

Reanimating *Shelley's Heart*:
Breathing new life into locative learning with dual process design

Introduction: The creature awakes

English Literature teachers can learn a lot from Victor Frankenstein. As a central character in one of the 19th century's most important Gothic novels, he makes for a fascinating object of study, but he is also an instructive role model. After all, like Frankenstein, anyone teaching classic texts is in the business of necromancy. Such pedagogical alchemists are tasked with breathing new life into dusty tomes written by long dead writers. They must reanimate ideas that modern readers may consider irrelevant by grafting them onto vital contemporary themes. When it came to designing the locative learning tool *Shelley's Heart*, this process involved stitching facts about Mary Shelley and the Romantic poets to a fictional frame tale featuring modern alter egos of these historic figures. Throughout its many iterations, this practice-led research project was fraught with uncertainty. If its disparate parts were not effectively joined together, the experiment would fail and the whole conception would collapse into a disjointed jumble. However, at 5:00PM on All Hallows' Eve, the 31st of October 2018, the creature finally sprang to life!

Figure 1. *Shelley's Heart*: Locative debut

The night that the *Shelley's Heart* web app was officially launched in St. Peter's churchyard in Bournemouth, UK, over 150 people were in attendance. For two hours, these participants explored four paths weaving around the location where Mary Shelley is buried along with the heart of her husband, poet Percy Shelley.

Since the official unveiling, *Shelley's Heart* has been freely available to the general public. It requires no downloading and can be accessed via the website

shelleysheart.com.' The three-year practice-led process that culminated in this debut involved securing internal funding from Bournemouth University and external funding from Bournemouth Borough Council. Additional partnerships were established with St. Peter's church and the Shelley Theatre in Boscombe. This allowed the production team to organise and execute nine days of shooting and also rehearse, present and film an interactive theatrical version of the project. As different script drafts were created and all of these diverse production elements were assembled, *Shelley's Heart* evolved into four interwoven location-aware narratives. Each story-path focuses on a particular historic figure: modern alter egos of Mary Shelley, Lord Byron, and John Keats, plus the ghost of Percy Shelley, a restless spirit desperate to locate his missing heart.

From the outset *Shelley's Heart* was conceived as a locative storyworld that would promote situated learning by geo-linking dramatic content to actual physical locations (Edmonds & Smith, 2017; Rieser & Clark, 2013; Ryan, Foote & Azaryahu, 2016). Locative technologies typically feature either factual or fictional content. Museum audio guides offer expository information about paintings and historic relics, and location-aware stories link narrative sequences, AKA 'ambient literature,' to physical settings (Abba, 2017). But even its earliest incarnations, *Shelley's Heart* combined these approaches, featuring a mix of factual and fictional content, which, in turn, provided opportunities for fostering both implicit and explicit cognition.

Implicit cognition is a process that occurs below the level of conscious awareness (Reber, 1989, pp. 219). It is tied to largely unconscious activities such as tying shoes, swimming and riding a bike. It has both an anti-social and a pro-social dimension. It is linked to racial stereotyping and all other forms of prejudice (Devine, 1989), but it also generates moral convictions (Vaisey, 2009), assists socialization

(Appel & Richter, 2007; Slater & Rouner, 2002), and aids language acquisition (Ellis, et al, 2009) and comprehension (Batterink & Neville, 2011). Recent research has shown that most decision-making occurs below the level of conscious awareness (Haidt, 2006; Zaltman, 2003), so implicit cognition is an important aspect of any learning process (Ciavarr, Dobson, & Goodman, 2008; Li, Guo, Zhu, Yang, & Dienes, 2013).

In contrast to implicit cognition, explicit cognition is a deliberative and also a *deliberate* process. It is thinking by intention, as it involves exerting conscious and sustained effort in an attempt to produce rational conclusions (Conole 2010; Watson, 2010).

Although they are distinct from one another, implicit and explicit cognition are mutually influential. There is no such thing as *pure* instinct or *pure* reason, yet it is possible to overemphasise a particular mode of thought (Kahneman, 2011, pp. 3-18). Those who uncritically accept implicit biases are uninformed, operating on gut instinct without considering enough factual information. And those who tend to over analyse, fixating on explicit data, may become rigidly didactic, cut off from the interpersonal implications of their decision-making. On the other hand, when *both* implicit and explicit cognition are engaged to an effective degree in an effective manner, the human mind is capable of complex critical thinking (Evans & Stanovich, 2013). This productive juxtaposition of the implicit and the explicit is known as ‘dual process cognition’ (Kahneman, 2011; Skulmowski & Rey, 2017; Vaisey, 2009) and promoting this type of thinking in a pedagogic context is known as ‘dual process learning’ (Anthony, Tian & Barber, 2017; Sun, Slusarz & Terry, 2005).

