

ANGLIA RUSKIN UNIVERSITY

FACULTY OF ARTS, HUMANITIES
AND SOCIAL SCIENCES

EVALUATING THE SIGNIFICANCE OF CONCRETE POETRY IN
THE EMERGING PRACTICES OF DIGITAL POETRY

MEIZI ZHANG

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ABSTRACT

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DOCTOR OF PHILOSOPHY

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This thesis examines the visual aspects of concrete poetry in the context of the new conditions of interactive technology. The development of interactive technology has expanded the expressive possibilities of concrete poetry, and enables ideas originating in concrete poetry (which emerged in the 1950s) to be developed beyond the limitations of the printed page. So, the new poetry demands new terminology, that is, a definition of interactive concrete poetry.

I have conducted a systematic investigation of concrete poetry in different periods and media, and explored the scope of different approaches through a number of practice-led projects including print-based concrete poetry, digital dynamic poetry, and interactive concrete poetry. To complement and inform practical research, I studied and compared different critical perspectives, exhibited my practical works and had conversations with poet and new media artists to help with establishing a critical framework for interactive poetry and analyzing aspects of my research.

Besides establishing the definitions of this new medium, I also found new forms of poetic communication in interactive concrete poetry, which is essentially a confluence of interactive technology, poetics, and typography. This new medium of expression allows readers to engage in dialogue with the text, and uses a variety of new technologies to create a poetry that provides multiple sensory experiences. This finding constitutes a strong background for the creation of an aesthetic theory of interactive concrete poetry.

Thus, this thesis makes significant contributions to a new field of knowledge and provides a comprehensive theoretical framework for interactive poetry. In addition to

the research value in its field, the thesis expands our current understanding of non-linear literature, reading patterns, typographic art, and interactive design technology.

Key words: concrete poetry, digital poetry, interactive concrete poetry, interactive typography, practice-led research.

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Chapter 1: Introduction

It has long been my interest to explore the characteristics of concrete poetry through digital media. This study uses practice-led research to explore the poetic expression of concrete poetry via human-computer interaction technology. Its purpose is to refine the definition of interactive concrete poetry and construct a new theoretical framework.

In this study, I use the term ‘interaction’ to refer to the form of interaction based on HCI (human-computer interaction) technology, rather than generally interactive processes(participation) that do not use digital technology. So, interactive concrete poetry discussed in this research refers to the works created by the electronic media. The development of interactive technology has expanded the visual expression and means of concrete poetry, and also broadened the scope of research into concrete poetry. In particular, cutting-edge human-computer interaction techniques not only create dynamic 3D visual effects for concrete poetry, but also transform poetry from merely a reading experience into a more comprehensive one that extends artistic conceptions to involve human senses through different media.

Jennifer Preece, Helen Sharp, and Yvonne Rogers (2011) discussed the idea of interactive design in similar terms in their book *Interaction Design: Beyond Human-Computer Interaction*. They argued that the main function of interactive design is to enhance the experience and meet the emotional needs of users by creating an appealing and pleasant man-machine dialogue. The characteristics of interactive technology can help the poets achieve the purpose they have been pursuing over time, that is the creation of more open artwork to ensure active viewer participation. In other words, interactive technology enables concrete poems to form questions, which is a defining feature of interactive technology and fundamentally important to this study.

In this context, theoretical research and experimental works have emerged in the 21st century. For example, Roberto Simanowski (2011) in his book *Digital Art and Meaning* noted that, compared with other forms of concrete poetry, poetry based on interactive media can provide readers with more open choices, focusing on the reader's sense of participation in the artwork and enabling the ‘dialogue’ between people and poetry. Katja Kwastk (2013) discussed the interactive aesthetics in interactive media art from the perspective of contemporary interactive artworks in her monograph entitled *In Aesthetics of Interaction in Digital Art*. She emphasized that when creating interactive art works, we should first understand the characteristics of interactive technology and the perceptual characteristics of interactive aesthetics. In addition to the two books above, the thesis builds on the work of other critics, such as *Literary Art in Digital Performance: Case Studies in New Media Art and Criticism* edited by Francisco Ricardo (2009); *Media Poetry: An International Anthology* by Eduardo Kac (2007);

New Directions in Digital Poetry (2012) and *Prehistoric Digital Poetry* (2007) by C.T.Funkhouser.

However, I find that previous research often labels this new form poetry as ‘interactive poetry’, ‘interactive art’ or ‘interactive installation’, often labels work in this field. The term ‘interactive concrete poetry’ has barely been used. Besides lacking terminology, I think that in many artists’ works interactive technology is a significant performative feature and it is precisely those interactive aspects that attract audiences, even to the point of overshadowing the message and meaning of the poetry itself. This issue has been highlighted in Marjorie Perloff (2006)’s article *Screening the Page/Paging the Screen: Digital Poetics and the Differential Text*. In her view, poems in digital form seem to say ‘see, what computers can do!’ Although Perloff’s point is that the interaction discussed in her earlier thesis has been replaced by advanced human-computer interactive technology and the problem has been resolved, the relationship between interactive technology and poetry is still worth exploring in contemporary interactive concrete poetry.

A thorough study of previous literature and artworks made me realize that there remain serious gaps in our knowledge of this cross-disciplinary study and that basic questions still demand adequate response: what is interactive concrete poetry? (An ambiguous definition); what is the relationship between interactive concrete poetry and print-based concrete poetry? What are the poetic characteristics of interactive concrete poetry? (the conceptualization and theoretical framework of interactive concrete poetry does not exist) Raising these questions also helped me to appreciate the importance of my topic and the purpose of the research. At present, our understanding and theoretical framework of interactive concrete poetry is work in progress, and in fact one which urgently requires a solid definition and aesthetic theory. The exploration of the form, media, and meaning of interactive poetry is becoming more and more important to address the knowledge gap in this field.

I opted for a practice-led research method to explore the characteristics of concrete poetry from the perspective of digital media in an attempt to advance our understanding of the subject. The use of digital technology supported my study in a more ‘see and do’ way (Morris and Swiss, 2006), similar to software or computer game development.

Each of my experimental artworks aimed at testing and responding to a research question. In the process of creation, I retrospectively analyzed each work, and tried to formulate new questions and provide solutions applicable to subsequent exploration and tests. Hence, my pathway led me from the creation of my first interactive poem *Four-Minute River* (aimed at establishing a definition of interactive concrete poetry) to my VR poem (to evaluate the significance of interactive typography for interactive

concrete poetry), then finally to *Mimosa* (to realize immersive interactive concrete poetry in the form of interactive devices). In the process of filling the gap in our knowledge of interactive concrete poetry, I encountered and resolved problems along the way. To sum up, practice formed the backbone of the entire research, which not only explored the innovation, but also advanced my theoretical knowledge of the project.

This study could not have been carried to fruition by theoretical or practical means alone, but required a combination of both. To avoid over-reliance on a single method and test the research questions more accurately, I opted for the 'Pick and Mix' method described by Yee (2010) in the article *Methodological Innovation in Practice-Based Design Doctorates*. As the term indicates, I used a number of appropriate methods instead of using a single and fixed one. Accordingly, my project combined literature study, parallel comparison, reflective thinking, interviews, exhibition. Various research methods were combined to explore the characteristics and poetic communication of concrete poetry in the interactive era, with the aim of building an academic theoretical framework for interactive concrete poetry.

This research is divided into Visual Works and Thesis. In addition to the creation of 14 visual works that formed the practical component of my research, in the written thesis I discussed the historical context of interactive concrete poetry, and combined this with relevant case studies to construct its aesthetic theory.

In Chapter 1 I outlined the research background of interactive concrete poetry and presented the research aims, research methods and research components to highlight the importance of the topic.

In Chapter 2 I described the research methods used in the research, according to the views of Christopher Frayling, Bruce Archer, and others on research methods in *Art and Design*. The analysis of the particularities of the research into interactive concrete poetry helped clarify that practice-led research was the main research method of my study. My own experimental works comprise the basic framework of the entire study. They helped me to confirm theories and assumptions, and to use reflective practice to detect complex problems.

After the presentation of the research methods, in Chapter 3 I described the history of interactive concrete poetry and the academic context in which it has been studied. Parallel work in four fields (concrete poetry, interactive concrete poetry, typography, and interactive technology) pinpointed gaps in scholarly knowledge and enabled me to focus my research more effectively.

Chapter 4 tackled the first research question, the concept and definition of interactive concrete poetry. I also discussed the way in which it conveys poetic messages by examining precursors of concrete poetry and the theories and artworks of its pioneers. In addition, I used for the first time my own interactive concrete poem, *Four-Minute River*, to explore, confirm, and demonstrate theoretical issues. Upon completion, I exhibited my creation in several exhibitions, including ‘Theorem’ in Ruskin Gallery (2016) of Anglia Ruskin University, ‘To be Continued’ (2017) held by North China University of Science and Technology, and exhibition ‘From Space to another Space’ (2017) with Zuyi Kang held in Beijing 798 Art Hall, where they were warmly received. Perhaps more importantly, these exhibitions instigated further reflective thinking and I established that the key factor that allows interactive concrete poetry to convey information is typography.

Four-Minute River revealed the importance of typography and in Chapter 5 I focused on the role and significance of typography in the expression of interactive concrete poetry. I reviewed the use of typographic rules in concrete poetry to determine the important role typography plays in poetic communication of concrete poetry, thus laying a solid foundation to examine poetic communication in interactive concrete poetry. Moreover, I created a VR poem to explore the three-dimensionality and temporality of typography in interactive concrete poetry and to explain the characteristics of interactive typography in interactive concrete poetry.

VR Poetry and relevant literature indicate that typography is an essential support for concrete poetry in any kind of media. This was a major contribution of my research and one of the key factors that led to *Mimosa*.

In Chapter 6, I summarized points made and conclusions drawn in previous chapters, and then continued with an interactive concrete poem, *Mimosa*, that I designed to offer a multi-dimensional, multi-sensory experience to participants and also experiment with and test assumptions. *Mimosa* successfully demonstrates the visual effect, use of language, and interactive poetic aesthetics inherent in interactive concrete poetry, and embodies the important role and significance of interactive typography in poetic communication.

Finally, in Chapter 7, I presented an overview of interactive concrete poetry based on the discussion in the previous six chapters. From the definition of interactive concrete poetry to the exploration of the characteristics of its meaning, the tests and results confirmed the theoretical assumptions and reflected the applicability of my methodology. In conclusion, *Mimosa* drew on my previous experience, presented a complete interactive communication characteristic and aesthetic concept of an interactive concrete poem, and showed the digital transformation of concrete poetry,

the transmission of typographic information, and the innovation and characteristic of interactive technology.

Chapter 2: Methodology and Visual Works

2.1 Methodology

The study of interactive concrete poetry does not only address the visual language of concrete poetry but also focuses on the interaction effect of interactive technology. In order to address this, it was necessary to include the testing of interactive function and audience feedback in response to the poetry. So practice is essential to test the choices in the use of interactive technology from the perspective of the author. While the use of interactive technology gives interactive concrete poetry its interactive features, the core of this study is new poetry that includes a wide variety of configurations of images, text, typography and interaction technology. In a multidisciplinary study of this kind, it is not sufficient to rely on research methods associated with interactive design. I needed therefore to select an appropriate methodology to support the entire research. I adopted a blended method that was based on practice-led research and integrated a literature study, parallel comparison, reflective practice and exhibition. This is known as a 'pick and mix' method (Galloway, 2008).

2.1.1 Practice-led Research

Since the 1990s, different research design frameworks that operate under the broad heading of 'designerly modes of inquiry' (Saikaly, 2005) have been proposed and applied in art and design research. For example, *Research in Art and Design*, Christopher Frayling (1993), Bruce Archer's (1995) *The Nature of Research Co-Design*, Nigel Cross's (1999) *Design Research: A Disciplined Conversation* and J.S.R Yee's (2010) *Types of Research in the Creative Arts and Design* all emphasize the legitimacy and importance of practice in art and design research, albeit from their perspective. Each framework has its function and value and helped me to develop an informed research methodology that incorporates practice. Linda Candy's (2006) *Practice-Based Research: A Guide* was particularly useful as it helped to clarify the purpose and meaning of practice in my study. She clarifies that practice-led research is an original investigation that, both through practice and its outcomes, helps to provide new knowledge. Practice is used as a means of enquiry that I constantly use to ask, answer and ask questions. Knowledge is presented in the design process, techniques, materials and context of each practice.

My research is consistent with the concept of practice-led research, and this is significant because interactive concrete poetry is a new topic without a theoretical framework. Many unexplored possibilities need to be tested by applying practice. This requires me to explore the history and definition of this new poem on a step-by-step

basis, and this requires me to explore new knowledge, such as the definition, characteristics and poetic features of interactive concrete poetry, by applying practices with different purposes. For example, visual works, such as *Toothache* and *Bee*, helped me to understand the concept and poetic characteristics of print-based concrete poetry. *Four Minute River* added interactivity to print-based concrete poetry, and this helped me conceptualise and define interactive concrete poetry. *VR Poetry* explored the expressive characteristic of interactive concrete poetry and helped me discover the important role of interactive typography in the meaning and expression of interactive concrete poetry. The final practical work of *Mimosa* combined the previous practical experience by presenting an interactive installation that allowed the audience to truly "step into" concrete poetry through an interactive experience. The historical study of interactive concrete poetry, the definition of characteristics and the exploration of aesthetic theory contributed to practice-led research that provided considerable insight into this unknown domain.

The concept of practice-led research affected my attitude towards my work and clarified the purpose and key points of the practice, but does not offer a specific method. This is underlined by the fact that previous research only provided broad concepts for the topic of my research. I, therefore, needed a more specific model that will help me to complete this project based on practice-led research.

2.1.2 Pick and Mix

This research is at the forefront of the using of cutting-edge human-computer interaction technology, one which involves knowledge of several fields. Research on interactive poetry requires more than one theoretical or practical research method, it needs to integrate the methods of social sciences, humanities and hard sciences to obtain an appropriate model of inquiry (Yee, 2010); that is, the methodology of combining a mix of methods, termed by Galloway (2008) as the 'pick and mix' approach. The emergence of the pick-and-mix method compensated for the shortcomings of established research frameworks, seen as too rigid for design research. It answered the concerns of Susan Tebbi (1994) that methodologies of design research should be seen only as frameworks. The innovation of the pick and mix method lies in the researchers' combination of established methods and methods guided by practice. As Joe Kincheloe (2001, p.687) explained: "it does not simply tolerate difference but cultivates it as a spark to researcher creativity...Sensitive to complexity, bricoleurs use multiple methods to uncover new insights, expand and modify old principles, and re-examine accepted interpretations in unanticipated contexts". Although there are different methodological structures in different disciplines, for research combining multidisciplinary elements, including literature, typography, sound and interaction design, a pick and mix approach would be the best choice. In the next part, I will explore what kind of methods will be

selected and combined in this study and how are they serving for the study of interactive poetry through using varied practices.

2.1.2.1 Literature Study

In *Digital Art and Meaning*, Roberto Simanowski (2011) wrote that kinetic digital poetry can be seen as a successor of concrete poetry in print. As a result, the question of possible continuity from concrete poetry into interactive poetry awakened my interest at the initial stage of my research project in exploring the relations between interactive poetry and concrete poetry. Consequently, at the beginning of my research, I first focused on tracing the history and origin of interactive poetry, exploring the concepts of and differences between different types of concrete poetry. I first searched the literature by using keywords related to the topic of my thesis (e.g. concrete poetry, visual poetry, digital poetry, interactive poetry and interactive art). Most relevant literature and theoretical perspectives came from concrete poets in the 1950s, such as Eugen Gomringer, Max Bense, Mary Ellen Solt, the Noigandres group and Ian Hamilton Finlay. They provide a solid background knowledge of concrete poetry, helping me to learn about its origin and development. The art works of concrete poetry in for example Stephen Bann's and Emmett Williams' anthologies and *Ubu Web* founded by Kenneth Goldsmith have expanded my perception of types of concrete poetry in the 1950s.

A study of the literature of digital poetry and interactive poetry required critical reading. Critical reading is an approach of thinking deeply and critically on the text you're reading. It requires readers not only to understand the author's meaning, but also includes questioning and evaluating what the author is saying and form their own points of view. So, this requires me to keep an open mind while reading, to ensure that I give the author a fair chance to narrate. I also need to know the author's background, social environment, historical era and historical background for each document. Critical reading requires me not to take the surface meaning of the text for granted, but to make sure that the author's every point of view is supported by sufficient evidence and consider the authority of those before accepting the author's opinion. For example, in reading books like *Digital Art and Meaning* by Simanowski, *New Media Poetics: Contexts, Technotexts, and Theories* by Adalaide Morris and Thomas Swiss, and *Prehistoric Digital Poetry* by Funkhouser, I don't assume all the opinions of the authors to be correct'. For instance, for the idea of the succession between concrete poetry and interactive poetry proposed by Simanowski, I would review the rationality and accuracy of this view, and then pay more attention to it in my later research and prove it through practice. In the whole process of literature study, I continually write down some key references and doubtful points. This method enables me to locate the knowledge gap of this research field and construct appropriate research questions.

