input and output (Mehta et al., 2010; Montfort, 2013). Schatten et al. (2021) paints a picture of the IF work as possessing some or all the following broadly defined components: rooms connected by doors, examinable objects, non-playable characters that can be interacted with, containers, consumable items, wearable objects, etc. (p. 385). While text adventure games often lack visually rewarding player experiences, they make up for this deficiency with some of the most intricate literary simulations packed with detailed map exploration and challenging puzzle designs (Montfort, 2013). The fact that IF games are still authored and played today is testament to its longstanding appeal to a particular type of individual who sees the rich capabilities that this medium provides.

Educational Applications

Montfort (2005) argues that while the commercial heyday of interactive fiction is over, authoring systems are attracting new authors that advance this modern literary art in innovative ways (p. 2). New technologies paved the way for a concept known as "digital storytelling," which enables students to explore creative writing projects, become better writers, develop critical thinking skills, and enhance media literacy (Xu et al., 2011). Teachers who assign multimedia projects to deliver creative writing instruction report students who are more motivated and engaged when learning the material (Trivelli-Bowen et al., 2014). IF authorship is clearly a facet of digital storytelling and, if facilitated properly, may build a student's confidence in writing prose and crafting nonlinear narratives.

In addition to developing students' written ability, IF also provides opportunities to introduce computer programming and game design theory through text adventure game development projects. Some general learning benefits of game development, for instance, requires systems thinking as students conceptualize the individual components of their

game as one cohesive unit (Nordby et al., 2016) as well as the problem-solving capabilities and programming expertise that comes as a developer (Denner et al., 2019). A semester-long introductory computer science course concluded that the student-designed content derived from building one's own text adventure game resulted in greater levels of motivation and satisfaction (Ladd, 2007).

Writing in the interactive fiction genre requires that the author include layers of complexity and richness to their work beyond simply establishing a setting and plot (Donikian & Portugal, 2004). This study hypothesizes that IF authorship and text adventure game development have far-reaching interdisciplinary learning benefits, particularly in building creative writing ability and technological literacy (computer programming). This study explores existing literature to identify other possible learning outcomes beyond the more recognized applications discussed here.

Research Methods

The research methodology selected for this study is the systematic literature review as it enables a careful examination of previous scholarly works which mentions IF and text adventure game development. The steps involved in this process welcomes publications that are high in quality, peer-reviewed, and narrowed sufficiently to answer the research question in a targeted, meaningful way.

A systematic literature review is a journal-length article with the sole purpose of examining existing, high-quality literature on a topic without introducing any new primary data to the analysis (Okoli & Schabram, 2010). Systematic literature reviews resemble more of a scientific process than the traditional literature overview, emphasizing elements of empirical research which help to eliminate bias and enable easier replication of methodology and approach (Lamé, 2019). This type of study involves performing a systematic and exhaustive search for publications that answer one or more research questions as well as provides a methodical way of synthesizing and presenting findings extracted from these sources (Siddaway et al., 2019). The strength of findings produced through a body of studies exceeds that of one or a few isolated studies, making it an appropriate research approach to uncover IF learning outcomes.

An essential element of the systematic literature review is developing a research protocol that provides a detailed plan for the process as well as provides a means for documenting activities carried out throughout the full study duration (Brereton et al., 2007). This section provides details on our systematic review protocol, which includes the following elements: a) database search with parameters; b) full-text article screening; c) data extraction; and d) thematic analysis.

Systematic Review Protocol

Database search with parameters.

Online literature search tools allow researchers to acquire large swathes of articles more efficiently across any discipline for their systematic literature review studies, however this freeing-up of time requires the careful planning of search strategies, syntaxes, and textual mining to maximize the use of these technologies (Gusenbauer & Haddaway,

2020). This section details our approach to searching the database for high-quality literature that is suitable for answering the research question.

Three of the more esteemed online databases of journal articles were selected for this systematic review: a) ProQuest; b) Web of Science; and c) JSTOR. The terms "interactive fiction" and "text adventure" are often used interchangeably, ultimately referring to works within the "choose your own adventure" (CYOA) fiction literary genre or works that grant the reader some level of decision-making ability that alters the trajectory of the story. It was necessary to utilize both terms in initial search queries, which is why the following string variants with "OR" operator were selected:

- ProQuest: "interactive fiction" OR "text adventure"
- Web of Science: (ALL=("interactive fiction")) OR ALL=("text adventure")
- JSTOR: "interactive fiction" OR "text adventure"

Queries contained the following filters: a) date of publication within last 10 years (2012 – 2022); b) language of articles is English; and c) articles are peer-reviewed. There is one notable exception to the peer-reviewed criteria as articles selected by the JSTOR database have no such filter, however the JSTOR website claims that most articles are peer-reviewed or (at a minimum) of high scholarly quality (JSTOR Support, n.d.). It was debated during research design as to whether the terms "learning," "education," and equivalents be included in search query, however it was decided that these extra terms reduced the range of the initial query and resulted in substantial data loss that detracted from our research aims. Learning outcomes are not always expressed in a predictable fashion, therefore the search query remained in a binary schema separated by "OR" operator.

The element of search was set to be as exhaustive as possible, reviewing titles, abstracts, keywords, and full text.

The result of this database search was 271 total articles (ProQuest: 181; Web of Science: 44; JSTOR: 46). Thirty-seven duplicates were removed (ProQuest: 11; Web of Science: 21; JSTOR: 5), before moving into the final stage of the screening process.

Full-text article screening.

A full-text review protocol was the final stage in the article selection process to ensure that remaining publications relate to learning and education. Criteria for inclusion and exclusion of sources in the systematic literature review are clearly stated and applied consistently so that it is probable that the same judgments would be made by a separate researcher (Siddaway et al., 2019); which was the approach taken in this section. Articles which demonstrated a clear educational or learning benefit from consuming or developing IF were included. Articles which focused exclusively on the entertainment appeal of the genre were excluded, although they sometimes occupied a fine line and required some degree of reasonable personal interpretation by the author of this study to resolve. Publications were considered for their ability to assist in answering the original research question posed earlier in this study.