Advocates of narrative-based education often emphasize the way in which fictional stories suggest implicit associations (Slater & Rouner, 2002), whereas

advocates of expository instruction tend to focus on the way in which textbooks promote the analysis of explicit facts (Watson, 2010). Nonetheless, fictional and factual texts alike have the ability to engage both implicit *and* explicit cognition. For instance, a work of fiction may highlight explicit historical details (Marsh, Meade & Roediger, 2003), and, based on how it is structured, a work of nonfiction may suggest all sorts of implicit meanings (White, 1985). The following section explains how *Shelley's Heart* has been designed to promote this type of double-edged thinking in a variety of contexts through productive juxtapositions of fact and fiction.

Dual Process Design: the creature evolves.

Mary Shelley (2003) understood the value of dual process learning. Her creature seeks out explicit and implicit information from sources that are both factual and fictional. After he acquires language and a sense of communal life from observing the de Lacey's, he expands his cultural repertoire by reading three books. The first, *Plutarch's Lives*, is an expository text featuring biographies of famous Romans and Greeks. It offers explicit information about historical figures but by reading it, the creature also gains implicit insights into the qualities that constitute an exceptional life. The other two books he reads are works of fiction. From Milton's *Paradise Lost*, he gleans explicit information about Christian theological, while gaining an implicit understanding of the world and his place in its cosmology. Finally, from Goethe's *The Sorrows of Young Werther*, he acquires explicit information about a modern urban setting and social milieu, as well as implicit insights into his emotions and his sense of romantic identity.

In an attempt to transform her creature from a mindless beast into a sensitive and highly cultured human being, Mary Shelley designed a dual process-learning

regime that would educate him via a collection of key texts. These volumes introduced him to an array of different eras, locales, genres and worldviews. The locative learning tool *Shelley's Heart* has been structured in a similar manner. Its trial and error production process involved refining a complex multi-modal interface that mixes fact and fiction across different time periods, locations, discourses and cultural perspectives.

Feedback is an essential component of any practice-led research project. In the case *Shelley's Heart*, this input came from two directions: laterally and bottom up. The lateral feedback involved discussions with collaborators from a number of disciplines including computer programming, animation, film, sound design, theatre, and even underwater photography. This student-staff co-creation benefited immensely from the input of specialists with a diverse range of talents. At the same time, bottom up input came from participants who engaged with dozens of user testing activities, from table reads, to fields studies, to staged readings, to two full interactive theatrical productions. Information gleaned from these activities and interactions was combined with research and continuous experimentation, resulting in the completed web app and the collection of techniques hereafter referred to as, 'dual process design.'

During the development process, just over 300 participants, audience members and collaborators tested various iterations of *Shelley's Heart*. Primarily, these respondents were white, British and middle class. They included a combination of media professionals, artists and novices. Although the participants and the audience members were a fairly even mix of male and female subjects, the collaborators were mostly male. Due to these demographic constraints, this article resists positing generalizable claims about dual process design in all conceivable cultural contexts. Instead, it focuses on what worked for the groups tested in this specific milieu. That

said, *Shelley's Heart* will continue to impact wider and more diverse groups of participants, and this will, hopefully, continue to inform and modify the design strategies developed in the course of this practice-led research project, warranting additional investigation and analysis. In fact, an impact case study and journal articles examining other aspects of the project are already underway. Nonetheless, the focus of this paper is unique as it looks at two complimentary cognitive states and a set of pedagogic design strategies meant to simultaneously engage them.

Experts on interactive design stress the value of structuring navigation in a manner that is highly intuitive (Islam & Bouwman, 2016, Norman 2013). In some instances, however, it may be beneficial to for interfaces to stimulate analysis as well as intuition. As Irit Hadar (2013, pp. 1424) points out, digital design strategies do not always mobilize explicit cognition effectively. She suggests that new design strategies should be developed 'to increase the accessibility to logical thinking in cases when it clashes with intuition.' After all, a design process that always emphasizes intuition at the expense of meaningful analysis cannot promote reflective inquiry. Therefore, a key goal of dual process design is to strike a productive balance between intuition and analysis (Ley, Schweiger, & Seitlinger, 2011). Interactive learning tools should *not* merely promote what Daniel Kahneman (2011, pp. 59-67) refers to as 'cognitive ease,' the tendency to reject careful analysis in favour of ingrained assumptions. A deep learning tool should reward instinctive exploration, but also challenge preconceptions.