2.1.2.2 Parallel Comparison

If literature studies allow me to enrich the knowledge of relevant areas, thus finding the research questions, the parallel comparison method is a way to help me analyse the case more deeply. The parallel comparison method is a way to compare those works which appear similar without being directly related. In this study, concrete poetry can be regarded as an international movement developed according to a common innovatory concept. Though the examples and methods are different, they have something in common. So, no matter which country the work is from, which theme is represented, or which medium it relies on, they are all comparable, that is, they can be compared and analysed. In addition to comparative analysis of different types of print-based concrete poetry, the parallel comparison method is also applied in cross-era and cross-media analysis of concrete poetry in the 1950s and today's interactive poetry. The selection of poems was determined by several factors. First of all, I need to consider whether there is comparability among these cases, and then choose those cases that were identical or had significant features in common. For example, the printed concrete poem *Rain* by Seiich Niikuni (1966) and the interactive poem *Text Rain* (1999) are compared in Chapter 4 from the angles of themes, media and representative methods of poetry. Besides analysing similarities and differences between the two cases, I also discuss the relationship between interactive concrete poetry and concrete poetry, as well as the concept of interactive concrete poetry. The parallel comparison method used in the conclusion of this study not only summarises their similarities and differences, but also motivates me to further think about the causes of similarities and differences and dig deeper into content. Unlike other comparison methods, it stresses deep exploration and inquiry by treating each artistic work as a case study; as Barrett suggested, we explore a work, not to see the surface of this work, but to experience what it created and manifested in that era by existing in that era and background. Therefore, when we compare the two case studies in parallel, we are not comparing the surface of each work, but seeing the background, author and content of each work as a whole, and take out and compare and analyse the whole parts. Only by this can the analysis be more objective.

2.1.2.3 Reflective Practice

Interactive concrete poetry is an emerging subject, requiring my research method to be an ongoing and capacious process, rather than depending upon a pre-existing theoretical model. Practice, as one critical process in the research, is used throughout my research, aiming not only to test the feasibility of this idea, but also to explore new knowledge in this field. So, how to make the most effective use of practice in the research?

Yee (2010) defines the reflective practice method as “involving the researcher thoughtfully considering own experiences in applying knowledge to practice”,

and observes this is the most popular method in current practice-based research. This is why I selected it as the basis for my practice. In applying it, I refer to Donald A. Schön's (1992) distinction between reflection 'on' and 'in' action. In creating each practice, I, therefore, determine in advance the problems to be discussed in practice and also clarify the purpose of each practice. When there are problems in practice, I review the context and try to find new solutions, and this enables me to develop cognitive capacities. Feedback enables me to reconsider and reevaluate, and this helps me consider problems and practice from a new perspective.

Reflective practice method and literature study were simultaneous and complementary. In the process of developing my understanding of concrete poetry and interactive poetry, I created 14 poems, which can be variously classified as print-based poem, digital kinetic poem, VR poem and interactive poem. Reflective thinking runs through the practice process of creation and beyond. This method not only enables me to more deeply understand concepts of concrete poetry and interactive concrete poetry, but also leads me to identify more problems about them and solve these problems in new practice. An example is the process of creating *Four-Minute River*. Based on my knowledge of interactive poetry, I have created an interactive poem with dynamic visual effects, sound effects and multisensory experience of human-computer interaction. In the whole process, I constantly challenged every choices: why should this be? Why should I not do that? This work demonstrates my knowledge and experience of concrete poetry and the use of interactive media. After the completion, I still continued to collect feedback to help break and update my fixed interpretation. In addition to collecting feedback scholars in this professional field, I also collected feedback by displaying the work and communicating with the viewers (as through an exhibition), especially for audience feedback on interactive poetry, because I need to check out whether the work has done what was intended in its design and poetic flavour by observing interactive dialogues between the viewers and the work, and then I can review and reflect on it. Certainly, the so-called 'inspection' is not to check whether viewers have achieved some kind of reaction as expected or whether they have some specific understanding of the work, but to check whether poetic expression is well conveyed by the work.

While the whole process of creation involves reflective thinking, it is also influenced by bottom-up design thinking. Morris and Swiss (2006) argued that research studies of new media poetry emphasise 'the act of making' rather than 'the thing made', and the most generative approaches to discussions of the computer as an expressive engine tend to be those that work from bottom up rather than top down. Unlike the research method of mapping categories used in research on the poetry based on linear structures and conventional syntax, as Morris and Swiss (2006) said, "these approaches start with the characteristics of the machines digital composers use to generate textual experiences as physical artifacts." In other words, for the combination of networks and programmable

machines, the study of interactive poetry emphasizes not just the linguistic dimension in ‘classical concrete poetry’(print-based) or the representational function of words, but also the technical capability. In this case, the research methods of interactive poetry tend to the ‘see and do’ method (Morris and Swiss, 2006), which resembles software or computer game development methods.

This way of thinking is also reflected in the practical creation of this project; however, it does not mean that all interactive works of this research have used the bottom-up design approach. In some cases and the subsequent studies, we can see that some interactive works adopt either top-down or bottom-up approaches, while others apply both. However, simply because of the particularity of interactive poetry's interactive technology, I indeed have to consider the factor of interactive technology at the beginning of creating interactive works. The choice and use of interactively technology does affect the early thinking of the creation of works. As a kind of integrative thinking, bottom-up thinking is usually used in related fields such as interactive design and game design. It requires constructing a whole from a ‘part’. The reason why interactive works created by this bottom-up approach apply to this method is that their authors first consider specific interactive technology at the beginning of creation, and start with thinking over the technology and then the content and meaning of the works. Although some other new media artists say that they create interactive works based on ‘top-to-bottom’ approach, that is, first constructing a whole concept and then considering technological media, it can't be denied that interactive technology, as a part of the works presenting content, is always to some extent related to artists' design of works at the early stage.

2.1.2.4 Exhibition

As most of the practical artworks in this study were interactive concrete poems with an interactive element that relies on audience participation, it was necessary to exhibit them in public and ensure viewer interaction. As a research method, exhibitions generate invaluable feedback from engaged audiences. In addition, the process gave me an opportunity to reflect upon the practical works and discover problems, thus deepening my understanding of my research topic.

During the process of my research, I presented my works in three exhibitions: the doctoral conference ‘Theorem’ (Ruskin Gallery, Cambridge UK, July 2016), ‘To be continued’ (Tangshan China, April 2017), and in the double solo exhibition ‘From Space to Space’ curated by Zuyi Kang and myself, (798 Art Hall, Beijing, December 2017). Overall, I received useful feedback. In particular the audience of the second exhibition was very enthusiastic in engaging with the interactive experience offered by *Four Minute River*. People approached my creation from the front side, waved their

arms and interacted with words as if they were playing a game. However, this kind of engagement made me realize that whereas interactive technology provided more forms of expression for concrete poetry, it also risked compromising the transmission of the poetic message. Because of its interactivity, the audience was drawn in by the appeal of technology and presentation, and their attention was exclusively devoted to the playfulness of the artwork, to form instead of the message. Therefore, the inherent risk of interactive technology replacing text itself became all too obvious. To pursue this consideration further, after the exhibition, I drew on Orit Kruglanski, Neil Postman, and Simanowski's views to discuss the relationship between interactive technology and poetic communication of interactive concrete poetry, and deepen my understanding of the definition and characteristics of interactive concrete poetry (see Chapter 4).

2.2 Visual Work

The previous chapter sought to define the methodology of my study, and I will now introduce the expression of that methodology through visual work, and will describe the relationship between these practices and my research. I have created 14 works, which include nine concrete poems, two digital kinetic poems, one VR poem and two interactive poems. I will now select seven examples for discussion: print-based poems *Toothache*, *Bee*, *Another Me* and *A London Bird*, interactive poems *Four-Minute River*, *VR Poetry* and *Mimosa*. These works, as practice cases of reflective practice, will help me to understand, propose and solve problems during the research.

Toothache and *Bee* are two concrete poems created by typewriter. They were created at the same time as I was reviewing the literature of concrete poetry taken from the period 1950-70. My intention was to understand the characteristics and principles of concrete poems.

Toothache was created by changing the letter structure of the word 'toothache'. After I added a few more 'o' letters in the middle of the word, the meaning was redefined as 'a row of teeth'. One of the 'o' s becomes a "broken tooth" because of repeated typing, which aligns the whole word with the meaning of toothache itself. This poem reflects Gomringer's (1954) views on 'constellation': 'it can be perceived visually as a whole as well as in its parts'. It turns the text into a concrete object through a 'word game'. The word 'toothache' now no longer conveys the information embodied in its own vocabulary, but shows the meaning that lies beyond the text. Through the simple overlapping of letters, this poem leads the viewer from the word 'tooth' to a story of 'bad teeth', which is no longer read but is instead imprinted in people's minds like a picture.

I
have
a
toooooooooooooooooooooooooothache

Figure 1 Zhang, M., 2016. *Toothache*. Cambridge.

Bee is the second work in the concrete poem experiment, describes a bee that flies to and fro while buzzing. When it is hit, its ‘singing’ ends. In acknowledging that we mostly recognise bees flying by the sound they make, I did not use the text to form a concrete bee, but instead used its ‘buzz’, to represent this bee. I arrange these ‘buzzes’ in a curved line to represent a bee’s flying trajectory. The insertion of the word ‘crack’ at the end is intended to show the bee's flight path being cut off; and ‘zz’ is the final sound of the bee being hit by a hand. It is not only the last buzz, but also symbolises ‘ending’.



Figure 2 Zhang, M., 2016. *Bee*. Cambridge.

This concrete poem does not only use the meaning of the text to describe the state of a bee, but also applies the typographic design to ‘paint’ the ‘sound’. *Bee* creates a poetic environment where people can hear and experience without considering any syntax. Finlay (1963) observes “it also has a new relation to sound—abstract in a much more real way than ‘sound’ poetry, since it is heard by the mind and cannot be spoken.” This poem does not primarily emphasise the storyline but rather the understanding of

typographic design in the arrangement of text elements – that is, the design of the bee’s ‘flying path’. I previously created several versions with different flying paths, which were discarded because they evoked too many subjective emotions. I continually considered what kind of typography can more objectively represent a bee’s paths, rather than pursue typographic aesthetics or incorporate my personal perspective. So I refer to T.S.Eliot’s objective correlative theory, because it stresses ‘non-personal emotional expression’ – the author therefore intuitively expresses a picture from life or memory through an objective expression that does not contain his/her individual emotions. Eliot believed that this was the only form of poetry that could convince the reader. In his words, “the only way of expressing emotion in the form of art is by finding an objective correlative – this is a set of objects, a chain of events which shall be the formula of that particular emotion; such that when the external facts, which must terminate in sensory experience, are given, the emotion is immediately evoked.” (Eliot, 1919) In my view, this provides an important justification for the application of Eliot’s theory to the creation of concrete poems. I then began to study the actual flying paths of bees, and observed and recorded their paths as they weaved through the garden and flowers. The text composition in this poem corresponds to the actual flying path of a bee that is flying from left to right and then from right to left as it tries to keep away from me in a garden. The poetic communication manifests through the combination of phonetic symbols, text elements and typography. These two works have helped me gain a deeper understanding of the concept of concrete, as defined by Gomringer, the Noigandres group and Bense. Of course, the ‘concrete’ of concrete poetry is also not confined to it.

My first interactive concrete poem, *Four-Minute River* (see Chapter 4), was based on the reflective practice method. It integrated the theme of exploring human language with dynamic visual effects, sound effects and human-computer interaction technology, and contained multiple sensory experiences. This work emanated from my reflections on the use of language in concrete poetry. Does the poetic content of concrete poetry have to be expressed in a semantic and readable language? With this question in mind, I visited the Cambridge poet Richard Berengarten in March 2016. During our conversation, Richard made reference to Ruth Weir’s book *Language in the Crib* to explain that language is a kind of embedding of memory in time and used the word ‘mom’, used to address and define mothers around the world, whose pronunciation alludes to the sound of a baby sucking milk.

The baby’s original sound, which is a kind of perception of life and experience of it, can convey emotions, although it clearly contrasts with adult language in that it does not contain textual information. The interview with Richard inspired me to use the language of the baby to create my concrete poem. During its creation, I applied my understanding of the concept of concrete poetry, and strived to construct the interactive work into a single form, in the full knowledge that this was consistent with the concept

of concrete poetry outlined by Gomringer, the Noigandres group and other poets. I constantly questioned if my design was consistent with their formulations. I also asked myself if it simplified the language, if the form was suitably adjusted to its content and if the 'play-area' (Gomringer, 1954) was sufficient open to enable speakers from different countries to appreciate the poetry.

The poem *Four-Minute River* was essentially created on the basis of the top-to-bottom method. It began with a consideration of the concept and then proceeded to consider interaction technology and the design of other details. Its creative approach is different from my *VR Poetry* (see Chapter 5). After completing this work, I received feedback from my supervisor and displayed my work in PhD group exhibition *Theorem* (2016) with the intention of gaining public feedback. This feedback was very valuable, as it helped me to reconsider my understanding of interactive poetry and forced me to question if I had sufficiently captured it in my own work. During the exhibition, I found that many viewers were not interested in the deep meaning of the work but instead focused on the game play of interaction when they were interacting with the work. This led me to question the relationship between technology and art and my reflections informed my dialogue with the media artist Li (see Chapter 4).

Typographic design, which played an important role in the creation of concrete poetry in the 1950s, is not part of *Four-Minute River*, and this is because this work's poetic expression is mainly generated through the interaction between viewers and the work. This raises the question of whether typography exists in interactive poetry, and we are also led to ask if it is as important as typography in print-based poetry, and if expressive typography helps concrete and interactive concrete poetry to convey poetic thought.

In searching for answers, I used a typewriter to create two poems, *Another Me* (see Chapter 5) and *A London Bird* (see Chapter 5), with the aim of better understanding the meaning and application of concrete poetry's typographic design. *Another Me* expresses the spiritual feelings of a person with a dual personality. The overlap of two sets of matrices made up of 'I' helped the overlapped part to create a kind of visual illusion of movement. The typographical context created in this illusion helped to demonstrate the important role that expressive typography plays in conveying the poetic intention of concrete poetry.

I later created *A London Bird*. Although it seeks to explore the meaning and possibility of typography in concrete poetry, its composing techniques and typography are quite different from those applied in *Another Me*. *A London Bird* makes more extensive use of visual representation, and this enabled me to challenge the typographic techniques of the typewriter. These two experiments produced positive experimental results, which directly contributed to my improved understanding of the typographic design of

concrete poetry in the 1950s, and also demonstrated how practice could be used to address the research question.

In most cases, the typographical characteristics of concrete poetry were originally conveyed through the medium of the typewriter. As time passed, and various media were developed, digital, dynamic and e-poetry began to be produced. Concrete poetry and expressions of its typography are constantly changing, which lends a new significance to its poetic expression. In order to gain greater insight, I analyse the work of Peter Sungil Cho, William David (Jhave) Johnston, Loretta Staples, Matt Woolman, Jeff Bellantoni and Matthias Hillner. I also refer to Barbara Brownie's views on 3D, temporary, reactive and generative typography. With the intention of gaining a better understanding of typography's application and its significance in interactive concrete poetry, I created a concrete poem that was based on VR media.

Before creating this work, I carefully considered the choice of media. After identifying that neither the LED screen nor projection technology provide a good visual three-dimensional experience, I finally decided to use a VR helmet for this work. This medium produces virtual space effects, which immerse viewers within the experience so they do not simply experience it through a screen. I therefore communicated with the technical team at the Maisui Company on several occasions to learn more about the creative process of artistic works based on VR media. This enabled me to use a bottom-up method to create the work. I began with the VR technology, which involved constructing a 3D environment in which animation production proceeded from one frame to another, and then onto programming before finally producing a concrete poem in which an artistic depiction of a bamboo forest was filled with Chinese ink elements. The theme of this work was the artistic conception of a classical Chinese poem (蝉噪林愈静, 鸟鸣山更幽). In this poem, when the sound of the cicadas in the bamboo forest is louder, the forest is more peaceful; when the bird's singing sounds further away, the mountain is more secluded.

The whole creative process of creation was accompanied by my reflective thinking. I found that the successful use of 3D typography enables viewers to perceive the content conveyed by this work through the 3D kinetic trajectory of 'oeoe' and 'chirp'. But this creates another problem – namely that the interactivity and user experience of this work are less obvious. The virtual space in *VR Poetry* could not sufficiently explain the characteristics and application of interactive typography in interactive concrete poetry and I therefore proceeded to create *Mimosa* (see Chapter 6), another work. This installation interactive work was inspired by Joan Brossa's work and it attempts to demonstrate interactive poetry and its 3D dynamic in real space, and also solves the problem of a lack of interaction in *VR Poetry*.

In summing up the experience of all previous practice works, it successfully presents the features that an interactive poem should have. After establishing mimosa as the theme, I first studied the characteristics and growth environment of this concept, which is a plant that immediately responds once it is touched. I realised that human-computer interactive technology captured this reaction very well. I initially proposed to apply light touch plate technology to complete this project. Sensors are added to the alphabet lights to create a visual effect, the lights are turned off and a sense of mimosa is generated when the audiences touch them. Three-dimensional typography also helps to create this effect. I did not have a script or screenplay, but tried my best to arrange them in a text matrix that could form 'mimosa' from several different angles. I hope that participants will walk into this installation poem in the same way as they do when they 'read' Brossa's work. In doing so, they will interact with the text both freely and openly and will become part of its poetic communication.

During its creation, I continually reconsidered the problems of previous cases with the aim of extracting lessons that would improve this practice. I constantly emphasised the concepts of 'play-area', 'graphic space' and 'form content'(Gomringer,1964) in concrete poetry and the role of three-dimensional typography in it. In contrast to both of the previous two works, which are seen and interacted with, *Mimosa* is there to be read and become immersed in. It is also relatively open rather than scripted and screen-based. It is the final practice, and therefore achieves a relatively complete summary of interactive concrete poetry. It inherits the concrete poetry of the 1950s, and explicitly expresses concrete poetry in an interactive age. It is no longer confined to the screen or virtual environment, but instead enters life and physical space in a way that makes it possible to directly experience poetic flavour. It is the 'interaction' of interactive poetry. This doesn't mean showing the powerful functions of interaction technology, but instead provides an immersive interactive experience that is based on the people-oriented principle.