Inclusion criteria consists of the following elements:

- Contains keywords “text adventure” or “interactive fiction”
- Publication period: 2012 - 2022
- Language: English
- Research quality: peer-reviewed (ProQuest/Web of Science), or high (JSTOR)
- Full-text review reveals IF relationship to education or learning

The 234 articles remaining after duplicate-removal were painstakingly reviewed against inclusion criteria for eligibility, with most requiring screenings beyond simply consulting the abstract. If one of these criteria were not met, the article was rejected from the final corpus of literature. The final total of articles that met the inclusion criteria for this systematic literature review was 63, and they were set aside for the thematic analysis to follow.

Table 1, below, presents the article totals across all three stages of the selection process.

Table 1

Database Search Results and Subsequent Filtering for Duplicates and Exclusions

Database	**Query Results**	**Duplicate Removal**	**Full-text Screening**
ProQuest	181	170	53
Web of Science	44	23	5
JSTOR	46	41	5
Total	271	234	63

Note: This table displays the number of articles selected through the initial keyword query across three databases (ProQuest, Web of Science, JSTOR), and the results after removing duplicates and conducting full-text screenings.

Data extraction

Data extraction forms include standard information (name of reviewer, date of extraction, publication details, additional notes, etc.), as well as excerpts of the text that helps to answer the research question (Kitchenham & Charters, 2007). An Excel spreadsheet was developed as a solution to effectively manage all 63 selected publications for this study as well as house descriptive and extracted data in a centralized location. Each entry contains publication information, results of the screening process, and raw data (primarily qualitative) extracted straight from the source. Justifications for an article’s exclusion from the review is also provided in a good faith effort for the purposes of adding transparency to this process as well as providing an auditable record trail documenting the interpretative choices made for these data sources.

Thematic analysis

Given quantitative data are lacking, this study provides a narrative approach to synthesizing information as opposed to employing a statistical meta-analysis. Relationships between publication findings are presented through a thematic analysis, building an understanding of emergent trends present in scholarly sources. It is worth noting that all themes identified and shaped through this analysis emerged through an inductive approach as opposed to pre-defining them through deductive means. Where deductive research deals primarily in testing theory, inductive research allows data to generate the theories for examination (Williams & Moser, 2019). In this way, we allowed the themes to aggregate organically through first manually coding the extracted qualitative data, and then narrowing these codes down into broader themes that would structure the systematic literature review.

Researchers have the option of utilizing advanced qualitative software packages to help facilitate the data coding process (Williams & Moser, 2019), however this author opted for a manual approach of searching documents for instances of "interactive fiction" and "text adventure," and then examined the content directly to coalesce around specific themes. By taking this direct approach, we were able to wade through content belonging to disparate perspectives and disciplines that qualitative analysis software would have trouble picking up on. Additionally, several sources mention our key words anecdotally or as a diminutive element within the full text, making running the content within a software solution appear unreliable. There appeared to be little alternative in conducting a manual review of each of the 63 documents for the purposes of coding and identifying themes without risking elimination of valuable understandings into this educational phenomenon.

Nowell et al. (2017), describes the issue of rigor and trustworthiness when conducting thematic analyses, arguing that the process should be illustrated through a decision trail that guides the interpretation and thematic synthesis of data from multiple sources (p. 1). Our goal in this research is to provide a blueprint backed by an auditable trail that documents the decisions made at every juncture—from inclusion criteria to how data were interpreted. A document was developed that houses all extracted data, organized by themes. This document informed the structure of the systematic review narrative and may be consulted and/or replicated in future research applications.

Results

This section presents the results of our analysis of publications included in this systematic literature review, representing the last 10 years of scholarly work into the role that IF plays in the context of learning. Some sources provided qualitative data supporting more than one theme, such as highlighting the effects of IF on different disciplines within the same article (e.g.: computer programming and fictional writing).

Seven distinct themes were uncovered from this analysis, showcased in Table 2.

Table 2

Emergent Themes from Thematic Analysis

Theme	ProQuest	Web of Science	JSTOR
The immersive potential of IF	6	2	3
IF as a creative writing medium	8	-	2
Improving reading literacy through IF	7	1	-
History instruction facilitated through	6	2	-
Learning technology through IF	13	1	-
Introducing complex topics and issues	13	1	-
Building a community around IF	6	-	-
Totals	61	7	5

Note: This table displays the seven themes that emerged through the thematic analysis in addition to the number of articles that contributed to each, organized by article database (ProQuest, Web of Science, JSTOR).

These themes are described in greater detail, introducing key educational findings from the perspectives of IF authorship and playability. Table 3 provides definitions and examples belonging to each theme to help build a more nuanced description of the subsections that follow.

Table 3

Emergent Themes from Thematic Analysis

Theme	Definition	Example
The immersive potential of IF	Providing a more immersive learning experience through IF	Consumers are involved in the IF story and take on the role (Antonsen, 2020).
IF as a creative writing medium	Building student confidence and ability in writing through IF	Students learned how to connect their stories (Barber, 2016).
Improving reading literacy through IF	Improving reading ability by reading IF	Participants preferred reading IF fiction over traditional text (Hall, 2019).
History instruction facilitated through IF	Delivering history lessons through history themed IF titles	Players are invited to put pieces of the past together (Stocks, 2019).
Learning technology through IF	Treating IF as a computer programming and game design learning activity	Students developed, tested, and published their IF games (Yacono, 2021).
Introducing complex topics and issues through IF	Miscellaneous topics (e.g.: safety, medical, etc.) delivered via IF	An interactive diabetes patient case was designed (Kiles et al., 2021).
Building a community around IF	Networking, knowledge-sharing, and collaboration in IF	The IF-network emphasizes technique and rhetorical craft (van Dijk, 2014).

Note: This table provides working definitions and examples of the themes identified during the thematic analysis.