Because it is impossible to suppress implicit cognition completely, and because implicit cognition often yields correct judgements, effective learning tools do not combat or ignore unconscious thought altogether. Instead, they find ways to channel it

in positive directions. Specifically, they reject knee-jerk intolerance in favour of celebrating diversity and complexity.

An amalgam of story elements that resist neat synthesis into a seamless whole, *Shelley's Heart* is a kind of 'Franken-text' grafting quizzes, endnotes and literary quotes to original narratives in a manner that invites critical comparisons between fact and fiction. This is complexity by design. Neither nonfiction, or fiction, has been proven to be uniformly superior as a means for promoting learning (Wolfe & Mienko, 2007, pp. 557), yet a learning tool that effectively shifts between fact and fiction has the potential to promote critical thinking as participants are challenged to consider both explicit and implicit links between narrative invention and historical exposition.

As the different iterations of *Shelley's Heart* were refined, various design strategies emerged. All of these involved mapping modes of implicit and explicit cognition in relation to one another. It became apparent, therefore, that designing an effective dual process learning tool was a form of mental cartography, hence the acronym, 'MAP.' The 'M' in MAP stands for 'Match.' This is the process of accentuating parallels between implicit and explicit cognition so that they exert equal influence on one another. The 'A' stands for 'Affect.' This is the process of mapping implicit influence onto explicit cognition. And the 'P' stands for 'prime.' This is the process of mapping explicit influence onto implicit cognition. The following pages will elaborate on how these strategies serve to promote dual process cognition and, therefore, deep learning.

MATCH

implicit < > explicit

The first design strategy, 'Match,' involves holding implicit and explicit cognition in a state of mutual tension. It is a process of highlighting parallels between expository

facts and fictional storytelling. The entire design of *Shelley's Heart* is based on this principle and yet feedback from the web app's debut revealed that the rationale for this approach required more careful explication. Some of the participants queried suggested that the locative interface would benefit from a short textual introduction that explained the significance of the modern day story and its relation to Mary Shelley and the Romantics. These respondents felt that a more holistic overview would help participants glean a clearer understanding of the relationship between the modern fictional characters and their historic counterparts. In response to these comments, a preface was added to the app, and subsequent participant feedback has indicated that this added signposting is beneficial, as it informs participants that they are meant to experience *Shelley's Heart* in two ways at once, drawing parallels between fictional frame tales and factual details about the biographies and works of classical literature that inspired them.

When first designing *Shelley's Heart*, the decision to draw connections between modern fictional characters and their historic counterparts was meant to ensure that the contemporary tale added new relevance to the biographies of these famous writers. This approach also enhanced the project's dual process design by productively utilizing a phenomenon known as 'matching bias.'

In cognitive psychology, matching bias is a sort of mental short hand, a process that involves equating resemblance with relevance (Thompson, Evans & Campbell, 2013, pp. 434). If two things or people look alike, we often assume that these similarities are meaningful, even if such assumptions don't stand up to logical analysis. In the case of racial profiling, this is clearly problematic. Matching bias may tempt us to associate the traits of a single person with every person that resembles

him. This does not mean that matching bias always conflicts with reason. In fact, when properly deployed it can actually promote critical thinking.

As Robert Glaser (1998, pp. 88) points out, experts are able to problem solve effectively with the help of pattern recognition. Whereas a novice struggles to make sense of seemingly unrelated pieces of information, an expert organizes them into conceptual clusters. According the Lambert Schuwirth (2017, pp. 888) combining discrete pieces of information into larger units, often referred to as ‘chunks,’ helps experts recognize the associations between phenomena. This in turn, allows them to more efficiently compare and contrast specific features.

As with the matching biases that undergird them, perceived patterns are not automatically positive or negative. They can yield productive insights into complicated issues such as global warming, but they can also give rise to deeply flawed conspiracy theories. As with all critical thinking, complexity is a key consideration. When matching bias operates within a single context, chunking elements in a stereotypical fashion, it inhibits critical analysis. Yet when it bridges contexts, suggesting parallels across disparate domains—fact and fiction, past and present, living and dead—all sorts of intriguing nuances emerge. *Shelley’s Heart* is designed to promote just this type of trans-contextual analysis so the process of ‘matching’ is an important aspect of its design strategy.