In the research, the creation of each practice is rooted in a problem that is examined and discussed and this in turn creates a new problem. The practices that are drawn from interactive concrete poetry enable me to constantly deepen my understanding of this poetry. This section has, in discussing these cases, sought to verify the successful implementation of these practices in the current practice-led research.

Chapter 3: Literature Review

Media and processes of reproduction has always played an important role in the development of concrete poetry. Between 1950 and 1970, the conventions that governed printed concrete poetry were mainly defined by the constraints and affordances of the technologies involved typewriters, movable type and tape. Later with the use of computer-related technology, digital and interactive poetry is similarly informed by the constraints and affordances of digital and interactive technology. Human-computer interaction technology is at the forefront of the times and has been widely used in art creation. This kind of interactive technology can not only bring dynamic visual expression to concrete poetry, but can also engage with the audience through its interactive function. The role of this new technology in the communication of meaning has become a key issue of debate.

In recent years, many new media artists and poets have made contributions to the exploration and development of interactive poetry, in terms of creation and publication of literature. Although they talk about their ideas and approaches with confidence, they could not provide a specific definition of interactive concrete poetry. Accordingly, the purpose of this chapter is to summarise current research and pinpoint problems and causes through studying relevant textual materials of interactive concrete poetry.

As an interdisciplinary and multidisciplinary research integrating concrete poetry, typography and interaction technology, interactive concrete poetry required thorough comprehension from different viewpoints. Therefore, my study revolves around four aspects of textual exploration: concrete poetry from 1950 to 1970 (to understand the history of concrete poetry and interactive concrete poetry, then to analyse their interaction); interactive concrete poetry (to evaluate the current status and problems of contemporary interactive poetry); interactive technology (to provide a definition of the term of interaction and to comprehend the aesthetic of interactive technology for the future development of interactive concrete poetry) and typography (to determine the role of expressive typography in the poetic communication of print-based and interactive concrete poetry). The purpose of this chapter is not only to establish a deep understanding of the research history and current conditions in this field, but also to expand previous knowledge, pinpoint gaps in the field of concrete poetry, and establish my own standpoint.

3.1 Literature review: concrete poetry

According to Simanowski, kinetic digital poetry is the successor of concrete poetry (Simanowski, 2011). Hence, I begin with a review of literary theories of concrete poetry to understand it in the context of new, interactive media. In what follows, I present theoretical approaches and current literature on concrete poetry.

Historically, many movements had shown interest in the connection between language and the visual form of poetry (Mencia, 2003). This connection between image and text has a long, fascinating history going back to ‘technopaignion’ in ancient Greece, ‘shape poetry’ in the 16th century, and ‘pattern poetry’ in the 19th century. Poetry in the pattern of the combination of images and words has been attempted over the centuries. Some poems were exclusively composed of letters and were almost completely verbal; some were comprised of letters, but their value was purely decorative. In short, some works were similar to traditional poems, while some resembled paintings. They did not have a precise definition and were not viewed under the scope of a unified concept. This approach prevailed until the emergence of the term ‘concrete poetry’ in the 1950s. Drawing on the experience of predecessors (such as Stéphane Mallarmé, Ezra Pound, E.E. Cummings and Guillaume Apollinaire), the concrete poetry movement combined the expression of semantics and vision, focused on ideas of ‘structural principle’ (Draper, 1971). It added a relatively specific and unified theoretical framework to the fundamental concept that ‘poetry can be seen’ (Bohn, 2011), thus forming a new poetic approach that saw language as an object. Beginning in the early 1950s in Switzerland and Brazil, the concrete poetry movement quickly spread its unique poetic visual form throughout the world.

However, with the development of concrete poetry, a series of criticisms came. Willard Bohn’s *Reading Visual Poetry* mentioned critics like Fancico Rigolot who believed visual poetry was a frivolous pastime. Bohn (2011, p.13) explained: “In an article published in a prominent French journal, Rigolot asserted that writers who experiment with formal devices tend either to live during unimaginative periods or to lack imagination themselves.” For some critics who focus on semantics and review concrete poetry from a semantic perspective, the ‘forms’ of concrete poems are just tools for artists to grab the limelight. But Bohn (2011) proposed that, since concrete poetry had become a recognised art form, and its theory had been tested and verified by practice since the 1950s, it needed no defence.

Gomringer explained the inevitability of the concrete poetry movement in his 1954 manifesto *From Line to Constellation*; he argued that since 1950 there had been a trend toward formal simplification in language: the content of a sentence was usually expressed by a word, and a long sentence was usually expressed by a set of letters. In his view, the simplification of the language did not mean the end of poetry, but reflected the essence of poetry, that is, “Restriction in the best sense-concentration and simplification-is the very essence of poetry” (Gomringer, 1954).

In addition, most of the artists who had had an impact on the movement came from different backgrounds (for instance, Gomringer was a poet, Pignatari a designer, Hansjorg Mayer a typographer, Diter Rot an artist, Friedrich Achleitner a student of

architecture), and their common goal was to experiment with language and create innovative poetry that completely broke away from tradition. Hence, the development of the concrete poetry movement is more related to the early development of architecture, painting, sculpture and design. This means that we do not need to look at new poetry exclusively from the perspective of literary semantics. This does not mean that concrete poetry is completely separated from literature, because, as Gomringer and Benns' comments imply, concrete poetry is created by applying spatial principles to the semantic potential of words; the essence of concrete poetry is poetry rather than graphics (Draper, 1971).

Therefore, the emergence and development of the concrete poetry movement accorded with the zeitgeist and was also demanded by the development of the language of the time. As Williams (1967,vi) said, "It was born of the times, as a way of knowing and saying something about the world of now, with the techniques and insights of now". Certainly, 'now' in his words signified 'that era' of the concrete poetry movement.

How do we perceive this kind of new poetry? Gomringer, who agreed with Bense and the Noigandres group, defined concrete poems as functional objects that can be viewed and used (Gomringer, 1960). According to Bense (1965), concrete poetry is a style of material poetry, whose language is not subject to grammar and syntax but "ruled by unique visually and structurally oriented models" (Bense, 1965), and whose poetic nature is based on the understanding of arrangements rather than understanding the meaning. The Noigandres group (1958) stressed, in the *Pilot Plan for Concrete Poetry*, that concrete poetry is the product of a critical evolution of forms, and the graphic space is its structural agent rather than linear-temporistical development. Thus, comprehending the aesthetic communication scheme of concrete poetry requires us to abandon reading rules and semantic rules of traditional linear text, and see new poetry as an object so as to understand it from a new, open perspective.

In addition to theoretical views on concrete poetry proposed by Gomringer, the Noigandres group, and Bense, similar ideas had been published in magazines and small publications, such as the journal *Spirale* edited by Rot and Marcell Wyss, *Material* (1957-59) edited by the Darmstadt Circle in Germany and the *FUTURA* pamphlets by Hansjorg Mayer. The theoretical views of these early concrete poets play an important role in my discussion of the concept and definition of concrete poetry and, in the two decades of booming development of concrete poetry from 1950 to 1970, dozens of books around the world studied this interesting art form. For example, *An Anthology of Concrete Poetry*, compiled by Williams in 1967, collected 77 poets' concrete poems composed from the early 50s to the end of the 60s. Similar to Bann's *Concrete Poetry: An International Anthology* (1967), Williams collected a wide range of concrete poems from across the world to reflect the

international character of the concrete poetry movement. Apart from the works of some well-known representative poets, it also contained some less well-known works that were important to the concrete poetry movement. It is a kind of protection of early concrete poetry and allowed more works to be perceived and studied by later generations. Williams discussed the views on the achievements of concrete poetry in the previous twenty years, called for a specific focused on each piece of concrete poetry's 'poetry' instead of 'concrete', and added a short explanatory comment to each poem, thus making this book an authoritative collection of concrete poetry.

Concrete Poetry: A World View by Solt (1968) is another important work in my view of the theoretical literature of the subject. Just as the title suggests, it is an anthology of concrete poetry with a worldwide perspective. Setting about the discussion of the contribution of each country in Europe, America and Asia to the development and influence of concrete poetry, Solt not only probed into different conceptions of concrete poetry by poets and artists from different countries, but also analysed the different creative expressions and categories of concrete poetry. This book showed me the diversity of types of concrete poetry, which is not only visual, phonetic and kinetic, as Mike Weaver (1966) said, but also both visual and phonological, or both expressionistic and constructivist. However, Solt (1968) argued that, despite the diverse categories of concrete poetry, all works fulfilled a basic requirement of concrete poetry: that is, "concentration upon the physical material from which the poem or text is made." According to Solt (1968), "emotions and ideas are not the physical materials of poetry" and the material of concrete poetry is the language, which reduces words to their elements of letters (to see) and syllables (to hear). She noted that, in addition to simplifying the language, concrete poets were also committed to creating linguistic materials in the new relationship between space and time. This meant that their works needed to be perceived rather than being read. She continued that, despite the disagreement on semantic issues, some poets/artists insisted that poetry should remain in the field of semantic communication, while others believed that poetry could spread new, pure aesthetics. Regardless of their views on semantics, they firmly believed in the creation of concrete poetry, that the old grammar and grammatical structure were no longer suitable for the advanced thinking and communication process of their age.

Three anthologies by Williams, Bann, and Solt took the theoretical study of concrete poetry to a new level. However, in the opinion of Stephen Scobie, the publication of these anthologies represented the end of the concrete poetic movement. Writing in *Earthquakes*, he said, "The very definitiveness of these collections 'froze' Concrete Poetry in its historical moment" (Scobie, 1997, p.146). There is difference of opinion regarding the time the concrete poetry movement ended (or whether it was really over), but it is generally believed that the movement did enter a new stage after the 1970s, and its diversity was more obvious during that period. As Jamie Hilder (2010) said, concrete

poems developed into highly personalised styles after the 70s and were presented under various other names. This phenomenon can be seen in the literature related to concrete poetry: most articles and books discussed from the 1950s to the late 1960s focused on the differences between concrete poetry and the poetry based on linear structures and conventional syntax, and the authors either advocated the concept of new poetry movement or tried to promote this new poetry. However, the criticism of concrete poetry since 1970, as in R.P. Draper (1971), Bohn (2011), and Hilder (2010), tended to distinguish between concrete poetry from the 1950s and 1960s and that of the period after the 1970s, because they discussed the former as an independent movement of the time.

In the article *Concrete Poetry*, Draper (1971) discussed the concrete poetry movement from a retrospective perspective and suggested a set of 'rational principles' for concrete poetry. He introduced the experimental poetry which appeared after the 1950s, building upon the structural principle proposed by Gomringer and the Noigandres group, and termed it 'pure concrete poetry'. He stressed that pure concrete poetry was different from the poems of pioneers such as George Herbert, Guillaume Apollinaire, e.e.Cummings, and others. He viewed the spatial element as the essential of 'pure concrete poetry' communication. Instead of using letters as writing material, poets replaced the role of traditional syntax with spatial elements of the poems to articulate implications of words. Draper (1971) perceived the works of Gomringer, the Noigandres group, Finlay, Edwin Morgan and others as models of pure concrete poetry and explored the concept and characteristics of 'pure concrete poetry'. Later, he discussed the poems of Franz Mon, John Furnival, Pierre Ganier, Solt, Rot, Dom Sylvester Houédard and other artists, who he believed contributed new dimensions to concrete poetry. He especially examined Houédard's typewriter poems, which he thought expanded the technical possibilities of the typewriter and showed that the results of experiments were usually obtained under the condition of resistance rather than pure freedom. He added that 'pure concrete poetry' was mostly based on the typewriter, but the technical possibilities of the medium seemed to have been exhausted in the 1970s. He noted that the development of the typewriter would be replaced by new media, so the impetus for the development of concrete poetry would be redirected to new, more appropriate technologies. Therefore, Draper (1971, p.336) believed that we should establish a rational principle for the creation of concrete poetry, that is, "to absorb the visual inventiveness into a fuller relationship with rational tradition." He tentatively proposed three basic principles for the creation of 'pure concrete poetry'. He said that, in the printing of European languages, there is a very strict space rule between letters and between words. Letters are aligned onto strict parallel lines on the page from left to right and move down at a firm pace. The first manifestation of the creation of concrete poems was the suspension of the strict conventions of the printed page-space. By using Morgan's *Orgy* (1965) and Bann's

Dominikus Zimmermann (1966) as examples, he further explained how concrete poems create meaning out of the contradiction between themselves and the printing convention. (Draper, 1971) The second tendency was to arrange words or letters according to an axial principle, such as Friedrich Achleitner's *Ruh/Und* (1959) and Ronaldo Azeredo's *Tic Tac* (1962). The third principle was to ignore the vertical and horizontal rules of the page and arrange text freely, such as in Reinhard Dohl's *Apfel* (1965).

However, "These three principles are not in themselves of especial importance." As Draper (1971, p.340) warned, "They become significant only when used in particular poems to articulate verbal material." We can see that Draper's principles are mostly based on the technological environment of his time. Writing in 1971, he might not have imagined that today's interactive technology could introduce brand new ways of thinking in concrete poetics. Thus, some of the principles he proposed may not be fully applicable today. However, regardless of what Draper's exploration of the principle of concrete poetry contributed to the field (a conclusion or a new problem), his focus on concrete poetry media and his consideration of future development in concrete poetry are significant to the study of concrete poetry.

As new media technology was gradually being used in concrete poems of the 1970s, poets and artists began to consider new possibilities in its future development. "Like the typewriter, which helped to shape concrete poetry, the personal computer has had a tremendous impact on contemporary visual poetry" (Bohn, 2011). In *Reading Visual Poetry*, Bohn (2011) discussed digital poetry after the 1980s. He said that, in this new field, concrete poetry can be manipulated in countless ways; its meaning could extend beyond the definitions of concrete poetry that had been established in the 1950s, thus raising new questions as to the identity and meaning of concrete poetry in digital media, as well as new challenges to the theoretical research of concrete poetry. Most concrete poets like such challenges, so in the 1980s and 1990s there were a large number of poetic experiments based on digital media. Depending on their characteristics, they were defined as hypertexts, kinetic poetry, video poetry, animated poetry, digital poetry, or e-poetry (Bohn, 2011). According to Augusto de Campos (1995), this development of concrete poetry is positive. By introducing movement into poetry, digital media enhanced the dimension of time in poetry and provided the ideal space for concrete poetry to become 'verbivocovisual' (de Campos, 1995). In these experimental works, some poets continue to write in the established concrete mode with the concept of printing concrete poems, such as *Worm Applepie for Doehl* (1997) by Johannes Auer and *First Screen* (1984) by the Canadian poet bpNichol. They connect concrete poems with digital poems in a seamless way (Portela, 2006), presenting us with a connection between digital poetry and print-based concrete poetry between 1950 and 1970. On the other hand, other poets choose to break away from traditional patterns

of concrete poetry and their works explore new poetics with different media (e.g., Eduardo Kac's works *Nao* in 1982 and *Reabracadabra* in 1985). These poetic experiments provide insight onto and generate questions about the poetic expression of digital poetry in a new space .

In his book, *Designed Words for a Designed World*, Hilder (2016) argued that there are some critical gaps in the criticism of concrete poems, especially in relation to whether contemporary with or after the concrete poetry movement, which all fall into: 'the national fallacy', 'the ancient fallacy', 'the theoretical fallacy' or 'the disciplinary fallacy'. Some critics tried to interpret the concrete poetry movement within a national framework; some associated concrete poetry with visual poetry and word imagery; others sought to use post-structuralist theories of language to retrospectively interpret concrete poetry; some critics even interpreted poetry exclusively within the context of developments in the critical culture of visual art. Such complicated discussion of context enables people to understand concrete poetry from different angles but also creates additional confusion.

Hilder's study emphasised the historical, social, and artistic context of concrete poetry from a more macroscopic perspective. His purpose was to 're-signify the term concrete poetry'. He thought that, when we see concrete poetry from a new angle in the 21st century, it is no longer the "poetic eccentricity, or as synonymous with visual poetry in its various forms across indicates the history" in the middle of the 20th century, but 'designed words' for a 'designed world' (Hilder, 2016, p.237). He explained that "The modifier 'designed' implies that the words are meant to serve a purpose, and challenges critics to question the technological and cultural bases of the work" (Hilder, 2016, p.236). In other words, when we read concrete poetry in the same way as we approach design works, we will neither separately focus on forms, nations, languages, disciplines, or any one single aspect of concrete poetry nor analyse concrete poetry's forms, language or techniques separately, but consider its meaning by taking it in as a whole. The macroscopic analysis of concrete poetry proposed by Hilder (2016) fits well with the purpose of my study, for it breaks the limits of time and media restrictions, and comprehensively considers each work as an independent 'design'.

In addition to the above-mentioned literature, valuable insight for theoretical study is provided by the avant-garde poetry magazine *L-A-N-G-U-A-G-E*, co-edited by Charles Bernstein and Bruce Andrews in the 1970s. *L-A-N-G-U-A-G-E* did not define poetry according to widely accepted aesthetics and basic principles, but provided a forum for poets, artists and designers to discuss their individual views. It clearly recorded the theoretical debate on concrete poetry at the time and served as a forum which generated criticism while recording it. As such, it provides strong theoretical literature for my study.