This study first describes an observed phenomenon of the player becoming immersed in the IF experience, heightening their reception to concepts and ideas within story world. We then discuss IF as a viable prompt for writing fiction and previous attempts to implement it in educational settings. The strength of IF titles to encourage reading is also a distinct theme—with history instruction being a closely-related yet unique concentration in placing students in textually-rich historical locations. We then examine IF, or the "text adventure game," as a vehicle for building technical skills and game design practice. The literature also suggests that IF can deliver training in special topics that challenge the player to solve problems or apply what they've learned in scenario-based puzzles. Finally, the benefits of belonging to communities of IF hobbyists, enthusiasts, writers, and developers is discussed as a distinct theme uncovered within the literature.

The Immersive Potential of IF

The road to IF started with CYOA books which had the reader imagine themselves in the position of the main character and "driver" of the story (Robson & Meskin, 2016). This short-lived genre of printed fiction was popular in the 1980s and 1990s and placed the reader into the shoes of the story protagonist (Wake, 2016). While the heyday of CYOA fiction has passed, this convention carried forward into the computer-based text adventure games that we still enjoy today.

Ensslin and Bell (2012), describes the power of the "you" phenomenon in the following: "Using present-tense verbs and imperatives, IF creates the illusion of being present in storyworld that is constructed by the reader in creative interaction with the programmed text" (p. 57). This phenomenon can be observed in the way that players in videogames refer to their avatars in the first-person manner (their in-game personage), which also applies within IF world environments (Antonsen, 2021).

A few studies investigated factors that allow a player to best identify with the main character in an IF. One study examined IF players and obtained evidence that specific personality traits such as extraversion, openness, and agreeableness, produced a higher sense of identification with the characters (Soto-Sanfiel et al., 2014). In an observation of 228 participants within a text adventure game environment, results revealed that immersive tendencies predicted the player's identification with the main character of the IF (Felnhofer et al., 2022). Another author took a more mathematical theoretical approach by combining three ideas to explain the phenomenon of the player imagining themselves in the role of the IF protagonist: a) The Imagination Assumption; b) The Indexicality Thesis; and c) The Identity Crisis (Antonsen, 2020). Immersion of the player is clearly a core concern for IF developers.

So why does the player's degree of identifying with the main character matter? Equipped with this knowledge, educational titles may be optimized in such a way that the learner becomes more immersed in the narrative and therefore more receptive to the lessons embedded within. Martínez-Cano et al. (2019) describe the connection formed between the player and the avatar, by virtue of interactive experiences, and how the mounting sense of

immersion enables greater assimilation of the message that is intended for them (p. 1480). IF provides a window into the thought processes of the reader when faced with different scenarios (Csikar & Stefaniak, 2021), which might prove useful in engineering future game experiences that are most conducive to learning new information.

Cova and Garcia (2015) liken IF to a children's game of make-believe in how it imposes some constraints on the player yet provides enough freedom of action to make it fun (p. 113). Cook (2021), provides an alternate perspective to other scholars' positions on tracing IF back to the early manifestations of computer games, instead contending that it goes back further to the "free choice" movement of 1980's America, ushering in choice-based narratives that appeal to children (p. 424). Both authors, in their own way, acknowledge IF as the thing of imagination and childlike wonder.

IF as a Creative Writing Medium

Crutcher (2017), makes a case for the legitimacy of IF as a distinct literacy and activity selection within language curricula:

> *As my department considers the humanist goal in the liberal arts of language study as well as the possible inclusion of student options to explore languages, I argue coding, writing in games, and ludic writing should be viewed as legitimate forms of narrative… (p. 4)*

One of the perhaps more obvious ways that IF impacts an individual, in terms of learning, is in their development as a writer by broadening their creative instincts and talents through digital storytelling. The creator of a work of IF is tasked with writing into existence a multifaceted environment that can arrest the interest of the reader for the full duration of the narrative (Santos, 2020). In this way, IF-writing is different than standard essay-writing as it introduces additional layers of complexity into the craft.

Writing IF is even more possible in the present day with the advent of authoring systems that contain standard text editor elements that the typical writer would be familiar with (Sarasa-Cabezuelo, 2020). This medium has been further democratized in recent years through the elimination of a "need to code" base requirement, opening it up to writers without computer programming aspirations. Where it was once a project only to be undertaken by CYOA authors and computer hobbyists, IF and text adventures are now an artform that is enjoyed more broadly and across many demographics. Despite this broadening of appeal, one teacher admitted that even after allowing students to create texts in less familiar formats, most students would opt for the traditional essay and respond with surprise when being introduced to a work of IF authored by another student (Ahern, 2013). This suggests that IF is still relegated to an obscure alternative to essay writing, if it is entertained in the classroom at all.

When considering everything that is involved in writing IF, it must be considered for its multi-faceted nature and complexity which typically goes beyond more conventional writing endeavors. Barber (2016) further expands the

learning potential of digital interactive storytelling by including additional skills which orbit the actual writing of the game, including: critical thinking, selection of content, evaluation of sources, and editing the content (p. 7). One author describes a new form of art-based research through IF, bringing together music, graphics, and interactions with the thoughts of the artist into a new way of creating knowledge and conducting scholarly research (Liao, 2017). This level of complexity makes for a rich writing experience, especially when multimedia possibilities are injected into the learning object.

Below are a few of the ways that the literature demonstrates how IF might improve or enhance the author's writing ability. A first-year rhetoric and composition course professor assigned an IF project and concluded through 500-word reflection essays that students reported higher engagement and enjoyed being provided the ability to explore their storytelling creativity (Yacono, 2021). Hall (2019) offers a quote by high-school student, Lily, who when asked if she was able to utilize her experience reading IF in her own writing responded with: "I think I learn a lot by paying attention to how other people write. The fact that I get to make choices in the story gives me more ways to analyze it" (p. 124).

Interestingly, a few studies describe the role of IF in teaching a foreign language. One article describes the development of specific IF writing prompts for multilingual students to utilize as part of their foreign language curriculum (Sauro et al., 2020). Another study provides a real-world account of this pedagogical intervention in a secondary English class in Belgium, concluding that there were many challenges with the open-ended aspects of the project and students lacking prior storytelling knowledge—but ultimately students benefitted in terms of developing domain-specific skills in language (Cornillie et al., 2021). Implementing IF within foreign language curricula allows authors to toggle between languages and is yet another sorely unexplored area of practice that may be worth further investigating.