The human brain is a highly sophisticated parallel processing computer, and it is most fully engaged when simultaneously contemplating complex sets of relations, shifting between different modes of thought fluidly and profitably in order to learn by association (Ellis, Denton & Bond, 2014; Moshman, 2000; Simon, 2011; Thompson, 2009). Promoting the type of complex cognition in which elaborate patterns are productively juxtaposed is a hallmark of dual process learning, and the goal of dual

process design. In the case of *Shelley's Heart*, leveraging matching bias involved highlighting parallels between fictional contemporary characters and their historical alter egos. This encourages participants to note similarities between two juxtaposed narratives, one fictional and one factual, while contemplating the significance of their similarities and their differences.

One of the first user tests of *Shelley's Heart* involved a trip to St. Peter's churchyard with six MA script-writing students from Bournemouth University. The participants walked to various locations, holding scripts and focusing on scenes set in the specific locales where we were standing. A different student read the internal monologue of each lead character: Mary, John, Byron and Percy's Ghost. This early version of the project was constructed as an array of parallel narratives describing the same dramatic action from four unique perspectives. As with the Akira Kurosawa's cinematic masterwork *Rashomon* (1950), these perspectives reflected the biases of the various protagonist/narrators. Yet unlike that classic film, it was possible to shift between perspectives continuously, even in the midst of an unfolding scene.

Figure 2. Early script page, parallel format

A key bit of feedback that emerged from this test involved the narrative voices of the four narrator/protagonists. The students felt they were not distinct enough, which made shifting between them less dramatic than it would be if there were stronger contrasts between their personalities and perspectives. This led to a series of rewrites. Subsequent drafts of the script emphasised differences between the four main characters. At the same time, similarities were drawn between the modern characters and their historic counterpoints. Like John Keats, Modern John became a

scrappy young cockney. Like Mary Shelley, Modern Mary became an impulsive teenage girl with an overactive imagination. Like Lord Byron, Modern Byron became a polymorphously perverse radical. And like Percy Shelley, Percy's Ghost began to express himself in lofty poetic verse. When the audio recording sessions and the film shoots commenced, the same actors were cast to play both the contemporary characters and their historic counterparts. Also, a colour-coding scheme was incorporated to help differentiate between the contemporary characters and to further accentuate parallels between past and present incarnations of the same character. Modern John and John Keats were both dressed in yellow. Modern Mary and Mary Shelley were both dressed in red. Modern Byron and Lord Byron were both dressed in Purple. And Percy's Ghost, in both flashbacks and contemporary scenes, was always dressed in blue. Nonetheless, despite all of these similarities, the text still highlighted key differences between the modern characters and their historic doppelgangers, bringing them into vivid relief.

Figure 3. Colour-coded characters

In cognitive science, a concept closely related to 'matching bias' is 'the contrast effect.' This occurs when a phenomenon is perceived in a distorted or exaggerated manner based on the phenomena that precedes it (Hartzmark & Shue, 2018, pp. 1568). A face may look more or less attractive depending on the appearance of the face seen before it. A stream of water may feel hotter or colder due to the temperature of the water touched before it. In the case of *Shelley's Heart*, the contrast effect serves to accentuate differences between contemporary mores and the era in which the romantic poets thrived. For instance, we learn that in Lord Byron's day

sodomy was punishable by death, which is why Lord Byron had to keep his bisexuality hidden. In contrast, Modern Byron is very open about his attraction to both men and women. Likewise, we learn that Mary Shelley was ostracised and stigmatised for being an unwed mother, yet Modern Mary makes no attempt to hide her pregnancy or apologise for it. The contrast between the modern characters and their historic antecedents amplifies our awareness of the cultural changes that have occurred since the 19th century. The fictional characters in *Shelley's Heart* are not meant to be literal reincarnations of their historical forbearers. Their stories are more like distorted echoes of what has come before and both the reverberations and the variations are jumping off points for dual process learning.