In addition to *L-A-N-G-U-A-G-E*, Richard Bradford (2011) proposed a ‘sliding scale’ in his book *Graphic Poetics: Poetry as Visual Art* to distinguish categories of concrete poetry. The book provides reference for my analysis of concrete poetry categories. In chapter 22 of *The Routledge Companion to Experimental Literature*, on concrete poetry and prose, Joe Bray (2014) introduced the historical origins of the movement in the 1950s from a literary perspective. *Ian Hamilton Finlay Selections, an anthology of the Scottish poet* edited by his son Alec Finlay (2012) enhanced my understanding of the great poet, his creative thinking, and his thoughts on concrete poetry. In addition, I also refer to *Concrete Poetry: the influence of design and marketing on aesthetics* by Tineke Bierma in 1985 and other papers, which helped me improve my theoretical cognition of concrete poetry and laid a theoretical foundation for the subsequent research on interactive concrete poetry.

3.2 Literature review: interactive concrete poetry

Since the 1970s and the emergence of new technologies, it seems that concrete poetry can always find new ways to express its ‘concreteness’: with the development of computer technology, concrete poems began to adapt to the needs of their time and expand the types of poetry, ranging from hyper-poetry, animated poetry, digital poetry, and e-poetry, to today's interactive concrete poetry. The development does not suggest the death of print-based concrete poetry but marks a historic evolution.

Poems created by means of digital technology include widely varied forms, which are constantly increasing alongside the development of technology. This study mainly discusses poems based on human-computer interaction technology. In addition to achieving the dynamic motion that some print-based visual poetry intended to express, this type of poetry also provides readers with a multi-dimensional, multi-sensory experience by emphasising the interaction between the work and the reader. In this type of poetry, the reader is not merely a passive receiver, but also an indispensable participant in the fulfilment of poetic communication. In recent years, more and more poets and artists have discussed the form and aesthetics of poetry in digital media (including interactive media). Their discussions have advanced my understanding of the research field and background of my study.

Manuel Portela's *Concrete and Digital Poetics* (2006) was the first literature I read to trace the origins of concrete poetry under the new media. By using Augusto de Campos, E.M. Melo e Castro, and Tiago Gomez Rodriguez's poetry as examples, Portela described how they were transformed from print-based concrete poems to digital versions. After an analysis of these works, he argued for the continuity between digital media and the creative mode of concrete poetry at the early stage: “...that there is an intrinsic connection between concrete poetics as a theory of the medium (i.e., of language, of written language, and of poetical forms) and digital poetics as a theory of

poetry for the digital medium” (Portela, 2006). In other words, a concrete poem is poetry that relies on a medium (visual pattern or typography) to express its meaning, whereas digital poetry is a digital medium for conveying poetry. To further display their connections, he outlined three attributes: 1) The spatialisation in the specific text is the same as the topographic and iconic writing of the digital interface; 2) The creation of non-sequential reading paths is the same as that of hypertext non-sequential; and 3) Concrete poetry and digital poetry have completed the process of text projection from the paradigmatic axis to the syntagmatic axis, combining to networks of various possibilities. Portela (2006) opined that “Because of those three properties, the opening of text to the probabilities of language by means of combinatorial procedures, which was the defining principle of concrete poetics, can now continue in the digital medium.”

In his article *From Dada to Digital: Experimental Poetry in the Media Age* (2013), Kurt Beals, who shares many of Portela’s views, established the connection between digital poetry and concrete poetry through discussing the works by Döhl, Auer, and others. He thought that the most obvious impact of concrete poetry on digital poetry was the emphasis on the visual form of letters and words. Like concrete poets, these digital poets focus on the ‘materiality’ of the text. Beals thought that the ‘material’ here should be understood in a broad sense. What poets focus on is not physical material of the hard disk drive or display for the computer, but the visual characteristics of the letters it displays. In a nutshell, according to Beals (2013) “the emphasis that these poets place on the visual properties of language is clearly analogous to the material focus of many concrete poets.”

Beals also discussed the differences between digital poetry and print-based concrete poetry. He argued that, unlike print-based concrete poetry, one of the most basic features of digital poetry is the use of kinetic forms. He said that adding dynamic movement into digital poetry not only highlights the spatial characteristics of poetry (often extending from the two-dimensional space of the screen to three-dimensional illusions), but also enhances the dimension of time. Differing from static texts, dynamic texts impose a timeframe for the reader to read, while, in static texts, readers can read at their own pace. However, this feature also raises some doubts about digital poetry, in that most digital poems that emphasise kinetic characteristics are designed to follow a prescribed script, and they are created more like short films, whose gameplay mode and content are the same every time. As can be seen from the two examples mentioned by Beals (Stefans’ *Dreamlife* and Huth’s *Endemic Battle Collage*), this type of digital poetry contains no interactive element, even though it emphasises the visual kinetic characteristics of poetry. To a certain extent, this limits the reader's sense of participation and constrains their imagination, contrary to the poetics of ‘invitation’ and ‘play-area’ proposed by Gomringer. Therefore, to a certain extent, the reading experience is even less than the reading experience brought by the

print-based concrete poetry. So, this type of poetry can only be understood as visual poetry with the added dimension of time. Therefore, my main concern in the following literature review is to explore those poems that contain interactive functions.

In his book *Digital Art and Meaning*, Simanowski (2011) indicated that, in the digital field, the language and text of concrete poetry can not only achieve dynamic effects of movement, zoom, appearance and disappearance, but also respond to audience input. According to Simanowski, compared with those poems which are similar to 'short film' and emphasise kinetic qualities, the interactive kinetic concrete poetry focuses more on the readers' sense of participation in the artworks. For example, *Das Epos der Maschine* (Machine Epic) (1998) by Urs Schreiber, *Yatoo* (2001) by Austrian artists Ursula Hentschlagler and Zelko Wiener, demonstrates this kind of interactive concrete poetry very well. These works provide readers with more open choices (links) rather than mandatory scripts. Inspired by Simanowski, I analysed two other interactive poems, Maria Mencia's *Birds Singing Other Birds' Songs* (2002) and Pedro Veneroso's web poem *Gogoame* (2016). A comparison with Auer's *Worm Applepie for Doebl* revealed that interactive poetry extends beyond the confinements of purely dynamic poetry in some aspects.

However, although these works add basic interactive functions on the basis of early purely dynamic digital poetry, this form still raises some concerns. For example, Marjorie Perloff (2006) noted in her article *Screening* that "digital poetry today may seem to fetishize digital presentation as something in itself remarkable, as if to say, Look, what the computer can do!" (Perloff, 2006). She believed that, regardless of category, digital poetry is a kind of language art, and poetry is a kind of language performance which can be understood only by reading. She went on to say that "the new techniques, whereby letters and words can move around the screen, break up, and reassemble, or whereby the reader/viewer can decide by a mere click to reformat the electronic text or which part of it to access, become merely tedious" (Perloff, 2006). Perloff (2006) acknowledged the possibilities new technologies offer to poetry and argued that interaction is designed in a set of fixed options, and the "input" is strictly predetermined by the author and programmer, so the interaction in interactive poetry is just a set of fixed options to choose from. Therefore, she concluded that, although this interaction increases the reader's right to choose, people soon get bored when they understand the fixed rules of the game. She used the online game *Virtual Life* as an example to prove this point.

Clearly, Perloff's views are based on those interaction poems controlled by the mouse and computer interface links. But the word 'interaction' nowadays not only signifies people interacting with the interface link, but also includes the aspect of physical interaction between people and machines. *Digital Art and Meaning* includes some

poems presented in the form of installation through combining language, text, and body movement, such as *Text Rain* (1999) by Romy Achituv and Camille Utterback . In *Text Rain* (1999) the audience stands in front of the screen and their shadows are projected on the screen. The text on the screen is shaped as rain dropping down on the audience's shadow. When the audience moves or makes an active response, these letters will fall. The audience interacts with the text rain on the screen through body movement, and integrates the body movement into the construction of poetic communication, thus becoming an active part of the poem. *Text Rain* (1999) adds randomness to the design, providing readers with more open-ended choices and a more random reading experience compared to interactive forms that require selecting screen links by clicking the mouse. This seems to answer Perloff's question about interactive poetry.

In addition, in *Digital Art and Meaning*, Simanowski (2011) pointed out that the meaning of *Text Rain* (1999) is not only derived from the interaction between the audience and the text rain itself, but also from the readable text information generated by human-computer interaction. Simanowski stated that the ability to read *Text Rain* makes it a poem rather than an item of interactive art. Simanowski's argument helped me understand the difference between interactive art and interactive poetry and reminded me to consider the meaning behind interactive works in the following case analysis. In his words, "There is room behind design and surface spectacle for deeper meaning" (Simanowski, 2011, p89).

From print-based concrete poetry to digital kinetic poetry, then to interactive poetry, the audience is transformed from readers to participants, and, finally, becomes part of the creation of poetry. The use of the interactive function conforms to the intention of the 'play-area' that concrete poetry intends to construct and enable concrete poetry to become an 'invitation'. We must admit that new technology possesses the bodily characteristics to bring unprecedented experience and get people engaged. But, just as people were enjoying it, another question was formed: how many people actually understand the textual meaning behind the interactive element? Its playfulness causes many artists and poets to be disappointed at their works, because people are more interested in the gaming aspect of such works and ignore the meaning that the poets and artists want to convey. As Simanowski (2011) mentioned, Noah Wardrip-Fruin's *Screen* (2004) is an interactive poem, even though it imposed additional reading requirements on readers and eventually turned into a gaming experience.

Playfulness does become a feature of interactive poetry, and it can be argued that in such works, words have dual lives, as linguistic artefact and an interesting object for playful interaction (Simanowski, 2011). As Simanowski (2011, p.53) said, "The only way for text to endure in this environment is to appear in the paradigm of double coding

- or double life - providing action on the surface level of perception and moments of contemplation on the deeper level.”

In addition, the innovative aspects of interactive concrete poetry of the 50s were not restricted in form. Simanowski (2011, p.76) stated that “kinetic concrete poetry differs from its predecessor in the 1950s and 1960s not only with respect to the medium used, but also with respect to the role it is playing as art in society.” The ‘evolutionary pathos’ of the 1950’s and 1960’s concrete poetry is hard to find today. Although Simanowski (2011) saw kinetic concrete poetry as the successor of concrete poetry, current digital poetry is more like a place for formal experiments. Therefore, within a new social and historical background, it is necessary to reconsider what is interactive concrete poetry from a new, 21st-century perspective.

Other works, such as *Literary Art in Digital Performance: Case Studies in New Media Art and Criticism* edited by Francisco Ricardo (2009); *Media Poetry: An International Anthology* by Eduardo Kac (2007); *New Directions in Digital Poetry* (2012) and *Prehistoric Digital Poetry* (2007) by Funkhouser also feature in and influence this study. These publications are based on case studies. Their purpose is not to formulate an abstract theory or to construct a comprehensive aesthetic framework for digital poetry, but to provide a set of analytical tools for interactive works of art, so as to help future researchers and artists to understand and create such artworks. Nonetheless, these publications expanded my knowledge of interactive poetry and made me realise that the exploration of interactive poetry must continue. As Orit Kruglanski (2007, p.78) said in her article *Interactive Poems*, “Interactive poetry is awkward and charming, a small child says its first words.” I am finding now how to encourage children to learn a new language, yet there are still many challenges and uncertain areas awaiting inquiry in the future.

3.3 Literature review: interactive technology

While studying the theoretical framework of interactive concrete poetry, I reviewed the historical development of experimental poetry and found that, whether through the use of typewriter, tapes, architectural sculpture, computer or today's interactive technology, media always plays an important role in the poetic expression of concrete poetry. Undeniably, it is the emergence of new technology that enables us to create interactive poetry that engages with more than one sense, often including vision, hearing, and touch. It is precisely because of the application of human-computer interaction technology in poetry that we have interactive concrete poetry. Therefore, if we want to know more about interactive concrete poems, it is necessary to understand the technology involved in this field. In order to investigate the use of interactive technology as a medium for concrete poetry, it is necessary to consider the literature on interaction design and its goals.

“Interaction design means designing interactive products to support people in their everyday and working lives. In particular, it is about creating user experiences that enhance and extend the way people work, communicate and interact” (Preece, Sharp and Rogers, 2011, p.6). *Interaction Design: Beyond Human-Computer Interaction* by Jennifer Preece, Helen Sharp, and Yvonne Rogers (2011) introduced the basic concept of human-computer interaction (HCI) and interaction design in detail. The authors believe that interactive computing technology began in the 1960s and advanced as an independent discipline during the late 1970s and early 1980s. In the wave of technology development in the 1990s, the concept of ‘interaction’ received new ideas from sociologists, anthropologists, typography designers, psychologists, and people from other backgrounds, to enhance user experience and build a pleasing, fun, and more humanised design that could be emotionally fulfilling. It can be said that interaction design after the 1990s has spread across many disciplines and today, from a broad perspective, is not only a design method, but also a concept with a human-centred approach at its core. In the interaction design of any product, designers need to learn as much as possible about users, their work, and the environment in which they work, so that the product can better support the users. The main goal of interaction design is to design the product to be enjoyable and increase the experience of the participants. These goals are primarily related to the user's emotional experience, which is how the user interacts with the system. The quality (character) of the medium is readily used by artists/poets to create artworks and poetry.

In *Aesthetics of Interaction in Digital Art*, Katja Kwastek (2013) said that, since the 1960s, the development of computers has made the application of interaction design possible in artistic and literary creation. Especially since the 1990s, interactive art has developed greatly and attracted the attention of extensive academic research. In today's interactive art, we can still see scholars' continuous exploration of its definition in an attempt to present current interactive art products fairly. This book is based on such a background to explore the contemporary interactive art aesthetics, and this interactive aesthetic theory helps me understand the nature of interaction in interactive poetry.

Kwastek (2013) used the term ‘interactive media art’ to “refer to a broad spectrum of artistic forms of expression, ranging from Internet art through interactive sculptures to locative performances”, mainly presented as ‘Internet art’, ‘locative art’, ‘interactive installations’ and ‘interactive environments’. It can stage narratives, simulate communication situations, or invite recipients to participate in physical experiences. Therefore, the information acquisition of interactive art does not depend on sensory perception, but, rather, on a process of consciousness. In other words, interactive art conveys information through media-based paradigms, immersive identification, bodily experiences, or distanced self-observation. To enhance the understanding of interactive art, Kwastek (2013) analysed some representative case

studies, like *Spaces of Interaction* (1998) by Scott Snibbe, *Visualizing a recipient's movements* (2004) by Camille Utterback, *The Transmute Collective* by Intimate Transactions (2005-2008) and *The ontological status of interactive art* (2007) by Sergi Jordà, Marcos Alonso, Martin Kaltenbrunner, and Günter Geiger.

Kwastek's purpose was not only to explain what interactive media art is, but also to discuss the aesthetic experience brought by this art form, that is, to discuss "the artistic strategies that locate the aesthetic experience in the interaction between the recipient and the technical system" (Kwastek, 2013, p.4) so as to offer a new perspective for art theory. She believed that interactive technology has fundamentally changed the environment in which sensory perception occurs and posed new challenges to aesthetic concepts. Interactive art puts the recipient's action at the core of its aesthetics, and the recipient's action provides the form of interactive art works. She argued that interactive media is not only reflected in the function of interaction design in the interactive art, but more reflects people's 'self-perceptions' when they are engaging with it. In interactive artworks, visual and auditory beauty is secondary, as "the composition of the relationship between action and response" becomes more important (Krueger, 1991, p.86). Accordingly, they regarded the recipient's active experience as a basic component of interactive art aesthetics.

In addition, when discussing aesthetic theories of interactive art, Kwastek (2013) analysed three key aspects: actors, space, and time. She discussed the relationship between the recipient and the creator in interactive art, and believed that, in interactive art, the recipient becomes the artist, while the artist (the creator of the work) can be considered as the first recipient of the interactive work. This is an important characteristic of interactive art.

In my opinion, the use of interactive media makes it impossible for artists to fully control the generation process of interactive art works, so that the state and final presentation of the works are explored by the public's different interactive activities. This leads to interactive media involve the recipient more in the role of co-creator of meaning, and that the artist should consider their role as participant as well as that of author.

Moreover, since the construction and implementation of the interactive aspect of artworks depend on technology, the functionality of works is also an important part of the aesthetic experience of interactive media art. She did not aim to analyse software or hardware functionality, but rather present an interactive aesthetic that originated in the interaction of constructing a technical system, or in Kwastek's words, "the general qualities of processuality" (Kwastek, 2013, p.98). So, according to Kwastek, the creator,

the recipient, and the technical system are all ‘actors’ influencing the aesthetics of interactive works.

Kwastek also explored the mode of interactive art in relation to space. As she wrote, “Each and every interaction proposition and act of interaction is tied to particular spatial situations” (Kwastek, 2013, p.99). She believed that interactive works not only arrange the interaction with digital space (virtual space) for the recipient, but also create the structure of real space. The overlap between real space and virtual space also plays a crucial role in the aesthetics of interaction. The spatial perception, has been recognized as a problem in the field of interactive art. According to Kwastek, another feature of interactive art is temporality. “The processuality of interactive art is not limited to a linear, preconfigured, and structured duration; rather, it is the result of interrelations between different levels of time” (Kwastek, 2013, p.109). Therefore, she analysed the interactive time structure and concluded that ‘interaction time’ is not an ordered linear existence, but rather one that considers randomness and the initiative of participants. So, time is manifested in the form of rhythm or structure.