Improving Reading Literacy through IF

A prevailing perspective on the intersection of IF and education is as it relates to authoring works, however this study would be ignoring a substantial body of literature that describes the benefits that IF provides to its readers. The consumption of IF and text adventure games is just as germane to the topic under examination as is their development. This section describes some of the highlights gleaned through this systematic literature review, including: a) greater reader engagement and excitement; and b) new textual dimensions explored through IF. A few observed challenges when offering IF in reading curricula are also explored here, although they are in no way exhaustive.

Articles that describe IF tend to focus on positive impacts that the intervention has on student engagement with reading material (primarily fiction), when offered narratives that place some degree of control in the hands of the reader. One English teacher observed the students, when presented with immersive text-based worlds, enthusiastically drawing maps of the game world (Ostenson, 2013). Another study discovered that 64% of adults

and 68% of youth reported that interactive texts made them want to read more, treating reading more as a game instead of a static text (Hall, 2019). Martin (2018) describes the IF phenomenon with a computer game vernacular: "To use computer game terminology, it is a game that resides in an open world or sandbox state of immersive creativity, which means it offers more freedom of choice than the usual linear structures of game play" (p. 225).

This choice of delivering reading instruction is unique insofar as it introduces dimensions to fiction and the way that students interact with it which are generally lacking or muted in more traditional textual formats. There is the concept of "fictional truths," which Willis (2019) describes as portions of narrative being revealed to the player through one playthrough, but other fictional truths remain undiscovered without subsequent playthroughs (p. 47). There are also the dialogic possibilities of IF being introduced to a classroom: the scenario where students work together to discover the potential meanings of passages in an IF game and decide, together, upon the input that makes the most sense to progress the game (Holdstock, 2021). The additional layers of complexity belonging to IF bring about new ways of interpreting and working with fiction. Breathing life into the Achilles paradox by adapting it into an IF work (Spivey, 2020) is a notable example, providing the reader with a new viewpoint to an ancient parable.

While research tends to present a more positive reception to IF as a specific fiction reading activity, it is not without some drawbacks and challenges. One study examined the perspectives of English as a Foreign Language (EFL) learners when introduced to IF, concluding that faulty game mechanics such as unclear command options and a lack of textual descriptions detract heavily from the experience (Sargsyan & Madyarov, 2020). In one study, youth and adults stated that the stories offered by a Delight Games app were engaging due to their interactive nature, however it was the quality of the actual stories that encouraged them to return (Hall, 2020). These insights suggest that while IF has the potential to engage even the most hesitant of readers, it must: a) be executed properly; and b) have a quality story that is enjoyable for the reader. Fiction that is augmented by digital media and innovative design approaches is not exempt from a very simple and fundamental rule: the story needs to be good. IF also has the added expectation to deliver effective gameplay elements and mechanics to contend with more conventional reader options.

History Instruction Facilitated through IF

IF narratives allow players to explore content that focuses on specific locations and time periods (Barber, 2016). This makes IF a uniquely qualified approach to immersing the player in history. Table 4 presents seven educational implementations of IF, each belonging to a unique branch of history or geography. This is a sample of IF activities that had been attempted to deliver historically rich content for a variety of learners and within varied learning contexts.

Table 4

Select Applications of IF in History Instruction

Theme	Definition	Example
Geography	Six teams of school pupils were tasked with developing a text adventure game that applies geography knowledge, the theme being "Tourism in Myanmar: threat or opportunity."	(Maier & Budke, 2020)
Indonesian history	The Indonesian tale of "Prince Kian Santang" is rendered into IF title to address the gradual loss of historical understandings by younger generations.	(Tanjung & Sitompul, 2020)
Philosophy	Zeno's philosophical paradoxes are developed into three IF titles as puzzles that the player may interact with, resulting in new understandings.	(Spivey, 2020)
Medieval history	Medieval studies teachers turn to interactive fiction game development to deliver lessons and better engage students.	(Ramey et al., 2019)
American slavery	Students play as a girl in bondage and are given opportunities to make decisions which will determine her fate (further enslavement or freedom).	(Acosta & Denham, 2018)
Roman history	An IF with virtual images leads players through a simulated Vindolanda Roman auxiliary, allowing them to experience history as visitors to Rome's past.	(Stocks, 2019)
Religious studies	A teacher designs two text adventure games that teach stories from the Old Testament using digital tools.	(Lester, 2018)

Note: This table presents seven themes uncovered in the thematic analysis along with topic, description of the intervention, and reference citation.

Learning Technology Through IF

One of the key hypotheses maintained at the beginning of this systematic literature review is that creating works of IF lends itself to bolstering a learner's technical ability, such as programming, systems-thinking, and the problem-solving capabilities that are inherent in game design and development. While the line between themes "writing" and "technology" often blurred during the analysis, it was ultimately assigned to the latter category when authoring

systems, programming languages, and digital tools entered the discussion (with a few exceptions). In this way, the computer science element of IF became one of the more dominant themes in this study.

Sumner (2016) provides a direct connection between the advent of text adventure games and IF titles and the widespread acceptance of personal computers: "Games—not only arcade-style video games but also the text-based phenomena known at their peak of popularity as "adventures" and later as "interactive fiction"—had a particularly prominent role in the establishment of mass computer use" (p. 40). This statement suggests that the establishment of digital IF ran concurrent with the broadening appeal of microcomputers, helping to set the tone for the remainder of this analysis. Sumner (2016), further adds:

> *Second, games development was a core pathway into professional careers for adolescent software tinkerers of the 1980s, and the games industry fostered many technical achievements, particularly in graphics manipulation and in squeezing the maximum performance out of constrained 8-bit machines. (p. 41)*

Could it be reasonably inferred by this quote that a good many of the proficient computer programmers that operate within today's tech fields had at one point authored a computer text adventure game as a personal project? These two statements may indicate the potential of the text adventure as an introductory activity that leads a "tinkerer" into an eventual career as a computer programmer.