AFFECT

implicit > explicit

Where as the Match strategy strikes a productive balance between implicit and explicit cognition, the Affect strategy focuses primarily on how implicit cognition influences explicit cognition. Cognitive science has shown that unconscious sentiments can sway otherwise logical analysis (Winkielman, Zajonc & Schwarz, 1997; Tversky & Kahneman, 1974). This is known as the 'affect heuristic,' the tendency to interpret facts a certain way based on one's emotional state (Zajonc, 1980, pp. 153). As with matching bias, the affect heuristic is often associated with negative outcomes. Propaganda operates this way, ginning up outrage and short circuiting reason. However, it does not necessarily follow that heightened emotional states must lead to faulty analysis.

Since ancient Greece, orators have employed pathos as means of persuading audiences with emotional appeals (Aristotle, 2018, 1371a). Pathos is essentially value

neutral, not inherently good or bad, though, like all rhetorical tools, it has the potential to either fan the flames of intolerance or rouse the better angels of our nature. The rhetorical aspects of storytelling have this same double edge quality, the ability to enrage and illuminate. Therefore, a key goal of narrative-based learning should be to draw participants into an imagined world in which they are encouraged to empathise with others and challenge cultural preconceptions (Appel & Richter, 2007; Haven, 2007; Slater & Rouner, 2002). The Affect strategy is a particularly effective learning tool because it generates empathy. Rather than merely memorising information, participants gain insights into the emotional lives of the main characters (Oatley, 2011).

An early inspiration for *Shelley's Heart* was *The Lizzy Bennett Diaries* (Pemberley Digital, 2012). A project that reinvents *Pride and Prejudice* as a popular web series, this narrative learning tool attracts young YouTube fans by transforming Jane Austen's classic tale into a contemporary love story. The modern setting and characters lend contemporary relevance to timeless themes of courtship and romance. In a similar respect, modern alter egos of Mary Shelley, the Romantic poets and Shelley's monster make *Shelley's Heart* more relatable, albeit by updating actual historical figures as well as literary creations.

Both *The Lizzy Bennett Diaries* and *Shelley's Heart* benefit from an affective bias known as 'the mere-exposure effect.' This psychological phenomenon compels people to develop a preference for things merely because they are familiar with them (Zajonc, 1968; Zajonc, 2001). Contemporary characters and settings, therefore, increase the likelihood that young people encountering these storyworlds will find them engaging. In the case of *Shelley's Heart*, this means they are more likely to empathise with the main characters and thus grasp the significance of classic romantic

themes: feminism, class struggle, sexual and racial otherness (Evans, 1984; Kruglanski & Gigerenzer, 2011). In other words, participants who explore the fictional story-paths of *Shelley's Heart* are not just collecting information about Mary Shelley and the Romantic poets; they are forming affective understandings of these historical figures. This allows them to empathise with long dead historical figures, gaining new insights into their beliefs and motivations.

Although there are clear pedagogic benefits to drawing affective parallels between fictional alter egos and historical figures, this approach presented some unique design challenges. One of the earliest versions of *Shelley's Heart* featured factual footnotes that could be reference in the midst of fictional scenes. However, feedback from one the first table reads revealed that most participants found this approach too disruptive. When the story's dramatic action was interrupted and their attention was redirected to an historical fact or a literary quote they were taken, quite literally, out of the story.

Figure 4. Early script with footnotes

Eventually, it was decided that the best way to combine drama and didacticism was to separate expository facts and literary quotes from the fictional content. This resulted in a new design paradigm in which dramatic scenes were bookended by historical fact. This clear delineation allowed for more pronounced juxtaposition of implicit and explicit modes of cognition. For example, in a key scene along the Byron path, Modern Byron pranks Modern John and Modern Mary by leaping from the shadows with a shout and alarming them. As they are still recovering from this shock,

he does something even more surprising, grabbing John and kissing him on the mouth. At this point, an animated thought bubble appears on screen.

Figure 5. Byron kisses John with thought bubble icon

When the participant clicks this icon, a new video plays in which Modern Byron is speaking directly to camera, sharing an interior monologue.

Figure 6. Byron aside

He says, ‘John is *so* asking for it, at least until he’s not. Still, let me savour this a bit. Yes, it’s not half bad; I’m willing to admit. (SIGH) Sadly, after several blissful seconds, he gasps and jerks away.’ (*Shelley’s Heart*, 2018, Byron, node 4B).