By discussing the role and function of various actors involved in the interaction process, the interaction mode of interaction art in space, the overlap between real space and digital space, and the time structure of interaction time structure, Kwastek (2013) further established that knowledge acquisition of interactive art does not depend on sensory perception, but is a process of consciousness. In short, the aesthetics of interactive art can be realised by transforming emotional or physical (expression) into a kind of reflection. Inspired by them, I also analysed the works of Chris Milk, Hannes Koch, Teamlab, Sisyu to learn more about interactive technology in interactive art and to further understand the interactive aesthetics introduced by the media of interactive art through case studies.

However, the primary focus of the book’s theory of interactive aesthetics was art and its differences between art and concrete poetry. Admittedly, concrete poetry and visual art share some similarities in terms of visual language, hence some aesthetic aspects of visual art are indeed relevant to concrete poetry. But that this is not the sole or dominant aesthetic. Concrete poetry also puts emphasis on word sequence and typography, hence it cannot be fully understood only on the basis of the aesthetics of visual art. In other words, their shared interactive media and expressive methods notwithstanding, interactive concrete poetry and interactive art remain different.

So, theories of visual aesthetics cannot be wholly adequate for the understanding of interactive poetry. However, since interactive art and interactive poetry both use ‘interactive media’, their views on interactive aesthetics are still helpful to define the nature of ‘interactivity’.

So, what is the application of interactive media in concrete poetry? The development of interactive art used this technology to create interactive poetry. Jim Rosenberg, for example, is an experienced interactive poet who has been working on digital interactive poetry for 25 years, constantly exploring the most advanced technologies and possibilities for poetry creation. In his book *Word Space Multiplicities, Openings, Andings*, Rosenberg (2015) explains that poetics in expressive interactive poetry is produced from the interaction between user and text, which means that the aesthetic characteristics of interactive media also play an important role in poetic communication. He argued that, in the early stage of the development and use of new interactive technology, compared with artists, most poets tend to be conservative in their use of technology. They allow some time to pass after the emergence of new technology before they start using it. One of the reasons is that the creative techniques of interactive media are not compatible with traditional linear writing. However, concrete poetry is different and much more compatible with new interactive media. The human-oriented concept of interactive media and the characteristics of interactive technology make it a good medium to materialise the playground and invitation aspects of concrete poetry.

Similar literature on interactive media includes Nathaniel Stern's *Interactive Art and Embodiment* (2013) (in which the author called on people to set aside technology and focus on body movement of interaction between people and works, thus making me rethink how the 'reading' of poetry in interactive media is redefined) and Chen Wang's *Interactive Installation Art & Design* (2020) which, from the perspective of an interaction designer, introduced the application of contemporary interaction technology in art and helped me understand better the latest interaction technology.

Generally speaking, research into the use of interaction technology in new media art (namely, the art using the current rapid development technology) has received considerable attention in recent years. Yet we have to admit that, because human-computer interaction technology is new and still developing, there is limited literature dedicated to the application of interactive technology in poetics, especially in concrete poetry. Therefore, the aesthetic expression of interactive media in concrete poetry needs to be further explored through experimental practice and research into such practice.

3.4 Literature review: expressive typography

As mentioned above, the meaning of interactive artworks emanates from the interaction aesthetic between the recipient and the artwork (Kwastek, 2013). However, interactive concrete poetry is not only interactive, but more specifically poetry. In particular, interactive concrete poetry focuses not only on the aesthetics of interactive technology, but also on visual effect, such as the relationship between text and space; in other words, it focuses on the application of expressive typography. It should be emphasised that in

my thesis, the term ‘typography’ refers specifically to the field of ‘expressive typography’, because concrete poetry requires much more than merely a conventional arrangement of words, as the term ‘typography’ normally suggests. Therefore, it is important to understand the role and significance of typography in print-based concrete poetry and interactive concrete poetry. In what follows, I will discuss the role of expressive typography in poetic expression of print-based concrete poetry and interactive concrete poetry, and examine relevant scholarship and viewpoints.

In my attempts to explore applications of typography in concrete poetry, the great work *Dao De Qing* (485 B.C.), written by the ancient Chinese philosopher Laozi, became a source of inspiration. In the eleventh chapter, he wrote that the empty space between the spokes of the wheel is necessary for the purpose of the cart; any vessel requires hollow space to hold water; and rooms have hollow space to store items. Here, Laozi emphasised the important function of void (spaces). This eastern philosophy, which is often used in western design, is applied not only to architectural and interior design, but also to typographic design. For example, in *Typography: A Manual of Design*, the Swiss designer Emil Ruder (2008) used this philosophy to explain ‘space’ in typography. In the film *Helvetica* (2007), the Italian designer Massimo Vignelli (2007) observed that “we think typography is black and white, but typography is really white. It is the space between blackened surfaces that really comprises it.” He added that “just like music, typography is defined by pauses (spaces) instead of notes.” (Vignelli, 2007) His explanations coincide with Laozi’s philosophy of void (spaces) and helped me understand the role of typographic space in the construction of concrete poetry.

Laozi’s point of view helped me realise the meaning of ‘space’ in typography from a philosophical perspective and enhanced my own understanding of the typography of concrete poems. In their works, Herbert Spencer, Johanna Drucker, Solt, and Houédard further explained the relationship between the print-based concrete poetry movement and expressive typography.

The Liberated Page: A Typographic Anthology, published in 1987 and edited by Herbert Spencer, was the first publication in which I encountered experimental typography, as it introduced some important historical events of typographic design in the early-20th century. The book records some experiments that may have influenced the development of concrete poetry: works by George Herbert, Stephane Mallarme, Apollinaire, as well as the Dada movement and the Futurists. Although these experiments in typography were conducted before the advent of concrete poetry and have no direct impact on its typographical design, they made me realise the value and influence of this innovative typographical design and further understand the evolution

of concrete poetry and the significance of typographical design. Then, I was able to apply this understanding to my research.

In addition, Johanna Drucker's *The Visible Word: Experimental Typography and Modern Art, 1909-1923* (1994) comprises a thorough introduction to the historical development of expressive typography before concrete poetry. Drucker stated that, early in the 20th century, Futurist and Dada artists carried out a series of innovative experiments in typography, which blurred the boundaries between art and literature. This was an international typographic movement that dismissed conventions and greatly affected the emergence and development of concrete poetry. In this movement, people were constantly exploring the potential of typography: "...all of the various activities which typography can engage in the production of value- pictorial analogy, emotional expression, formal iconic imagery, the freeing of linguistic elements from traditional syntactic relations and placing them into field like arrangements-demonstrate its capacity to participate in the production of signified value" (Drucker, 1994, p.245). Drucker commented positively on expressive typography and explained the process of typographic experimentation from its initial escape from traditional typesetting conventions to becoming mainstream, then to oblivion, and back to being recognised again. From this, I realised that the development of concrete poetry is inseparable from the impact of experimental typography.

Solt (1968) discussed the connection between concrete poetry and typography in her book *Concrete Poetry: a World View*. According to her, no matter how influential a poet is in the construction of a visual concrete poem, at the beginning of the creation process she would face certain problems inherent in his materials, namely the application of typography: "If she is going to find poetry in the visual dimensions of words, she must learn to handle them typographically" (Solt, 1968). Solt analysed the works of Gomer, the Noigandres group, Edgard Braga, Finlay, Hansjorg Mayer, and John Furnival and discussed the application of typography in concrete poetry and their perception and application of typography in concrete poetry.

Solt (1968) believed that concrete poetry required sensitivity in the way poets interpret poems, as well as the insight of typographical artists about typography. Thus, typography is a common problem that poets face, not least because they must become familiar with the technology of printing. Otherwise, when a concrete poet considers the typography of a concrete poem, they also need to focus on the poetic principles of concrete poetry. This is what Houédard meant when he wrote in his article *Concrete Poetry and Ian Hamilton Finlay* that "A printed poem is ambiguously both typographic-poetry and poetic-typography, not just a poem in this layout, but a poem

that is its own type arrangement...hence many type layouts are poems” (Houédard, 1963, pp.47-62).

As a leading poet in British concrete poetry, Houédard composed a large number of concrete poems called ‘typestracts’ (combining the terms and concepts of typewriter and abstract), published in many books. *Notes from the Cosmic Typewriter: The Life and Work of Dom Sylvester Houédard* (2012), edited by Nicola Simpson, was the first book since the early 1970s to be devoted exclusively to his work. It is an important publication for the purpose of my study as, in Houédard’s opinion, the relationship between typography and concrete poetry is of great importance to scholars (Houédard, 2012, p.34). Of course, this does not mean that concrete poetry is purely a pursuit of typographic aesthetics, but that it views graphic space as a structural framework to construct poetic thoughts.

Houédard believed that in concrete poetry the syntax is replaced by the text’s typographic arrangement on the page and conveys the missing links to the reader, as stated by the Noigandres group (1958) that “concrete poetry begins by being aware of graphic space as its structural agent.” Furthermore, in his article *DSH’s Typestracts: Horizons and Spirit Levels*, Rick Poynor (2012, p.34) added that “The graphic void between elements in a typographic design or a concrete poem are the structural agents that hold everything together”. All in all, Houédard believed that the perennial conflict between content and form was becoming obsolete, as the creator must embody both poet and typographer.

The poems mentioned in Solt’s articles and Houédard’s typestracts indicate that the general use of the typewriter during the 1950s was a significant factor in promoting the concrete poetry movement and addressing the relationship between concrete poetry and typography by poets and artists. The analysis of the typography of concrete poetry by poets and artists is an attempt to understand the typewriter’s typographical rules and techniques. Except for sound poetry or poems about architecture and sculpture, most print-based concrete poems are created with the use of the typewriter. Therefore, the expressive typography of concrete poetry, mostly, is a further re-creation process based on the arbitrary rules of typewriters. Typewriters employ a fixed, consistent, and mechanical system of spacing and alignment, wherein concrete poetry continuously evolves to form a unique typographic poetry, which becomes the key factor to convey poetic expression.

In *Typewriter Art* (1975), Alan Riddell published 119 concrete poems created with the use of typewriters and analysed printing techniques and typesetting characteristics. Riddell (1975) suggested that the typewriter was not only a part of social life, but also an artistic instrument. He acknowledged its technology and analysed the building

blocks of different poems created with the use of typewriters. This book enhanced my understanding of the rules and art of the typewriter as a medium, as well as of the distinctions between concrete poetry and typewriter art, because, as Riddell (1975, p.14) stated “Not all typewriter concrete poems can be called typewriter art. Only those which explore the instrument's visual possibilities interestingly are considered so here”. *Typewriter Art: A Modern Anthology*, by Barrie Tullett (2014), collects some important historical examples from concrete poets and contemporary artists’ artworks. These works showcase the ways concrete poets used the typewriter. The artists adopted the typewriter’s keyboard as the tonal palette and compositional device to create their works. Tullett (2014) stressed that since its invention the typewriter, as a rigorous medium, had played a significant role in the creation of numerous works by artists, designers, poets, and writers. He added that in these works characters constitute images. When viewers read carefully a page, in addition to textual information they acquire deeper visual understanding. In these works, printed characters, the raw material for concrete poets, may overlap with another character, but this does not weaken the meaning; in fact, this enhances the visual density of the image created and enriches the visual meaning.

In researching the expressive typography of print-based concrete poetry, besides the above-mentioned literature, I also referred to Steven Heller and Gail Anderson's (2017) *Type Tells Tales*, which introduces the evolution of typographic design under various trends of thought and emphasises the powerful dramatic effect produced by the integration of expressive typography and content. In addition, Bohn's (2011) suggestion of three different steps for reading visual poetry in his *Reading Visual Poetry* indicates how typography helps concrete poetry convey poetic expression to the reader’s perspective.

The study of the literature above shows the close connection between expressive typography and print-based concrete poetry, but also that the typographic systems of typewriters, the major authoring tool of print-based concrete poetry in the 1950s, affect the visual form of concrete poetry. However, the media for the creation of concrete poetry constantly change as time goes by, from typewriter to digital type and, then, to today's human-computer interaction media, which offer new pathways for the development of concrete poetry. Furthermore, the typography of concrete poetry also changes in form and mission alongside the change of media and creates further possibilities.

In exploring the characteristics and functions of typography in interactive concrete poetry, I first reviewed theoretical work on the evolution of typography from 2D to 3D. I learned how typography has changed with the development of new media and interactive media and analysed dynamic and expressive typographic experiments and

visual poems based on computer technology. Other publications of the 1990s were particularly helpful, mostly Peter Sungil Cho's thesis *Computational Models for Expressive Dimensional Typography* (1999), but also *Aesthetic Animism: Digital Poetry as Ontological Probe* by William David (Jhave) Johnston (2011) and *Typography and the Screen: A Technical Chronology of Digital Typography, 1984-1997* by Loretta Staples (2000).

Aiming to explore the potential of 'new typography' in the new digital age since the 1990s, Cho's thesis presented the performance of typography in films, the Internet, new media, and interactive media in the 1980s to the 1990s (letter forms convey their message through, bigger or smaller, various dynamic forms). His introduction shed light on the new possibilities of typographic design ushered in by computers as a new medium in the 1990s, and the nature of letter forms in virtual three-dimensional environments, as well as the expressive potential they offer. More importantly, his thesis proposed a set of algorithms for building 3D typography on digital works. Cho argued that we should not regard 3D typography as a single entity, but we must associate it with the interaction between 2D and 3D layouts. He stressed that, "In the context of 3D graphics, this can mean taking the xyz coordinates of objects in space, projecting them to the xy of the flat screen space, then manipulating the three- to two-dimensional conversion in some way" (Cho, 1999). He had already seen the rudiments of typography in the digital art field. In his opinion, the purpose of works of interactive digital media is not necessarily to provide access to information, but to create a noticeably computerised visual experience.

Moving Type: Design for Time and Space by Matt Woolman and Jeff Bellantoni (2000) systematically discusses screen-based and spatio-temporal typography. By presenting some innovative works, the authors analysed their legibility, colour, animation (kinetics, sequence), and the production process to explore ways to establish a good typographic principle for moving type and apply this principle to films, video, interactive media, and web design. As they wrote, "The discipline of typography has evolved from movable type to moving type, from designing physical objects to designing events and digital environment" (Woolman and Bellantoni, 2000, p.6). Time-based media provide an opportunity to strengthen the meaning of the text; however, it does not mean that the basis of typography that has been in used for 500 years must be discarded. Instead, typography in time-based media should not only consider the semantic meaning of the text, but also emphasise the visual dynamic performance. They further explained that characters in printed text are static and only the viewer's eyes are moving; since spatio-temporal typography is kinetic, the viewer's eyes move together with the movement of characters. The concern of such a typography is to create an 'impression' and 'emotional attachment' (Woolman and Bellantoni, 2000) without compromising the intention of the text. Thus, timeliness and well-structured have

become the major characteristics of typography in time-based media. However, it is easy to compromise the previous textual message due to the visual stimuli in dynamic text. In other words, this dynamic visual effect generates a temporary visual stimulus, yet, when it stops moving, it is likely to leave merely an ‘impression’ on the reader. Therefore, it requires designers to pay more attention to content communication when using dynamic typography to create time-based dynamic text.

Matthias Hillner’s (2009) *Virtual Typography* used several examples of expressive typography to explore the visual arrangement of text in multimedia environments. He proposed the following typology: kinetic typography, motion typography, temporal typography, transitional typography coded typography, and virtual typography, and attempted to “establish a theoretical basis for the time-based communication of typographic information” (Hillner, 2009).

Hillner examined in depth virtual typography and its underlying fundamental principles: “...virtual typography as information that is nearly or virtually typographical, rather than defining virtual typography simply as computer-generated type, or as type that is displayed through computer technologies” (Hillner, 2009, p.50). He observed that virtual typography does not simply squeeze a traditional font to let it bounce around the screen or rotate freely in three dimensions, but provides a solution for effectively delivering textual information in a media environment. He also explained how to enhance communication process through virtual typography by some representative examples (e.g. *Streams of Consciousness* by David Small and Tom White and *Still Standing* by Jason Edward Lewis and Bruno Nadeau). Furthermore, he discussed issues of reading perceptions in time-based typography and the way they differ from perceptions in reading the printed page. This book functioned as the theoretical background in support of my creation of *VR Poetry* and instigated further consideration of the flight track of ‘oeoe’ for the cicadas and ‘chirp’ for the birds.

The above-mentioned literature mostly relates to the use of dynamic typography in new media. Although they constitute a sound theoretical background in support of my understanding of the performance and application of typography in the new media, and they were helpful in practice, they do not suffice to answer the questions on interactive typography this study addresses. To further explore the typographic design of human-computer interaction concrete poetry, I would like to briefly discuss Barbara Brownie’s book *Transforming Type* (2015).

At the beginning, this book provides a definition for temporal typography, categories, and range of application. It is worth mentioning that it also refers to a significant feature of the typography of kinetic works, that kineticism on any screen can be predetermined by the designer or the poet. The designer chooses the appearance and behaviour of each

form on the screen and interactive media allow the user to control such kinetics. Consequently, research on typography in interactive media is more complicated.

Brownie (2015) explained that interactivity in interactive works entails reader participation, which can impact on-screen content. She thought it is very likely that the term 'interactive', associated with navigation in a webpage, would mislead the reader. For this reason, Brownie suggested another word to better express such features: "reactive,...which is exhibited in kinetic typography that responds to the user or reader" (according to Lev Manovich and Megan Sappner's theory). She clarified that reactivity is a two-way process, in which the reader (the user) reacts to the content of the artefact and the latter reacts to the behaviour of the reader (the user) to co-construct a story. In other words, both designers and users are responsible for what appears on screen, the meaning of poetry and the potential dynamic behaviours. Therefore, in the artwork, the meaning conveyed by its typography and any expression of each letter are determined by both the designer and the reader.