The body of literature which collated into "IF as a medium for learning tech" revealed an assortment of modern IF authoring solutions, from common web development languages (Diez-Sanmartín et al., 2020); Gómez-Albarrán et al., 2021), to sophisticated authoring systems created for the express purpose of writing a work of IF (e.g.: Cornillie et al., 2021; Felnhofer et al., 2022; Gómez-Albarrán et al., 2021; Sarasa-Cabezuelo, 2020; Sauro et al., 2020). Within the last 10 years of IF, there appears to be an ever-increasing trend toward more simplified solutions that do not require as much technical expertise as text adventure writing demanded of its authors in the earlier days. A content editor conceals the complexity of the programming and maintains the structure of a normal text editor, only with features to connect passages and provide a web of interactions within a narrative (Sarasa-Cabezuelo, 2020).

Table 5 presents some of the common authoring solutions encountered when mining the data from literary sources, along with the frequency of articles which discussed them.

A few interpretations might be produced from this dataset. Firstly, the IF authoring system, Twine, easily eclipses all other solutions in popularity over the last 10 years of research and publications. This finding aligns with a statement by Lester (2018), "[Twine] is widely considered to be a learner-friendly tool. It is normally – though by no means invariably – chosen as a first tool for learners of interactive fiction" (p. 269). Second, the only programming languages encountered in this analysis were the common web-design triad of HTML, CSS JavaScript, a single mention of the Zork Implementation Language (ZIL), and some discussion on Inform 7—the second most

referenced solution. General-purpose programming languages like JAVA, C#, Python, etc. were surprisingly missing from this body of literature. Most articles that mention IF authoring solutions suggest that user-friendly systems have an edge over methods of old to create works of IF.

Table 5

Programming Languages, Authoring Systems, and Tools from the Literature

Tool	Language/System	Frequency	Associated citation
JavaScript, HTML5, CSS, PHP (web-based languages)	L	2	(Diez-Sanmartín et al., 2020); (Gómez-Albarrán et al., 2021)
Universal Ripsoft Quest	S	1	(Fiadotau, 2016)
Twine	S	14	(Cornillie et al., 2021); (Felnhofer et al., 2022); (Fiadotau, 2016); (Gomez, 2019); (Gómez-Albarrán et al., 2021); (Holdstock, 2021); (Liao, 2017); (Maier & Budke, 2020); (Morningstar-Kywi & Kim, 2021); (Phillips & Lund, 2021); (Sarasa-Cabezuelo, 2020); (Sauro et al., 2020); (Wells & Boyd,
Inform 7	L	4	(Cornillie et al., 2021); (Gómez-Albarrán et al., 2021); (Sarasa-Cabezuelo, 2020); (Wells & Boyd,
ZIL	L	1	(Wells & Boyd, 2019)
Unfold Studio	S	1	(Proctor & Blikstein, 2019)
Google slides	T	1	(Yacono, 2021)
Quest	S	2	(Gómez-Albarrán et al., 2021); (Sarasa-Cabezuelo, 2020)
Ren'Py	S	1	(Sarasa-Cabezuelo, 2020)
Squiffy	S	1	(Sarasa-Cabezuelo, 2020)
TADS	S	1	(Sarasa-Cabezuelo, 2020)
Inklewriter	S	2	(Cornillie et al., 2021); (Sauro et al.,

Note: This table provides the programming languages (L), authoring systems (S), and tools (T) utilized in the body of studies along with their frequency of mentions and reference citations associated.

Outside of Twine, a few other authoring systems were described in the literature, although they appear to command a much smaller audience of users. A Russian language IF engine called "Universal Ripsoft Quest" (URQ) gained some popularity online despite lacking in graphical capabilities due to the small download size of games and the syntax simplicity which appealed to aspiring authors with no programming experience (Fiadotau, 2016). One high-school class fulfilled an IF authoring project with the Unfold Studio system, however less than 20% of stories made use of computational concepts such as randomness and variables despite having been taught how to implement them into their game (Proctor & Blikstein, 2019). Despite the strengths of alternative IF authoring systems, there is some speculation as to their ability to provide a feature or innovation that the better-known Twine doesn't already provide its users.

A second option outside of Twine is Inform 7, which appears to enjoy some degree of popularity within seasoned IF circles as a specialized programming language designed specifically for IF authorship. Inform 7 is a fully declarative language that attempts to read as closely to the natural English language as possible, making it hardly recognizable at all as a programming language (Wells & Boyd, 2019). Lester (2018), praises Inform 7 for its English-language syntax, but admits that it can be picky and require some time to learn (p. 272). Inform 7 appears to be the beginner programmer's answer to IF much in the same way that Twine is for those focused more on writing story, which is backed up by the frequency of IF articles that mention them (Twine: 14; Inform 7: 4).

There were some instances in the literature of basic web developer languages having been employed in recent IF projects, specifically making use of HTML, CSS, JavaScript, and PHP to deliver stories hosted online. In one paper, a domain-specific-language called HEXIFE was developed as an extension of HTML5 with an IF-specific markup and support through a runtime environment based on HTML, PHP, CSS, MySQL, and JavaScript (Gómez-Albarrán et al., 2021). One project made use of ILSAditor, a digital editing tool, which would output a finalized IF project in a web-oriented format (HTML5, CSS, and JavaScript) (Diez-Sanmartín et al., 2020). The shareability aspect of a web based IF makes this an enduring approach to authorship, however it does not appear to enjoy the degree of popularity as Twine and Inform 7.

There is also a category of articles which document specific IF activities embedded within traditional educational curricula. A hybrid liberal arts/technology undergraduate program in Poland introduced an IF component with a lab to the game design curriculum (Mochocki, 2016), providing a unique interdisciplinary experience. One university challenged students to design a game which deals in the concept of human errors within health care, resulting in an IF title that presents the player with scenarios demonstrating the ways that humans make errors (Iacovides et al., 2019). In one classroom, students proposed, developed, and eventually published IF games over one month of development in their platform of choice (Twine or PowerPoint), resulting in a newfound preference amongst students for game development activities over more familiar options (Yacono, 2021). These types of examples suggest that IF applications within learning contexts still exist and occasionally result in publications within educational journals—although the true prevalence of this type of pedagogy remains largely unknown.