Figure 7. John shoves Byron away

As the scene resumes and John lurches back and shouts, ‘Knob jockey!’ Hearing this, Byron quips, ‘Giddy up!’ Although he is attempting to save face, he is also recoiling from the sting of rejection. The participant who encounters this dramatic turn is able to glean an implicit understanding of Byron’s anguished state of mind. This emotional pain goes on to inform much of the expository materials later encountered. For instance, on a subsequent page, an icon with a quotation mark appears. When the participant clicks on this, she hears the following quote recited by the actor who plays both Modern Byron and Lord Byron: ‘Why do they call me misanthrope? Because they hate me, not I them. — George Gordon Byron, *Don Juan*’

(2004, pp. 48). As this example illustrates, partitioning a quote into a separate section does not preclude associations between this element and the fictional frame tale. In some respects, it actually serves to amplify the significance of the juxtaposition. First, the fictional narrative dramatizes the torments of Modern Byron's repressed sexuality. Then we encounter a quote from Lord Byron that focuses on the antipathy of his fellow men. The emotional resonance of the rejection scene informs the literary quote with psychological insights that create empathy for Lord Byron and invite participants to view him as more than just a flamboyant oddity. This emphasizes the value of deriving knowledge via narrative content in a manner that generates powerful affective understandings (Batterink & Neville, 2011; Dettori & Morselli, 2008; Mar, Oatley, Djikic & Mullin, 2011).

The Affect dynamic can also involve implicit factual elements inflecting fictional exposition. For example, in node 2 of the John story-path, participants learn that John Keats was buried with unopened letters sent by his fiancée, Fanny Brawne. This biographical detail suggests that Keats deeply valued his attachment to Brawne, but also resisted intensifying the pain of their estrangement by continuing their doomed correspondence. In the fictional scene that follows, Modern John imagines the final encounter between Keats and Brawne. Separated from his love by a glass screen meant to protect her from his tuberculosis, Keats says, "You deserve a husband who is fit and wealthy." Taken at face value, this sounds like a straightforward rejection, but implicit insights gleaned from the biographical detail about the unopened letters suggest that there is more to this exchange than meets the eye. Keats is ending the affair to save them both further suffering.

Subjects who were interviewed after various interactive table-reads, were able to articulate complex understandings of Keats' romantic motives and Byron's

sexuality. Additional surveys and focus groups confirmed that participants were able to glean insights into the values, flaws, talents and obsessions of all four of the project's fictional protagonists and, by association, their historical counterparts. Much of this appeared to be derived via an affective response to both the fictional and the factual elements of the project.

PRIME

explicit > implicit

Unlike the Affect strategy, which focuses on how implicit cognition influences explicit cognition, the Prime strategy focuses on how the explicit influences the implicit. In cognitive psychology, priming is a technique in which exposure to an initial stimulus triggers an unconscious association to a subsequent object or idea. This response is especially powerful if the two are already related in some manner, i.e. semantically, conceptually or physically (Meyer & Schvaneveldt, 1971; Schvaneveldt & Meyer, 1971). For example, the word 'adolescent' is recognised more quickly following the word 'adult' than following the word 'bicycle.'

One of the ways that priming occurs in *Shelley's Heart* is when, at the start of each node, information about Mary Shelley and the Romantic poets precedes dramatic scenes featuring their modern alter egos. After a POV tracking shot arrives at the latest location, a multiple-choice quiz appears. The participant must determine the correct answer in order to unlock the dramatic sequence that follows. This is *not* a test of the participant's retention, as the answers have not been previously revealed. Instead, it is a guessing game meant to invite speculation about the historical figures that the project is based on. For instance, mid-way into the John path, participants

encounter this question: ‘After contracting TB, John Keats would break out in cold sweats. He knew the end was near when...’

Figure 8. Multiple-choice quiz

Once the correct answer is selected and the validity of a particular choice is confirmed, the quiz becomes a priming mechanism. The explicit information the participant has just learned will now inform the implicit details of the subsequent dramatic scene. In the case of the quiz above, the correct answer is ‘B. He coughed up bright red arterial blood.’ Upon reading this, the participant is primed to assign heightened significance to the act of coughing, which has been linked to the concept of untimely death. Priming, in this sense, is a form of foreshadowing. It hints at the significance of events to come. Therefore, when Modern John begins coughing in the next scene, the participant is likely to suspect that he is doomed, and sure enough, he soon collapses and dies. As fever sweats cool around him, a block of ice forms. He is trapped in a kind of supernatural limbo until he feels the warm embrace of Fanny Brawne, the fiancée of his alter ego, John Keats.