"In reactive typography, kineticism occurs as a response to user input. It is also possible for letterforms to react to other kinds of external influences in generative typography" (Brownie, 2015, p.60). In her discussion of reactive typography, she coined the term 'generative typography' (or code-driven typography) as another type of typography in interactive works. She noted that some artists and creators predict that generative typography will be at the core of future development in the field, that is, to study the feasibility of intelligent or self-sensing fonts on interactive works with reactivity. As she put it, "Generative typefaces can have data embedded inside the letterforms, which give responses to particular settings and interactions" (Brownie, 2015, p.62). Designers devote more attention to the development of a letter's behavioural expression, rather than directly developing forms of that letter.

Whether to explore reactivity or to conduct research on generativity, I think that, in interactive works, the role of typography is often complex. It contains not only the designers' consideration of generative typography, but also reactive typography as was displayed by reader participation. I realise it is useful to apply reactive typography and generative typography to interactive concrete poetry. Brownie's ideas are reflected in my work *Mimosa*, where the design and programming of the individual behaviour of each letter fully reflects our consideration of generative typography (the design of brightness variation and retention time by touching each letter); also, the layout of the installation reflects the consideration of reactive typography of user participation in the installation (see Chapter 6 for details).

In general, from print-based expressive typography to digital dynamic typography and then to reactive typography and generative typography in the interactive media, I formed a thorough understanding of the historical development, definition, categories, and characteristics of the typographic design of concrete poetry. Apart from the above-mentioned books, Brooke N. Fancesi's *Temporal Typography* (2015) and Simanowski's *Digital Art and Meaning* (2011) were of particular importance, as they provided me with theoretical support and enabled me to pose more questions, which deepened my understanding of the field. However, since several functions and forms of human-computer interaction are still experimental, while others are mere ideas and plans awaiting development, and most literature does not directly link typography with interactive concrete poetry, so that many challenges in the study of interactive concrete poetry and typography remain.

Chapter 4: Interactive concrete poetry

For the purpose of this study, it became clear that definitions from a limited literature study were not sufficient, and that a more accurate definition was essential in order to comprehend interactive concrete poetry in full. In the following chapter, I explored definitions of interactive concrete poetry through theories, related cases, and my own practice.

As Simanowski's view that digital Kinetic poetry is the Legacy of Concrete Poetry (Simanowski, 2011), I explored the definition, characteristics, and categorisation of 50s print-based poems. This aims not only to describe concrete poetry, but also to consider it as a means to understand interactive concrete poetry. In this process, I discovered the connection between the interactive concrete poem and the concrete poem. In its long history, concrete poetry showed its different creation methods based on different media and showed the meaning expression through different forms as well. And the use of interactive technology not only made the text dynamic, but more importantly gave concrete poetry the characteristics that could interact with the audience according to the characteristics of the technology. To this, I explained the changes according to the art works *Worm apple pie for Doehl* by Auer, *Birds Singing Other Birds' Songs* by Maria Mencia, *Text Rain* by Achituv and Utterback in 1999. In the end I gave an accurate definition of interactive concrete poetry by my own practical work *Four Minute River*.

4.1 Concrete Poetry

Concrete poetry refers to an innovative worldwide poetry movement which flourished from 1950 to 1970. In stark difference to poetry based on linear distribution and conventional syntax, this new experimental form of expression arranged the elements of language freely by abandoning conventional sentence structure, reducing the use of textual language, and instead conveying meaning and message through space, image, typographic features, and a bold arrangement of words. As the Noigandres poets said in their *Pilot Plan for Concrete Poetry* in 1958, the principle is that a “concrete poem communicates its own structure: structure-content.” In these experiments, poetry is perceived visually and the traditional word order is broken, so that people can perceive poetry visually, from different viewpoints. Essentially, this new kind of poetry can be both read and viewed.

The first meeting of Gomringer with the Brazilian designer Decio Pignatari (a member of the Noigandres group) in 1955 marked the beginning of the concrete poetry movement. Thenceforth, the movement was rapidly developed by artists, designers, and poets from different countries and cultures, who endeavored to create new poetry using different forms (sound, visual effects, semantic charge) and materials (stone, print, typewriter, and audiotape). In this context, we may comprehend concrete poetry

through its various forms, such as Gomringer's 'constallation', the 'ideograms' of the Noigandres group, the 'purely visual poetry' of Rot, the poetic garden created by Finlay, and the 'Typestracts' of Houéard. The plethora of possible ways to create concrete poetry means that the definition of 'concrete' is more diverse and variable than the term initially implies. In fact, what concrete poetry is depends on how each poet comprehends 'concrete'.

4.1.1 Historical origins: Gomringer and the Noigandres group

Many commentators trace the origins of concrete poetry in the distant past, back to the Greek technopaion around 300 B.C., or to the Shape Poem of the 16th century and the subsequent Pattern Poem (Higgins believed that visual poetry before the 20th century could be generally defined as pattern poetry). It is often defined as 'the poem as picture' or regarded as a kind of poetry exploring "the intermedium between poetry and painting" (Williams, 1967). Others trace its origins and connect it with the *Calligrammes* (1917) of Apollinaire, the typographical experiments of the Futurist Filippo Tommaso Marinetti, the dadaism of Kurt Schwitters' poems, e.e. Cummings' verse forms, and Pound's imagist poems, viewing all these works as predecessors of concrete poetry. For example, the Noigandres group state in their *Pilot Plan for Concrete Poetry* that the concrete poem is the product of the evolution of the works of pioneers such as Stéphane Mallarmé, Pound, Cummings, Apollinaire, Futurism, and Dadaism.

Perhaps these works show a kind of 'visual lyricism' (Apollinaire, 1917), similar to concrete poetry; still, it is necessary to distinguish pure concrete poetry from the works of these pioneers. In his book, *An Anthology of Concrete Poetry*, Williams (1967) notes that, as a particular type of poetry emerging in the 1950s, the definition of concrete poetry emphasizes poetry more than concreteness. Compared with the works of predecessors, concrete poems focus more on the structure of the text itself (Bense, 1965).

Concrete poetry does not imitate picture poetry or pattern poetry of the past. It is an independent type of poetry, reflecting the trend of its time. Hence, an appropriate definition of concrete poetry should distinguish it from the works of its precursors, and be based in and after the 1950s.

The Swedish poet Öyvind Fahlström used the term 'concrete poetry' for the first time in his *HÄTILA RAGULPR PÅ FÅTSKLIABEN* in 1953, but the accurate beginning of the concrete poetry movement was a meeting between Gomringer and the Noigandres group in 1955 in Ulm, Germany. In the early 1950s, Gomringer experimented with a new type of poem which he termed 'constellation' (since it was not called concrete poetry at that time). As the name suggests, constellation entails "enclosing a group of

words as if it were drawing stars together to form a cluster” (Gomringer, 1954). His most representative works, both created in 1952, were *Avenidas* (consisting of only three words (avenidas, flores, and mujeres), and *Silence* and *Wind* (which I will discuss in detail at a later point). This new type of poetry used concise language and broke away from traditional arrangements of words. According to Gomringer, to say so much with a single word was a wonderful accomplishment (Solt, 1968). Poetic language based on linear structures and conventional syntax could not match the rapid way of communication in modern societies. Therefore, Gomringer believed that this new poetry emerged at a perfect time.

What Gomringer did not know was that the idea of new forms of poetic expression had also emerged elsewhere, at almost the same time among a group doing similar work in San Paulo, Brazil. The group, named Noigandres, was led by a Brazilian designer, Haroldo de Campos, and included Augusto de Campos and Decio Pignatari as members. Whereas Gomringer used the term ‘constellation’, the Noigandres group referred to their poems as ‘ideograms’. It was a new style of poetry that utilised non-verbal communication and space-time structures instead of mere linear-temporistical development. In the view of the Noigandres group, the method of this new-style of poetry was that by using the phonetic system (digits) and analogical syntax, it creates a specific linguistic area (‘verbivocovisual’), which shares the advantages of nonverbal communication, without giving up words’ virtualities (Noigandres, 1958).

Whether constellations or ideograms, they both comprised simplified language composition: sentences were reduced to nouns and verbs, even to letters and sound symbols to replace words. Both concepts are poetic-linguistic experiments using material and structure (material means the sum of all symbols with which we make poems) (Gomringer, 1960). As Bense explained in his paper *Concrete Poetry I* in 1965, “This is a kind of poetry which produces neither the semantic nor the aesthetic sense of its elements, words for example, through the traditional formation of linear and grammatically ordered contexts, but which insists upon visual and surface connectives” (Bense, 1965). Thus, the principle of its creation is not the awareness of words, but the perception of words that are placed together.

Thus, when Gomringer and Pignatari met in Ulm School of Design (Hochschule für Gestaltung), Germany, in 1955, they found that they could understand one another’s artwork without knowing one another’s language. It was there where they coined the term ‘concrete poetry’ together. Their views on new poetry have since been used as a guideline for defining ‘concrete’ in early concrete poetry. Meanwhile, other poets and artists of the period, such as Rot, Carlfriedrich Claus, Carlo Belloli, Gerhard Ruhm, Friedrich Achleitner, Oswald Wiener, Hans Carl Artmann, and Konrad Bayer, started to explore this new kind of poetry. Poets who agreed on the term ‘concrete poetry’

quickly expanded the movement from Europe and Brazil to the United States, Britain, Romania, Czechoslovakia, France, Spain and Japan, thus bestowing the term ‘concrete poetry’ with global recognition.

Concrete poetry became a worldwide movement. In addition, publications of articles, magazines, and anthologies of concrete poetry followed; among them Bense’s *Augenblick* (1955-1961), the Swiss magazine *Spirale* (1953-1964) edited by Rot and Marcell Wyss, the German magazine *Material* (1957) edited by the Darmstadt Circle group, the FUTURA pamphlets by Hansjörg Mayer, and three anthologies by Williams, Solt, and Bann, as well as, of course, Gomringer’s *From Line to Constellation*, published in 1954 and the *Pilot Plan for Concrete Poetry* by the Noigandres group in 1958. The first *International Exhibition of Concrete Poetry and Kinetic Poetry*, organised by Bann, Reg Gadney, Philip Steadman and Mike Weaver, was held at St. Catharine’s College, Cambridge, in 1964 and attracted additional attention to concrete poetry.

Experts agree that, after 1960, artists from different fields and backgrounds (Gomringer was a poet, Pignatari a designer, Hansjörg Mayer a typographer, Rot an artist, Friedrich Achleitner an architect) no longer followed the guidelines of early concrete poetry as specified by Gomringer and the Noigandres group. Instead, they began demonstrating their individual understanding of what ‘concrete’ was through different means and in different forms. Many of them tended to call their experiments ‘visual poetry’ or ‘sound poetry’, to distinguish them from earlier concrete poetry. Gomringer discussed this in his 1960 article *The Poem as Functional Object*, and stressed that the ‘constellation’ had become ‘old hat’ for concrete poetry by that time. (Gomringer, 1960) For many young poets, their work had gone beyond the confines of earlier concrete poetry and they began to demonstrate the concept of ‘concrete’ more freely (for example, Bremer’s works enriched ‘constellation’, as Gomringer said in 1960). Gomringer did not criticise this newly-emerged poetry, as he suggested that he himself had been exploring new possibilities of expression for concrete poetry. In his view, the contributions of constellation to concrete poetry should be an inspiration for new poets and artworks instead of a rigid set of rules: “it can be the rallying point as well as the point of departure” (Gomringer, 1960).

A substantial number of studies regards the 1960s and 1970s as a period of flourishing development for concrete poetry, as the emergence of new artworks extended and enriched the communicative and expressive possibilities of the genre. This diversity manifested itself since the emergence of concrete poetry and remained an inherent characteristic of the movement, “as the working philosophies of different practitioners became more clearly defined, the distinctions between different approaches became more explicit” (Hill, 2019). This phenomenon poses additional difficulties for a clear

definition of 'pure' concrete poetry. However, it was fortunate for the development of concrete poetry itself, as Williams (1967) comments in his *An Anthology of Concrete Poetry*. Besides diversity, 'the matter of personal interpretation' is another factor that affects the attempt to define concrete poetry. Poets have varied understanding of the meaning 'concrete' bestows on concrete poetry, hence the plethora of concepts and definitions. However, they are just personal views and cannot be regarded as definitions of the genre. In other words, one cannot describe all concrete poems in terms of an individual's understanding of concrete poetry. Hence, to define concrete poetry, one must therefore accept and include complexity and potential obscurity in one's definition, as well as accounting for diversity of form.

Regardless of the forms concrete poems may take, they all "relieve the poem of its centuries-old burden of ideas, symbolic reference, allusion and repetitious emotional content...and instead establish the poem as an object in its own right for its own sake" (Solt, 1968). Concrete poetry can be seen universally as "an innovation, a new use of language, a combination of arts and literature" (Bierma, 1985). Although Hans Clavin, Gerrit Jan de Rook, Herman Darnen, and Robert Joseph declared the death of concrete poetry in 1978, marked by the Dutch manifesto, we can still see aspects of the movement in later works. Other art forms originated from concrete poetry, such as recorded sound, visual performance (live or recorded as video), sculpture, installation, public art. They all demonstrate that the concept of concrete poetry is timeless, deeply rooted in life, and that it still influences art. Therefore, when we turn our attention to interactive concrete poetry, we can, at least, be sure that it is regarded as a new poetics inspired by concrete poetry which employs minimal use of words, symbols, or sounds via the medium of interactive technology.

4.1.2 The classification of concrete poetry

Historically, concrete poetry demonstrates the spirit that broke away from tradition and abandoned conventions in the use of language. Common perceptions brought artists and poets closer together in a process which unified new poetic experiments under the term and movement of concrete poetry. However, the definition of concrete poetry still requires further elaboration, and requires an internal differentiation.

As Gomringer said in 1960, "Today concrete poetry is a general term which includes a large number of poetic-linguistic experiments, termed as ideograms, constellations, dialect poetry, palindromes, typograms, or pictograms." Especially during the key period of concrete poetry in the 1960s, the concept covered a wide range of artworks. Weaver (1966) divided such experiments into three categories in his article *Concrete Poetry*: visual optic (visual), kinetic (moving in a visual succession), and phonetic (sound). He associated poems within the three categories with either the constructivist

or the expressionist artistic tradition. “The constructivist poem results from an arrangement of materials according to a scheme or system set up by the poet which must be adhered to on its own terms (permutational poems). In the expressionist poem the poet arranges his material according to an intuitive structure.” (Weaver, 1966)

Among many theories, it is often easier to identify and distinguish between phonetic poetry and kinetic poetry, which are respectively defined as ‘an auditory succession’ and ‘a visual succession’ by Weaver (1966). He argues that “in phonetic poems the figure (sound) rises off the ground (silence), producing a configuration of filled time against emptied time” and that “in kinetic poems the dimensions of the visual figure are extended to produce a temporal configuration only possible by virtue of the sense of succession” (Weaver, 1966, p.295). In phonetic poems, which are meant to be recited and heard, like music, their performance of concrete is phonetic, whereas kinetic poetry produces dynamic poems to be viewed in succession (Swiss, 1976).

By contrast, concrete poetry and visual poetry are discussed more frequently by artists and poets, because both “dwell on the visual aspects of the poem” (Döhl, 1971). Although they are often used as synonyms, they differ in meaning.

The use of the term ‘visual poetry’ has been confusing since its first appearances. In *The New Concrete: Visual Poetry in the 21st Century*, Goldsmith (2015) says that visual poetry normally develops alongside the development of concrete poems and is often used as a synonym for concrete poetry. Visual poetry is now used to denote any visual poem from Greek antiquity onward, but also to signify a distinct movement in this field that developed with, and out of, concrete. (Goldsmith, 2015). Goldsmith’s viewpoint is well-founded. In his 1979 article *Some Remarks on the Notion of Visual Poetry*, Gomringer views visual poetry as an extension of concrete poetry: “By introducing the notion of visual poetry the medium-conscious concrete poet drew the attention to the artificiality of the written in any form. The notion of visual poetry focused anew on our interest in traditional forms of singular signs (letters, punctuation marks, elementary symbols, signs for cypher, and so on) as being gestalten, in order to interpret them anew and to poetise them freshly...”; and after the spatial system of image had been established several times, ‘graphic-iconic elements’ became more and more independent (Gomringer, 1979).

Weaver argues that, because visual poetry is a ‘constellation’ in space, visual poetry has a sense of ‘simultaneity’ and ‘multidirectionality’, which are requirements of spatial order and cause visual poetry to inhibit the continuity and phonetic response of language units. Accordingly, it is not hard to see that despite the significant overlap between visual poetry and concrete poetry, the former emphasizes purely visual

concepts, wherein semantics is not the most important feature; in contrast, pure concrete poetry is just the opposite.

Scholars, poets, and artists have tried to analyze concrete poetry in more detail and from different angles to better explain and describe its inherent diversity. Indeed, a full understanding of the types of concrete poetry allows for deeper insight into the genre. However, individual poems cannot be accurately classified and defined according to theorised types, as most poems entail various performative aspects. For example, Solt (1968) criticized Weaver's classification, although it was widely accepted at that time. In Solt's view, confirmed by later developments, category boundaries were blurred, as each poem might contain both visual and phonetic elements, or be both expressionistic and constructivistic. In practice, some concrete poets make use of all approaches, others only one, and many employ a number of approaches. Solt explained this phenomenon by using Williams' kinetic poem *Sweetheart*, which she thought contained all the aforementioned possibilities of concrete poetry.