A few significant innovations occurred within the realm of IF with possible future implications in terms of how fictional works are developed now and into the future. One text adventure game, "AI Dungeon 2," generated the first never-ending IF with advanced AI methods, prompting considerations into new types of games that could employ these or similar technologies (Risi & Togelius, 2020). Game jams and competitions that push the limits of game development have also been documented, revealing new insights and approaches to how games could be crafted and designed. Fiadotau (2015), describes the "TWIFComp4" competition, which asked for IF games with a source code not to exceed 140 symbols, challenging authors to think outside of the box (pp. 90-91). New approaches to text adventure game development occasionally reveal new understandings and applications, the effects of which might reverberate into the future and shape the fundamental nature of the genre.

With such a heavy emphasis on utilizing IF authoring systems (as opposed to programming a game from scratch), it is reasonable to wonder if content better aligns thematically with improving written ability through IF versus learning technical skills. Maier and Budke (2020), argue that even though coding is unnecessary, developing a text adventure in an authoring system still employs complex problem-solving and game design processes (p. 1110), making it an activity that is steeped in technology use. It is also important to consider the element of meeting students where they are at in terms of maturity and technical experience, making an IF authoring system not only an appropriate option in the general sense but also an activity geared toward developing technical ability in learners of every age. Learning to code is one possible outcome in authoring a text adventure game with a programming language, just as learning game design principles comes with utilizing IF authoring systems. Both exist within the framing of IF as a technology pedagogy, approaching it at different yet complementary angles.

Introducing Complex Topics and Issues Through IF

Recent publications describe IF as the vehicle for delivering instruction on special topics (sometimes referred to as "serious games") outside of the previously discussed domains in writing, reading, history, and technology. Special topics include diverse areas in science, health and wellness, business, medicine, and real-world applications. Some of these publications demonstrate the problem-solving, scenario-based training aspects of interactive media, revealing a host of potential educational and professional points with which such a game could be integrated.

Science topics are one such category having been benefitted through the integration of interactive narratives in the classroom. A STEM-focused (science, technology, engineering, and mathematics), curriculum leveraged a multiplayer text adventure game that required youths to collaborate on science-based puzzles through textual commands, revealing insights into student cooperation in the IF multiplayer environment (Jagoda et al., 2015). One small-scale study discussed an IF covering Newton's laws and was tested on 27 high school chemistry students, resulting in a positive effect size on students' understanding of physics (Flynn & Hardman, 2019). The applied nature of science as a discipline (e.g.: labwork, natural interactions, etc.), provides subject-matter harmonious to IF as a method of instruction (in select cases); particularly for its ability to simulate the world around the player with rich visual multimedia to accompany the text.

There are a couple of instances where studies incorporate the use of IF as instrument to examine or verify some observable phenomenon in novel ways. One study, for example, examined the relationship between participants' choices in IF to commit violent acts and their level of satisfaction with the story presented to them (Lagrange et al., 2019). York et al. (2021) encountered a philosophical conundrum when applying the digital game-based language learning (DGBLL) categorizations to IF-based classroom scenarios: a) game-based: if the teacher creates the IF game as a mediating tool; b) game-enhanced: if the IF is found by the teacher online; and c) *unclear:* if the IF was created by the student (p. 1167). Another study tested a model-based reinforcement learning approach with a basic text adventure game as data sample to exploit structural properties of the environment (Serban et al., 2020); an example of applying IF to validate a hypothesis that does not necessarily involve human subjects and their

behaviors. The inherent structures of the IF phenomenon could be creatively applied to other scholarly or scientific contexts as a data object/model instead of applying it in more straightforward and predictable ways.

IF applications geared toward building awareness and familiarity of certain health and wellness issues were also encountered in the literature. An IF gamed entitled "Depression Quest" was released in 2013 and places the player in the role of a character suffering from clinical depression, resulting in mixed reactions from players due to the sensitive nature of the content (Consalvo & Phelps, 2020). Another study describes two text adventure games that explore romance and sexual themes, challenging the teenage player to navigate uncomfortable simulated scenarios with desirable and undesirable outcomes (Franco Vega et al., 2022). Another IF assists adolescents with autism by simulating real-world social scenarios for the purposes of gaining skills that they may apply in their everyday lives (Sani-Bozkurt et al., 2017). "TRAUMA" is an IF game that tells the story of a woman who survives a car accident and details her life after the incident (Roederer & Filser, 2018). In these examples, the immersed player may experience the impacts that decisions and events have in the real-world, without any real repercussions yet the benefit of newly gained knowledge.

Medical education is one area identified in the literature as being particularly favorable to IF implementations, given the focus on clinical practice and simulating patient cases that might be experienced in the hospital or clinic setting. In a medical college, the Twine software was used by 11 faculty members to develop interactive patient-scare scenarios within their areas of expertise, resulting in > 90% of students responding favorably to the games (Morningstar-Kywi & Kim, 2021). In another study, a CYOA patient case was built which focused on managing diabetes, resulting in greater student confidence and clinical decision-making ability (Kiles et al., 2021). IF use in medical and allied health science education is a promising area to explore in the years to come as the effects of erroneous decision-making do not risk harm to patients but does help build knowledge for the clinician-in-training.

Some literary sources discuss IF implementations as an approach for teaching focused, practical skills that may immediately be internalized and applied in the real-world. Below are a few examples of this trend within different learning contexts:

1. "Appalachian State University's Library Adventure Game" is an IF with minigames and animation to teach the player how to best navigate and make optimal use of library resources (Snyder Broussard, 2012).
2. In a professional development meeting, the facilitator who was tasked with teaching the four pillars of the connected mentor framework to mentors-in-training did so by reading an IF story that he had created with Twine, leading attendees to acquire new and applied understandings of the material (Phillips & Lund, 2021).
3. Disaster education for school-aged children was approached using a head-mounted display augmented reality solution with options for the player to interact with the surrounding environment, reinforcing lessons in emergency and disaster response (Mitsuhara et al., 2017).