Figure 9. Animation of Fanny and John

Priming is not a one-way street in which fact exclusively inflects fiction. It can also involve fictional exposition suggesting implicit connotations related to factual details. For example, in scene 2A of the Percy path, the ghost of Mary Shelley’s father, William Godwin, confronts the ghost of Percy Shelley. As Godwin fumes about Shelley’s affairs, he provides expository evidence that Mary’s husband was

frequently unfaithful. At the end of his node, participants learn that Godwin had once been an advocate of free love. It then becomes clear that, by abandoning his first wife, Harriet, and eloping with young Mary, Percy Shelley had been—in a somewhat ironic fashion—honouring Godwin’s ideals. The juxtaposition of a fictional scene and an historic fact, allows participants to infer that much of Godwin’s anger at Shelley involved a painful sense of self-recrimination. Had his celebration of free love inspired this young disciple to run off with his daughter? Still agonizing over this dilemma, Godwin’s ghost goes on to state in section 2B, “he makes a mockery of me and calls it veneration!” In this example, the direction of the priming reverses, proceeding from fact to fiction, as details about Godwin’s philosophical convictions inform this dramatic aside.

Effective dual process design operates in different ways in different contexts, but none of the MAP strategies work in a vacuum. The concluding section will consider what happens when all three of them are deployed simultaneously.

Discussion: The creature dreams.

A key finding that emerged from the production of *Shelley’s Heart* is that the strategic juxtaposition of fact and fiction can help to trigger both implicit and explicit cognition and, therefore, promote dual process learning. But what happens when all three MAP strategies are simultaneously deployed? Often the interaction of the implicit and the explicit is too complex to reduce any one set of relations. When this happens, the learner experiences ambiguity, the quality of uncertainty that suggests events are open to more than one interpretation. Experienced writers know that ambiguity can function as either an effective or an ineffective literary device (Brooks, 2010 & Cercas, 2018). Ineffective ambiguity disrupts the thought process,

overwhelming audiences with a muddle of contradictions and logical inconsistencies resulting in confusion and disengagement. In contrast, effective ambiguity is a catalyst, promoting deeper engagement and further analysis. A key means of promoting effective ambiguity involves establishing clear story dynamics, character motives and backstories and then deliberately complicating the arrangement of these elements in order to suggest an intriguing host of possible interpretations.

Through its various iterations, *Shelley's Heart*, generated effective ambiguity in a variety of ways. One example of this involved projecting footage of actors performing next to the Shelley tomb onto three monitors on a stage in the Shelley Theatre, a converted manor house in Boscombe once owned by Percy Florence Shelley, the one surviving heir to Mary and Percy Bysshe Shelley. In November of 2017, a year and a half after that original field test, this interactive performance linked the tomb and the theatre via a high tech media array. Audience members were empowered to determine the course of the dramatic action by voting with radio-response clickers. This triggered live actors playing Mary, John and Byron to remotely explore sites in St. Peter's churchyard while interacting with multi-media images representing various supernatural visions, including Mary's morbid creation, the monster. Through this amalgamation of narrative tropes, historical facts, and physical and virtual spaces, the audience was able to reflect on the lives and works of the Romantic poets and their modern counterparts in a variety of novel ways.

Figure 10. *Shelley's Heart*: Stage Production, 2017

The theatrical version of *Shelley's Heart* was only performed twice, but the first production was filmed and this footage would soon find its way into the project's

next incarnation. Transforming the stage version of *Shelley's Heart* into a locative story both literally and figuratively set in St. Peter's churchyard meant reimagining its narrative structure once again. The programmers responsible for coding the web app suggested allowing participants to follow the characters along different physical and narrative paths (Millard & Hargood, 2017; Packer, Hargood, Howard, & Papadopoulos, 2017; Jones et al., 2018). This approach meant that participants would be afforded more freedom of movement, more varied experiences and more dramatic possibilities. It all made perfect sense, but it also meant that a lot more work was required, including additional rewrites, film shoots, recording sessions, post-production and web development.