The 'sliding scale', introduced by Bradford (2011) in *Graphic Poetics: Poetry as Visual Art* to address this issue with definitions and classification, is not a measuring tool, but a comparative index of the interaction between sound, time, and space in poetic structure. Using Edwin Morgan's poems as case studies, Bradford concluded that Morgan's poems entail both visual and regular forms, as well as an ideal ratio in the 'sliding scale', which can provide readers with a calibration of auditory and visual poetry. The comparative index of each poem varies on the basis of theme and content (for instance, each one may contain more visual or sound elements). Just as Weaver (1966) said, "the identification of form in concrete poetry varies according to the predominant tendency of the perceptual requirements." The interaction between sound, time, and space in each poem varies. As such, concrete poetry encompasses a wide range of poems, covering all kinds of possibilities and interpretations of 'concrete'. As for its categories, I must quote Solt's view: "often, concrete poems can only be classified in terms of their predominating characteristics" (Solt, 1968).

4.1.3 Key examples of concrete poetry between 1950 and 1970

The following section presents different types of concrete poems, each one quite representative of its respective sub-genre (pure concrete poetry, visual poetry, sound poetry, kinetic poetry, or poems incorporating two or more types). Their boundaries are not as clear as in Weaver's or any other classification, yet they all reflect the composition and combination that is most appropriate.

Avenidas, the first poem Gomringer termed 'constellation' in 1952, consists of only three nouns, 'avenidas' (streets), 'flores' (flowers), and 'mujeres' (women). Without unnecessary comment or elaboration, he used these three words alone as the basic units

of his poem. He thought that, although modern languages move toward simplification, the restriction of the use of language in its most simplified form does not create any issues for poetic expression. He stressed that “Restriction in the best sense - concentration and simplification - is the very essence of poetry” (Gomringer, 1954). In his view, the constellation that manifests the essence of poetic language meets the requirements of poetry of that time, just like in *Avenidas*, which does not require redundant textual elements because the words themselves convey meaning and beauty. Moreover, this form of poetry, which does not mingle authors’ descriptions with emotions, allows more room for interpretation and offers readers enough freedom to respond subjectively. For example, in *Avenidas*, readers are induced to imagine themselves the women, streets, and flowers the poet mentions. This upgrades readers to collaborators who, in a sense, are invited to complete this poem.

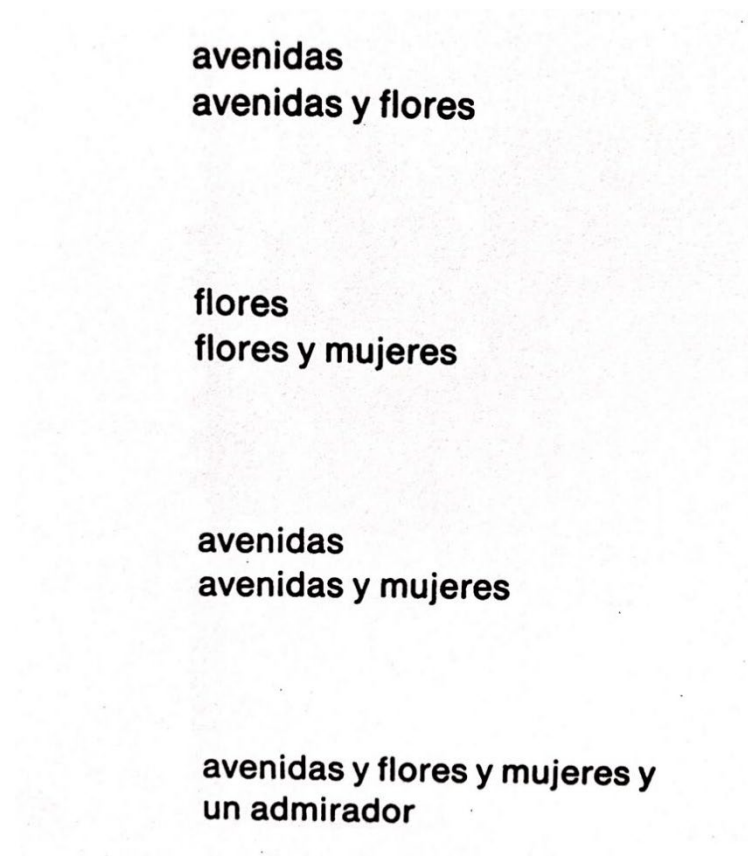


Figure 3 Gomringer, E., 1952, *Avenida*. [image] In: E. Williams, 1967. Anthology of Concrete Poetry. Something Else Press.

Although the tendency to abandon syntax is strongly criticised by theorists and semanticists like Donald Davie, it does not seem to affect people’s appreciation for such poems. Instead, because it liberates poets and increases opportunities for readers, as Gomringer said, the absence of structured language is a ‘play-area’ and an ‘invitation’ (Draper, 1971).

Unlike the approach taken in *Avenidas*, Gomringer also emphasised ‘graphic space’ (Solt, 1968) when using simplified language in his later works. His *Silence* (1954) is a poem that incorporates the element of graphic space in its structure (meaning). The logic of this poem lies in using only one word, silence, to create spatial experience. The language of this poem is minimized dramatically to a single word, without any comment, description, or elaboration. The poet arranges copies of the same word into a block and deliberately leaves empty space in the centre to symbolize and visualise the concept of silence. In *Silence*, what truly conveys the idea of silence is not the meaning of the word itself, but the space left in the centre; the space, without any linguistic sense, is where the silence truly lies. “Silence is thus contextual, and the context exists essentially in space” (Draper, 1971).

silencio silencio silencio
 silencio silencio silencio
 silencio silencio silencio
 silencio silencio silencio
 silencio silencio silencio

Figure 4 Gomringer, E., 1954. *Silence*. [image] In: E. Williams, 1967. *Anthology of Concrete Poetry*. Something Else Press.

Gomringer’s *Wind* also employs graphic space to convey poetic meaning and message. By presenting the letters w,i,n, and d from different angles, he provides readers with more than seven possibilities of interpreting the word ‘wind’. In addition, the distribution of letters resembles the outcome of a blowing wind that scattered them on the page, so that readers can experience the effect of wind. As in most ‘constellations’, Gomringer tries to use the most simplified language possible in this poem, where semantics are subtly embodied by and combined with space.

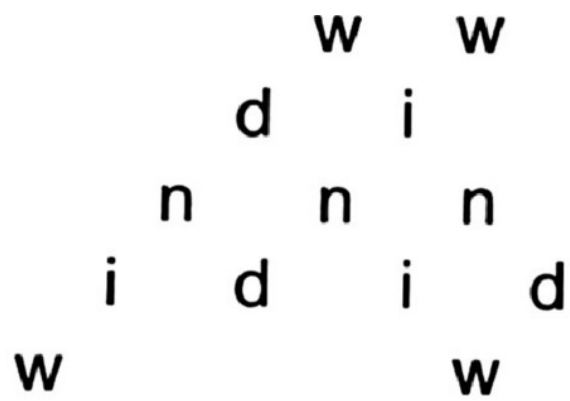


Figure 5 Gomringer, E., 1953. *Wind*. [online image] Available at:
<<http://www.ubu.com/historical/gomringer/gomringer03.html>>

The ‘constellations’ are considered to be the earliest specimens from the concrete poetry movement and Gomringer's declaration as a guideline in the early stages of concrete poetry. Influenced by his theory, a number of outstanding poets and artworks stand out.

Claus Bremer's works are regarded as an enrichment of Gomringer's ‘constellations’. Bremer's star-shaped poem *Haltungen Provozieren* (1966) consists of only four words, *haltungen* (attitude), *postures* (provoke), *nicht nur* (not only) and *informieren* (inform), repeated and arranged so that they shape a star. However, the key to this poem is not only about its shape. To understand its structure, readers must move either the poem or themselves. While the page is moved or rotated, words and consequent information provided by the text constantly change; as a result, readers experience mental commotion (thinking) through physical commotion. Moreover, *haltungen* means not only attitude, but also posture; “Bremer plays with the double meaning of the words” (Morrison, 1997). In addition to manipulating semantics, the poem allows readers to experience emotional changes through an abstract visual design (by viewing a repetitive arrangement of words). Bremer terms his poetry ‘engagierende text’, because there is no linear connection between its verses and its form is constructed by letters alone, achieved only when semantic and visual aspects of words and letters are carefully considered. Just as Bremer said, “The visual organization of my poems allows for an examination of the meaning of words and letters” (Solt, 1968).

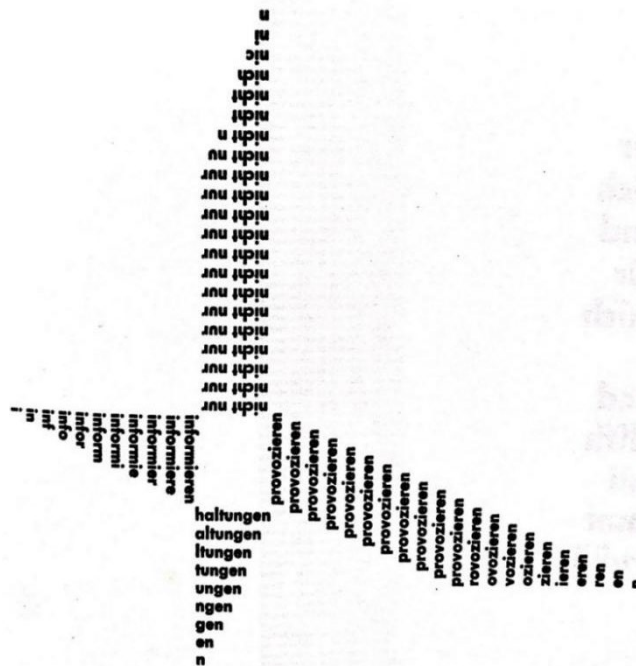


Figure 6 Bremer, C., 1966. *Haltungen Provozieren*. [image] In: E. Williams, 1967. *Anthology of Concrete Poetry*. Something Else Press.

Finlay experimented with a wide range of possibilities of concrete poetry.” What impresses us most about Finlay's use of materials is their organic relationship to content.” As Solt (1968) notes, Finlay’s works make use of various media. In his concrete poetry, poems are no longer bound by materials and traditional rules, but can entail printed paper, books, printmaking, stone or wood carving, architecture, even gardens. Finlay believes that concrete poetry, architecture, and gardening intertwine as an outcome of a logical development of early concrete poetry – “from the poem as an object on the page to the poem as an object properly realised in sandblasted glass, stone or indeed concrete.” (Finlay, 2012).

Little Sparta, a three-dimensional living anthology of poetry with poems incorporated into the architecture, the landscape, and even some of the fauna on the property is an extraordinary garden near Edinburgh, Scotland, filled with Finlay’s poetry. Among them, *Wood-Wind Song*, composed in 1969, one of the earlier cases. The word “wind” was carved on the flagstone where the poet had heard the sound of wind. The message conveyed on stone is no longer the word itself, but the feeling that the text has been integrated with the flagstone. The text acquires a natural setting and the sound of the wind becomes abstract language, translating the text on the flagstone. Rather than saying *Little Sparta* is a garden, we should perceive it as a poem or a collection of poems, because any visual element (whether the text or a symbol, or even the media

used) embodies the significance of poetry. Sunlight and shade, birdsong or wind are indispensable elements of this ‘garden poem’.



Figure 7 Finlay, I.H., 1969. *Wood-Wind Song*. [image] In: A. Finlay, 2012. *Hamilton Finlay Selections*. University of California Press.

In addition to contributing in the expansion of the dimensions of concrete poetry by using different media, Finlay also raises a question about the role of metaphor in concrete poetry. He argues that the question of concrete poetry is not only related to syntax, but to embody the metaphor. In a letter to Bann he said: “I think the simplicity achieved by some concrete poems is only going to remain possible if we can find a way back to metaphor (the sum of any poem must be greater than its parts merely added together.” (Bann, 1966). This is an entirely novel understanding of the metaphor. Just like the metaphor in *The Blue and the Brown Poems* (1968), it is achieved by using color variation and wordplay.

wind
wind

wave
wave

bough
bow

star
star

Figure 8 Finlay, I.H., 1968. poem from *The Blue and the Brown Poems*. [online image] Available at:

<https://www.artsy.net/artwork/ian-hamilton-finlay-the-blue-and-the-brown-poems>

This poem is composed by using the words ‘wind’, ‘wave’, ‘bough’, ‘bow’, and ‘star’, all written in blue except ‘bough’, which is written in green. The readers can gradually discern them through the vertical layout of the letters. However, the harmonious process is interrupted when they read the word ‘bough’. Firstly, the colour green is used for ‘bough’ because a bough is part of a tree; the other words refer to sea, sky and boats and are set in blue. Secondly, the pronunciation of ‘bough’ and ‘bow’ is the same (when repeated they are uttered quickly and repeatedly), but their meaning is different. This unexpected occasion separates them from combinations of other words written in blue. After ‘bough’, the readers' attention would have been naturally directed to the word ‘star’, therefore, a picture would have taken shape in their mind: above the ocean, wind, a tree, and looking up to the stars. In essence, concrete poetry is an art of signs and symbols, and metaphors are not expressed by a discursive means, but by variations and combination of printed text. Bann says that “Metaphor is the process by which a sign becomes the sign of a sign, uniting in one compass the literal meaning, and the meaning conferred by the context” (Weaver, 1966, p.5). In other words, one plus one is greater than two.

If the aesthetic of concrete art inspired Gomringer to develop a concept of new poetry and create his 'constellations', about the same time in Brazil, the Noigandres group created ideograms, influenced by the ideas of Pound and Ernest Fenellosa, who provided the concrete poetry movement with inspiration. Besides freeing poems from the conventions of 'formal rhythmical unit', ideograms also emphasize that concrete poetry communicates its own structure: that is, structure-content / form=content, thus, it requires non-verbal communication. Unlike Gomringer's emphasis on visual aspects, the Noigandres group conceived the concept of ideogram as three-dimensional: verbivovovisual. As they say in *Pilot Plan for Concrete Poetry*, "a concrete poem is an object in and by itself, not an interpreter of exterior objects and/or more or less subjective feelings. Its material: word, sound, visual form, semantical charge. Its problem: a problem of functions-relations of this material" (the Noigandres group, 1958).

That the Noigandres group had formed such an idea of poetry is partly due to the influence of pioneers such as Stéphane Mallarmé, Pound, Apollinaire, and others, and partly to the influence of modernist architecture in 1930s and 1940s Brazil. Modernist architecture's criticism of older Brazilian buildings is contemporary with Noigandres' dismissal of ornate language in Portugal. In *Architecture Versus Sound in Concrete Poetry*, Antonio Sergio Bessa (2008) argues that most poems composed by ideograms clearly show a rigid architectural metaphor, whereas the concept of 'concrete' in these poems is "a structural material of endless expressive possibilities" from an architectural perspective (Bessa, 2008). In *Designed Words for a Designed World*, Hilder (2010, p.102) states that Brazilian concrete poets regard themselves as 'poetic engineers', who emphasize structure and 'mechanical strategies of composition'.

Uma vez (1957) by Augusto de Campos reflects his viewpoint. The poem is composed of the repeated permutation of several words, such as 'one time', 'one speech', 'one river mouth', 'one bullet', 'one voice' and 'one ditch'. It is shaped like a capital 'Z' and a combination of two acute angles facing in opposite directions. It can be read from any angle, thus producing different outcomes and experiences. As Bessa (2008) says, this poem is appealing because of its architecture: "Its repetitive structure, like the modules of a building facade, forces the reader's eye to scan the text back and forth, moving intermittently from one idea-word to another; the staggered diagonal shape also emulates a staircase, suggesting an experience of descent, which in this specific examples is those of the poem itself" (Bessa, 2008, p.10).

uma vez
 uma vala
 uma f o z
 uma vez uma bala
 uma fala uma v o z
 uma f o z uma vala
 uma bala uma vez
 uma v o z
 uma vala
 uma vez

Figure 9 de Campos, A., 1957. *Uma vez*. [image] In: E. Williams, 1967. *Anthology of Concrete Poetry*. Something Else Press.

The Swiss poet Rot terms his poems ‘ideograms’. The basic feature of his poetry is the use of typographic design to convey poetic message to readers, allowing readers to use the layout of his poems to compose their own poems. Most of his poems are composed of single letters, punctuation marks, or special characters. Between vision and semantics, he chooses to maximize the use of visual components as means of expression; therefore, his poems belong to visual poetry, a type of concrete poetry.

Rot composed *Tu* in 1956, where he used only two letters, ‘t’ and ‘u’, to form simple words (the simplest elements of concrete poetry) as poetic elements that are independent of the poet’s subjectivity and allow readers to appreciate poetry as it pleases them. ‘t’ and ‘u’ form the shape of two squares, and two words (‘tu’ and ‘ut’) are shaped at their intersection. People have interpreted this poem in several ways. For example, Daniel Spoerri (1966) argued in an article that “there is no meeting without reciprocal influences.” From another viewpoint, Solt (1968) interpreted it as a death poem, not only because an array of t’s resembles a cross over a grave, but also because ‘you’ is translated into another state when ‘tu’ is reversed and becomes ‘ut’. Roth uses this technique often in his poems, many of which are entirely visual. For instance, in his *Stupidogramm* (1961) a grid of printed commas is neatly arranged into a square, into which he draws different shapes in circles (heart, teacup, and other) with a pen.