Building a Community Around IF

A substantial portion of the literature describes communities of IF authors and enthusiasts, some with a greater online presence than others, and the potential for personal growth and practice that comes with being a member. IF networks were likened to 19th-century European and United States literary and cultural societies comprised of amateurs and professionals who conducted writing competitions to advance in their craft, focusing on building rhetorical excellence (van Dijk, 2014). IF "guilds," as we shall henceforth refer to them, are not only a phenomenon in the western world, but also exists in pockets of activity across the globe.

The "interactive fiction retrogaming scene," as Allington (2015) refers to it, was at that time estimated at 3,000 registered members and 2,300 developers who produced numerous independent works (pp. 269-270). The members of the international IF network (discussion list rec.arts.int-fiction), provides a substantial open archive of technical and poetic theory for the benefit of IF developers, appearing disinterested in serving an economical aim (van Dijk, 2014) and suggesting that the desire to create is at the forefront of the community. The growth of the network was also due in large part to the release of freely distributed IF authorship tools such as Inform, inklewriter, and Twine, alongside the emergence of Usenet groups, and eventually social media (Cornillie et al., 2021). The democratization of IF authorship shifted the industry from commercially viable companies producing it into a vibrant hobbyist culture of individuals and groups with a shared interest in the genre.

The hobbyist culture that emerged from the ashes of IF's commercial decline revealed a thriving independent (indie) developer scene (Cornillie et al., 2021) to push the medium along through the ensuing decades. A case study detailing the development of an IF game with artificial intelligence dungeon-building capabilities demonstrated the power of indie game networks, as a teaser released by college student Nick Walton resulted in major journalist interest and 1,000,000 players lending support virtually overnight (Hua & Raley, 2020). This level of support and financial backing encourages the advancement of IF and certainly supports the individual learning outcomes of the game's developer. As an aside, this level of acclaim for an IF title in the year 2019 clearly challenges previous assumptions that the text adventure is a gaming genre that long outstayed its welcome.

Within the last five years, publications describe Spanish-speaking and Latin American online IF groups and some of their novel approaches to collaboration and networking (Gainza, 2017; Gomez, 2019). Specific IF communities include "Libros juegos," the primary online community, groups that focus on the use of a specific authoring software, such as Twine, and those that follow specific IF authors and their works (Gomez, 2019). "La Huella de Cosmos," a project sponsored by Escuela Superior de Artes y Espectáculos of Madrid, enabled a community of writers and readers to contribute ideas in the development of Peruvian-Venezuelan writer and journalist Doménico Chiappe's IF work (Gainza, 2017). The recent development of these small, decentralized communities of IF writers provide a window into the attributes of fledgling online writer's guild communities with an added veneer of technology and digital storytelling that sets them apart from their predecessors.

Affiliation with a group of fellow IF authors is more possible online and indeed the preferred means of networking within the field, according to the literature. The longstanding existence of the online IF community, starting in the 1990's and going strong well into the present (van Dijk, 2014), is testament to the longevity of the medium and the willingness of members at all levels of expertise to share best practices, mentor, collaborate, and strive for individual and community excellence. The IF "guild" is teeming with learning opportunities brought about through a shared passion for the artform, its development, and an unwavering dedication to its readership.

Discussion

This systematic literature review analyzed 63 peer-reviewed journal articles published over the last 10 years describing the educational and learning benefits of reading and authoring digital IF. Seven themes were identified, comprising a wide-reaching impact across multiple academic disciplines: a) writing, b) reading, c) history, d) technology, and e) special topics ("other"). This study also explored the learning advantages of a) player immersion within interactive narratives and b) belonging to an IF community. Some of the main highlights of this research are discussed here with newly acquired understandings of pedagogical applications and theory that define the last decade of IF from a learner's lens.

This comprehensive review of the literature revealed a variety of documented implementations within educational and learning contexts beyond our initial writing/programming dichotomy introducing this research. IF should not be viewed merely as a creative writing exercise or introductory computer programming project; but rather one which may be treated as a vessel for delivering educational content in ways that are sufficiently engaging to the reader. The added element of "learner immersion" provides virtually endless possibilities to deliver material in ways that engages the learner beyond what is possible in most conventional texts. Additionally, the potential exists to expose the player to real-world scenarios without any of the repercussions that comes with making a false selection (Franco Vega et al., 2022; Sani-Bozkurt et al., 2017), building practical skills and knowledge normally acquired through real-world experiences.

There is also an observed commonality shared among studies where students reported heightened levels of satisfaction and excitement when reading or writing IF as an alternative to traditional reading and writing assignments. With IF works becoming more the product of multimedia with visual and audio elements that accompany a story text (Liao, 2017), consumers of IF are treated to rich digital storytelling experiences that places them at the center of the narrative. When asked, students reported enjoying reading for the first time when introduced to IF (Hall, 2019) and a preference for creating works of IF over essay-writing (Yacono, 2021). It is worth mentioning that proper execution and quality of the IF activity can be the difference between a positive experience and an ineffective one—meaning it is not a completely foolproof strategy to encourage reading and writing in the classroom.

Another key finding in this systematic literature review is an overwhelming preference within the last 10 years for authoring systems that simplify the production of IF titles (Lester, 2018). This discovery was surprising as we originally theorized that IF game development is a viable opportunity to learn coding fundamentals, given its relative simplicity as a beginner computer programming activity. The findings from this selection of peer-reviewed journals suggest that this has simply not been at the forefront of scholarly pursuit as of late. The fiction writing appeal of IF appears to eclipse its application as a "learn how to code" activity, however the literature does describe other technological literacies that students might encounter in these types of endeavors (problem-solving, game design principles, systems-thinking, etc.). The advent of authoring systems like Twine seems to have replaced general-purpose programming languages as the preferred solution for writing IF.