Figure 11. *Shelley's Heart*: Locative Flow Chart, 2018

Incorporating ambiguity into a story structure always involves a degree of risk. If dramatic elements are combined too haphazardly, confusion will result and narrative momentum will grind to a halt. Therefore, creating one of the most ambiguous sections in the Percy path presented a significant challenge. The sequence in question involves a confrontation between Percy Shelley and the wife that he abandoned, Harriet Shelley. It features several moments in which fantasy and reality are intricately intertwined. As the biographical details framing this sequence make clear, both Percy and Harriet died of drowning. He perished in a shipwreck off the coast of Italy, and she committed suicide by diving into the Serpentine, a lake in Hyde Park. There are also elements of dramatic exposition where Harriet describes how Percy left her when she was pregnant with their second child. However, the actual clash between these two characters is an obvious fabrication. It happens underwater

after both of them are dead and, in its climactic moment, Harriet thrusts her hand into Percy's chest and tears out his still-beating heart.

Figure 12. Harriet grabs Percy's heart

The actions, dialogues, and monologues leading up to this moment deliberately trouble neat distinctions between fact and fiction. Harriet never had such a violent, face-to-face confrontation with Percy, but the rage and anguish that she expresses is grounded in an emotional truth. In an earlier scene, she sits at the edge of a lake penning a suicide note and struggling to articulate the depths of her despair. In the follow section, a textual addendum reveals that lines from Harriet Shelley's actual suicide note are woven into this monologue, retrospectively heightening both its veracity and its affective impact. As the Percy path continues, scores of elaborately interwoven elements converge with increasing frequency, throwing participants off balance and making the final confrontation between Harriet and Percy something stranger than fiction and more visceral than fact. At the moment when Harriet seizes Percy's heart, reclaiming it as her own, participants know that they are witnessing a fantasy sequence. Nonetheless, the sense of emotional catharsis that accompanies this event is disturbingly real.

Figure 13. Percy, Harriet's hand & heart

As Harriet clutches Percy's heart, she cries out, 'It's mine!' (*Shelley's Heart*, 'Percy 7,' 2018). Once Harriet has wrested the organ from Percy's chest, we see its bloody form pulsating in her clenched fist. The drama of this moment is heightened

by the realization that the titular object/symbol is both a physical vessel and a metaphor representing Shelley's errant affections. Recognizing that the one syllable word 'heart' can resonate with these competing connotations means accepting the irreducible complexity of dual process thinking.

Feedback from the staged version of *Shelley's Heart* confirmed that this type of narrative ambiguity intrigued audience members and spurred them to grapple with the moral complications swirling around the brilliant, idealistic and deeply flawed personage of Percy Shelley. Additionally, theatre goers positively responded to the supernatural confrontation between Harriet and Percy, complimenting how it voiced the torments of a young woman commonly silenced by more traditional accounts of Shelley's life.

There are many supernatural sequences in *Shelley's Heart*, moments that explore strange intersections of reality and fantasy, calling into question basic understandings of narrative truth. For instance, do the modern alter egos of Mary Shelley and the Romantic poets actually exist? Has Mary dreamt all of them up? Is she also an imagined character? And if so, who has invented her? All of this is left deliberately ambiguous as the text evolves into a multi-modal metafictional melange of different mediums, genres and points of view. Visual effects are superimposed over filmed images from the theatrical play with additional graphic icons overlaid, which, in turn, unlock animated visions, still photographs and cinematic monologues.

Figure 14. Meta-media collage in *Shelley's Heart*

In each scene, multiple realities collide: old and new, real and supernatural, cinematic and theatrical, mimetic and poetic. The ultimate effect of all of this

mushrooming complexity is a strategic juxtaposition of the literal and the literary, celebrating their dynamic interplay. As each of the 4 story-paths approaches its climax, fact and fiction increasingly blur as the modern day characters have more frequent and intense encounters with their historic forbearers. Finally, the membrane separating living and dead is ruptured entirely and these fictional characters come face-to-face with their historic counterparts.

The MAP strategies outlined in this paper involve simple relational dynamics. They are ways of sketching out potential interactions between implicit and explicit cognition. No strategy is uniformly superior to the others and often two or three strategies are simultaneously deployed. This does not mean that any configuration of implicit and explicit learning is bound to be productive and positive. Dual process cognition can easily devolve into confusion or promote prejudicial conclusions. This is precisely the value of carefully considered dual process design strategies.

The next phase of development for this practice-led research project involves the creation of *Shelley's Heart: the Home Version*, a desktop iteration hosted entirely on the Klynt platform. Participants will be able to access the story-paths without physically visiting St. Peter's churchyard in Bournemouth, which will make the project remotely accessible, expanding its reach to international participants. Additional studies are planned that will examine how *Shelley's Heart* promotes dual process cognition across different learning domains: theatrical, cinematic, virtual, local and global.

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FIGURES

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