There is an apparent decline in the use of the term "text adventure," shifting to the use of "interactive fiction" when discussing dynamic storylines with branching narratives and roleplaying elements. Most recent articles which fit the inclusion criteria used the term "interactive fiction" over the now visibly aged "text adventure" synonym. Could "interactive fiction" be yet another iteration of the CYOA story genre in the same way that "text adventure" had at one point enjoyed common usage amongst players and authors during its heyday? Is "text adventure" more a carryover from a time when IF was the dominant computer game genre? Allington (2015) suggests as much in the following: "Videogames such as these were originally described not as 'interactive fiction' but as 'adventures', 'adventure games', 'text adventures', or 'text adventure games': all terms that essentially meant 'games similar to Adventure'" (p. 269). This observed terminological sea change is important to consider as it might inform future approaches to scholarly inquiry—does one opt for "interactive fiction," "text adventure," "choose your own adventure," or some future iteration having yet revealed itself when inquiring about the current state of IF?

Finally, there were a few notable works with the aim of investigating and describing IF communities online, revealing a reservoir of potentially untapped data relating to our topic of focus (the learning benefits of IF). The presence of online IF devotees, authors, and readers goes back to the infancy of the internet and, by all apparent measures, persists well into the present. Literature which describes online IF communities either references them anecdotally (Cornillie et al., 2021; Gomez, 2019), or provides substantial digital ethnographic analyses (Allington, 2015; van Dijk, 2014), however research into the authoring practices and general perceptions of its members on IF-related topics are lacking from scholarly examination. Membership in one of these communities grants opportunities to learn collectively and improve upon one's craft, conferring a great many benefits beyond simply working at it alone.

Limitations

One possible limitation lies in the reality that the CYOA genre and movement surrounding it has undergone several name changes over the decades, making it possible that the last 10 years of research contains articles outside of our search criteria. Where this study examines scholarly work related to "text adventure" and "interactive fiction," it is probable that some studies employ alternative or more modern descriptions to refer to the same phenomenon.

Montfort (2005) names a few other ways to describe IF and related concepts: “computer literature”, “electronic literature”, “MUDs and MOOs”, “hypertext fiction”, “conversational programs” (chatterbots), and “automatic poetry and story generators” (p. vii). The effects that this potential limitation has on study results is unknown but worth acknowledging if in doing so uncovers a future research direction which was missed in the scope of this study.

Other limitations are perhaps more obvious—this systematic literature review only examines publications from the year 2012 onwards and the target language is English. While this was by design as the interest is in acquiring a more contemporary understanding of IF within educational and learning contexts, IF and text adventure games have a celebrated history going back several decades. A review of classic literature might provide a more complete understanding of this (relatively) new literacy, its genesis, and its evolutionary trajectory. We would also be remiss to ignore a potentially broad corpus of work belonging to scholars of different nationalities and mother tongues as this study is limited to the English language.

Finally, it is speculated that research publications trend more toward an academic viewpoint which means that other voices involved in IF authorship and play are missing from this analysis. The full implications of this factor are incalculable at this time, but it is worth recalling a figure offered by Allington (2015) who suggested that the “IF retrogaming scene” included an estimated 2,300 active authors (p. 270), and this pool of developers has likely only increased since that statement. Most articles that describe IF as a learning intervention approach it as an introductory activity trending more heavily toward authoring systems and teaching the basics over implementing a more technologically-seasoned approach of programming entire works from scratch. Would an equivalent analysis of the happenings in IF author and hobbyist circles produce different results? Surely insights into learning can be assembled through the highly active and documented “authors’ guild” side of the IF equation; however, this study only manages to describe it on a superficial level, bypassing lessons that can be learned through a more thorough examination of its cultural underpinnings and practices within IF.

Recommendations for Future Research

While we were able to gain insight into the emergent themes that belong to the last 10 years of journal articles describing the educational applications and learning outcomes of IF, we nevertheless identified a few possibilities for future research:

1. It will be necessary to refresh this process in the ensuing years as this study only provides a review of publications released between the years 2012 and 2022. There will surely be advances in the realm of IF, particularly as A.I. capabilities enable more sophisticated augmentations of the artform, impacting the way that players consume and develop titles in the genre.
2. With this study having focused on IF within educational contexts, it is quite probable that the scope of this research leaves out populations that routinely read and author IF works, acting outside of academia and

thus the scope of peer-reviewed journals. Future research might specifically examine the authoring preferences, best practices, perceptions, and techniques of members within online IF networks.

3. By repeating a similar systematic literature review process for publications predating those that were included in this study, we may get an idea of the shifting trends in IF across multiple decades. Prior to introducing user-friendly IF authoring systems, did authors turn to general-purpose programming languages to realize their works? If so, to what degree? This is just one example of a question that might be answered through consulting classical IF literature, particularly when analyzed against this study's findings.

Finally, there is the concept of the first-person "you" in IF narratives, and the effect that this orientation has in terms of immersing the player in the game world. Further research into player/learner immersion in IF and its impact on their ability to learn and receive/internalize new information is encouraged, given the medium's multiplicity of educational applications (as the findings show).

Conclusions

This study's aim was to fill a broad gap in knowledge related to more recent implementations of IF and text adventure games as multidisciplinary pedagogy. We conducted a systematic review of peer-reviewed journal articles spanning three of the more respected databases (JSTOR, Web of Science, and ProQuest), and manually reviewed and narrowed the results down from 271 matches to 63 publications that fit our inclusion criteria. Seven themes emerged from a comprehensive analysis, providing a window into the wide reach that IF has had within educational settings and learning contexts over the past decade.

Equipped with this knowledge, educators may find ways to introduce IF writing and reading activities into their own curricula to enrich and enliven topics through immersive storytelling possibilities. This study's findings could provide inroads into new directions for future research so that society might maximize the full use of this unique literacy in educational and learning contexts. Through our understanding of the last 10 years of work into this promising field we may better conceptualize the possibilities that lie before us through nonlinear storytelling.

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