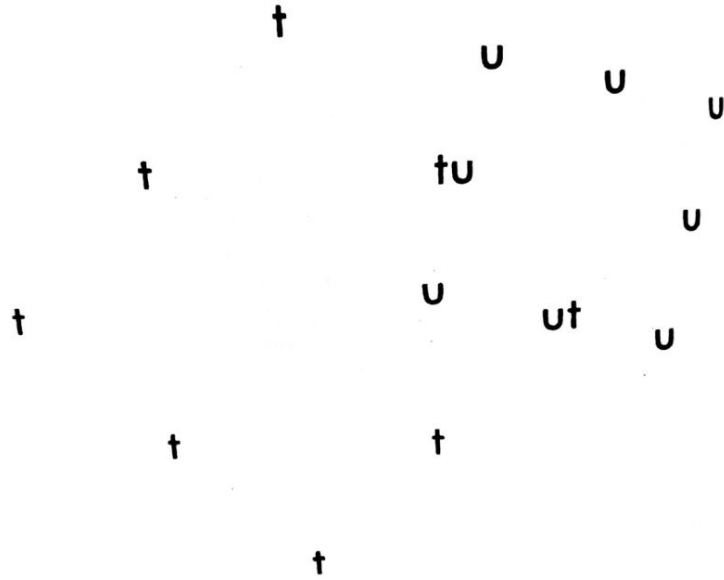


Figure 10 Rot, D., 1956. *Tu*. [image] In: E. Williams, 1967. *Anthology of Concrete Poetry*. Something Else Press.

In Rot's poems, readers can engage themselves with much more than pure concrete poetry: visual poetry that attaches importance to the use of simple symbols (letters, punctuation marks, elementary symbols, signs for cypher, and others). As Solt (1968) commented, sometimes his poems completely lack words, as Rot filled the page with one or more signs (always of different shapes). The signs interact with the white space and create an artistic conception which enables readers to interpret the artwork in any way they like.

Differing from the previous works, Ernst Jandl's poem *Schztzngrmm* (1957) emphasizes "the sounds of the acoustic components of the word." (Bierma, 1985, p38). The poet composed his work on paper and also recorded it. *Schztzngrmm* abbreviates *schützengraben*, which means trenches. Only when readers comprehend its semantic content and associate it with repeated, prolonged sounds of letters do they realize that the poem comments on war. 'ttt' is similar to the sound of machine guns; 'scht' is the sound of bullets flying through the air; and 'grrrr' is the sound of the advancing tank. In the end of this poem, the pronunciation of 't-tt' is the same with 'tot' (death). Although this poem is visually composed of words and letters combined with graphic space, sound elements are the key component that conveys content. Therefore, the poem falls into the category of sound poetry, and it is a type of poem "composed directly on magnetic tape, words and sentences being taken as objects and centers of auditory energy serial, permutational, verbophonic etc. poetry" (Bierma, 1985, p53).

these letters are arranged into the shape of the ideographic character ‘日’ (which means ‘Sun’ and ‘Day’ in Chinese). In the last page, the letters are arranged to form the word ‘life’ again. By associating textual changes via turning pages with changes in nature, this poem projects warm feelings, alluding to the warmth of the sun, which generates life. In this case, the meaning is revealed after the reader turns pages over. In other words, the physical aspect of reading becomes an important part of poetic communication.

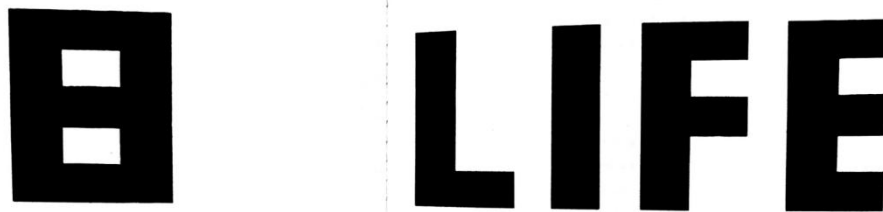


Figure 12 Pignatari, D., 1958. *LIFE*. [image] In: E. Williams, 1967. *Anthology of Concrete Poetry*. Something Else Press.

Over time, the use and popularization of computers has made possible a “truly kinetic poetry” (Bolter, 1991), that is, words and letters of poems can implement various motions on screen in ways unimaginable for printing. New technology not only offers more space for kinetic poetry, but also extends the scope of concrete poetry. *First Screening* (1984), by Canadian poet Barry Phillip Nichol (known as bpNichol) is a specimen of early-stage computer-based kinetic poetry. It is not a poem, but an electronic anthology, comprising a dozen kinetic poems of his written in programming language. In one of them, *Reverie*, the words ‘sun’ and ‘field’ are placed at the top and bottom of the page respectively, then ‘hoe’ appears and slowly moves from right to left (the moving style is similar to physical rhythms of hoeing). When it moves to the middle between ‘sun’ and ‘field’, the suffix ‘rizon’ appears and joins ‘hoe’ to form the word ‘hoerizon’. His approach is familiar to readers, because his works are based on the perspective of concrete poetry and adopt ideas from the static page. Even though the text is endowed with time and motion, he still preserves the most simplistic style of poetic writing to maintain the reader’s attention. His works belong to both kinetic and concrete poetry and use technology to explore new ground.

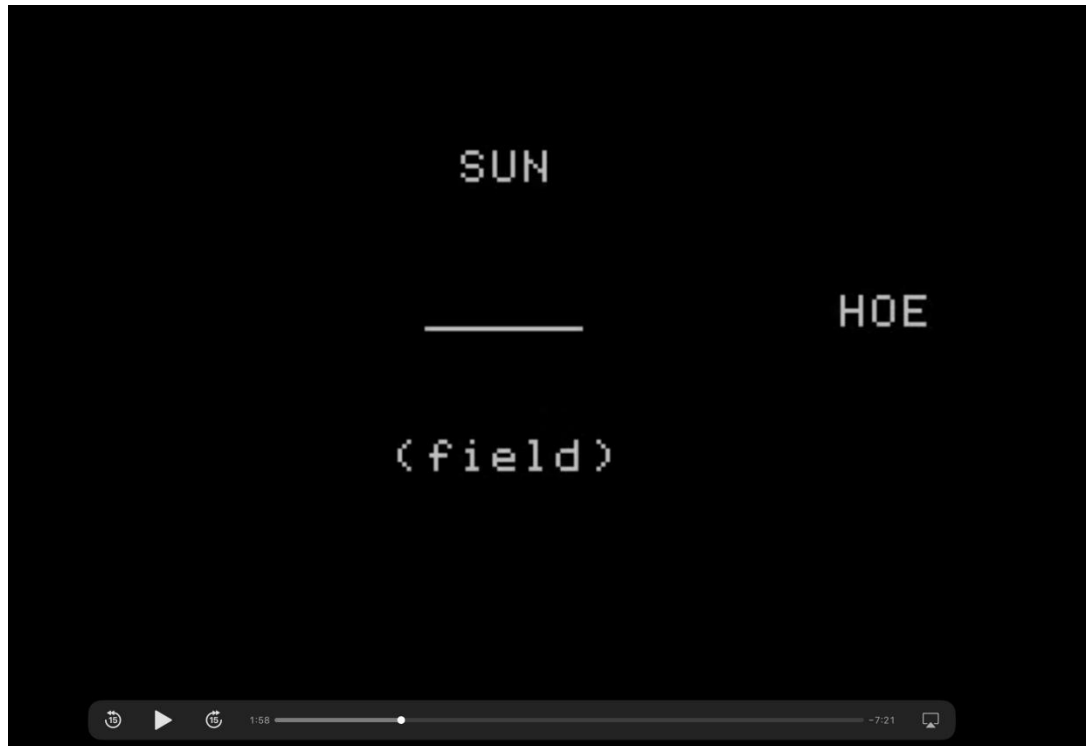


Figure 13 bpNichol, 1984. *Reverie* from *First Screening: Computer Poems*. [mp4] Available at: <
<https://vispo.com/bp/firstscreening.mp4>>.

The concept is both specific and vague, because “it refers not only to an orthodox form or practice, but also to work that responded, and continues to respond, to a shift in art production and discourse coming out of the mid-1960s” (Hilder, 2016, p.130). From its first appearance, it has been constantly expanded in scope. Some lay stress on vision; others on structure, sound, or media presentation. It is never bound to a fixed statement or definition. After the 1970s, concrete poets have developed this art form in more inclusive and independent ways. Especially with the widespread use of computers, the creation of concrete poetry shifted from paper to screen, thus giving new life to concrete poetry and visual poetry in the digital (interactive) field and era.

4.2 Interaction

“Concrete poetry of the 1980s and 1990s is, on the one hand, more free in relation to the orthodoxy of the first years and, on the other, more intensely participatory in the challenge of new technologies, which have produced digitalized poems, graphic and sound animation, and multimedia and intermedia processes.” (de Campos, 1995)

The ‘wishful thinking’ of concrete poetry in the 1950s has become a reality with the advent of electronic media. Digital media has undoubtedly become the ideal medium to materialise ‘verbivocovisual’ (de Campos, 1995). Many poems using digital (interactive) media as their form of expression have been created since, such as de

Campos' *Sem Saida* (no exit; two versions dated to 1983 and 2003), the Spanish poet E. M. de Melo e Castro's series of computer-animated poems *Singagens* (1985-1989), Johannes Auer's *Worm apple pie for Doehl* (1997), Maria Mencia's *Birds singing other birds' songs* (2001), Romy Achituv & Camille Utterback's interactive installation *Text rain* (1999) and Pedro Venerosode's *Gogoame* (2016). They all contribute to the development of new poetry in the 21st century with the use of different digital media. Poetry composed in a digital environment is too diverse to be classified comprehensively. However, based on unique genre characteristics, digital concrete poetry can be initially divided into hypertext, kinetic poetry, digital visual poetry, e-poetry, code poetry, holographic poetry, and interactive concrete poetry, which is the topic of this thesis.

The historical development shows that interactive concrete poetry has a special relationship with concrete poetry of the 1950s. In order to define interactive concrete poetry, I will begin by discussing the relationship between them and compare concrete poetry from 1950 to 1970 and interactive concrete poetry after 1970. I will also use *Four-Minute River*, my interactive poem, as a case study for the purpose of my research and, in combination with several theories, I will discuss the concept and definition of interactive poetry. The reflective evaluation method is the main feature of my methodological approach. But first, I will begin with an explanation of the term 'interaction' in interactive concrete poetry.

4.2.1 Before Interactivity

Media always play an important role in concrete poetry. From 1950 to 1970, concrete poets mainly used typewriters, radio, magnetic tapes, and sculpture to create poetry. After 1970, the progress of computer technology enabled many poets to use digital media (by using programs and software such as HTML, DHTML, Java Script, Java, Macromedia Flash, and MOOs). At the beginning, some poets such as de Campos, E.M.de Melo e Castro, and Johannes Auer merely recreated previous works of printed concrete poetry of the 1950s, without much consideration of programming or software.(Funkouser, 2007) To them, the most obvious influence of computer technology was the emphasis on visual forms of letters and words, and their impact on the size, form, and moving pattern of alphabetic characters. Their works focused on the appearance of text and still followed the early forms of expression of concrete poetry and visual poetry in theory and aesthetics. Like concrete poets, these digital poets focus on the text as an 'object'. Their interest lay not in computer programming or the physical materials of the poetry, but in the visual aspect of the text. Their poems completely differed from other works developing from hypertext. One may easily discern a succession of successful cases of subtly converting concrete poetry to digital poetry (Portela, 2006).

The transformation is manifested in *Worm apple pie for Doebl* (1997) by Auer, who essentially digitized *Apple*, a printed poem by Reinhard Döhl in 1965. Auer's intention was to revive the worm in the apple. By moving within the apple and gradually making the shape of the apple disappear, the worm eats the entire apple. It is obvious that the digital version of concrete poetry increases visual dynamic effects and transcends the boundaries and restrictions of the printed version of the poem. But it must be noted that we do not know whether this little worm in Döhl's poem wants to eat the apple or not, or it just wants to remain on the surface of the apple, or if it has any other intention. The dynamic state of the worm eating the apple is just Auer's association, which is realized and strengthened by digital technology. The new version differs from the static text in which readers can experience the action at their own pace, whereas the dynamic text may set a time frame for their reading. From another perspective, Auer's incorporation of his own interpretation into the poem obstructs reader participation, limits readers' imagination, and provides an inferior reading experience to the printed version. For this reason, it is no longer a playground (Gomringer's aspiration for concrete poetry), nor makes good use of the concept of 'invitation'.



Figure 14 Döhl, R., 1965. *Apple*. [image] In: E. Williams, 1967. *Anthology of Concrete Poetry*. Something Else Press.



Figure 15 Auer, J., 1997. *Worm apple pie for Doehl*. [online] Available at: <
<https://auer.netzliteratur.net/worm/applepie.htm>>.

Even so, Auer's works created new possibilities for concrete poetry, introduced spatial features to the concrete poetry movement, and increased the temporal dimension of poetry. In addition, many similar works added extra layers of meaning to poems through colour effects, 3D, temporal effects and dynamics.

In some later works, especially in Internet poetry, the emergence of interactive functions seems to have resolved problems occurring in Auer's works. For example, Mencia's *Birds Singing Other Birds' Songs* (2001), an e-poem with interactive features presented in a web interface, uses different letters to outline the shape of twelve birds. These letters are all parts of phonemes of various birds and different phonemes outline the shape and allude to the sound of different birds (for instance, 'gu-gu' for a pigeon and 'aw-aw' for an eagle). The concept of this poem is the exploration of the translation process, that is, the singing of birds is translated into human language and then uttered in human voice. In this poem, bird song is reinterpreted by human language. One of its features is interactivity: as readers click on different buttons, different birds fly around the web interface and sing.

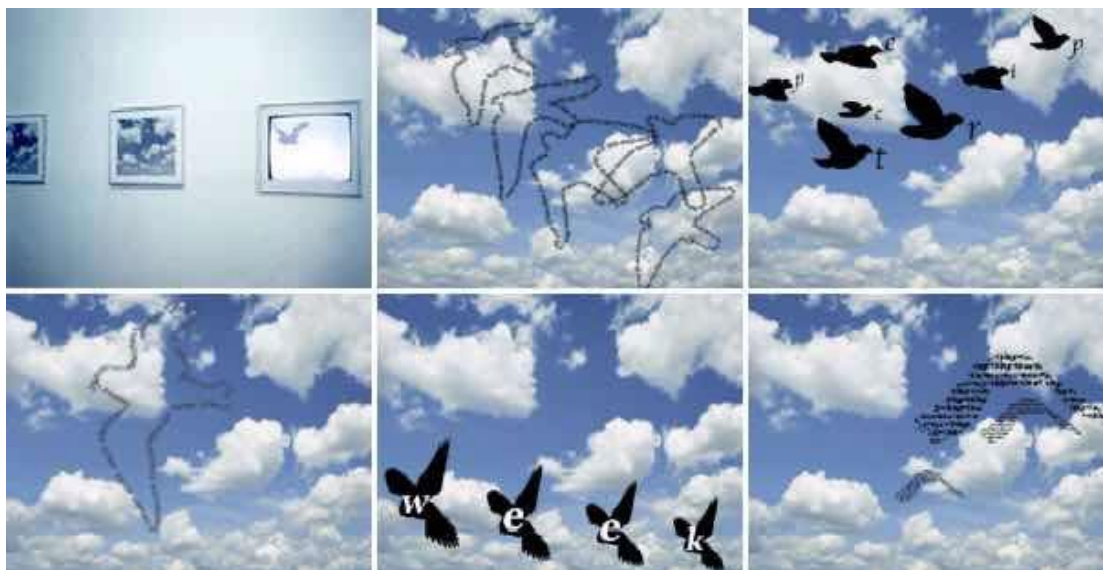


Figure 16 Mencia, M., 2002. *Birds Singing Other Birds' Songs*. [online] Available at
<<https://www.mariamencia.com/pages/birds.html>>.

Unlike Auer's digital *Apple*, Mencia provides readers with the optional opportunity to interact with the poem, although such interaction has been questioned. Perloff (2006) said in *Screening the Page* that such poems allow the reader to track their path through a given e-text, decide to move from a to b or from b to q, and rearrange word sequence by clicking on a button. However, do these activities constitute 'interaction'? Perloff used the online game *Virtual Life* to make a comparison and stressed that every option in this game is fixed; although gamers can choose, this does not mean that they can do whatever they want. "The input is rigidly predetermined by the largely anonymous authors and programmers" (Perloff, 2006, p.143).

Pedro Veneroso from Brazil created in 2016 the web poem *Gogoame* ('afternoon rain' in Japanese). The prototype of this poem is *Rain*, a concrete poem by Seiichi Niikuni from Japan in 1966. "In his poem, Niikuni deconstructs the ideogram that means rain (雨) and transforms it into the fundamental structure of the rain, a drop" (Veneroso, 2018). After Veneroso's recreation, the poem became an item of web poetry with an interactive function, wherein an engine is used to simulate the acceleration, and gravity and wind to spatialise the text (text falls through the screen like rain does). It continues the tradition of literary experimentation in concrete poetry and visual poetry. Moreover, this work invites the website's visitors to create their own poems by interacting with the text on the webpage. Visitors can enter any text they want by using buttons on the left-hand side, send it and then watch it on screen amid the rain, thus creating a unique form of 'rain poetry' of their own. Compared to other digital or web poems, the functional design of this poem greatly enhances reader participation and freedom of choice, as it does not limit the options it offers to readers. In addition,

visitors' creations can be projected in a room, so that readers may experience the interaction between text and rain more vividly. Accordingly, *Gogoame* provides the reader with a more immersive experience of rain poetry. The reader does not input the text with the use of the mouse. Instead, they wave their arms or use other motions based on human-computer interaction technologies.

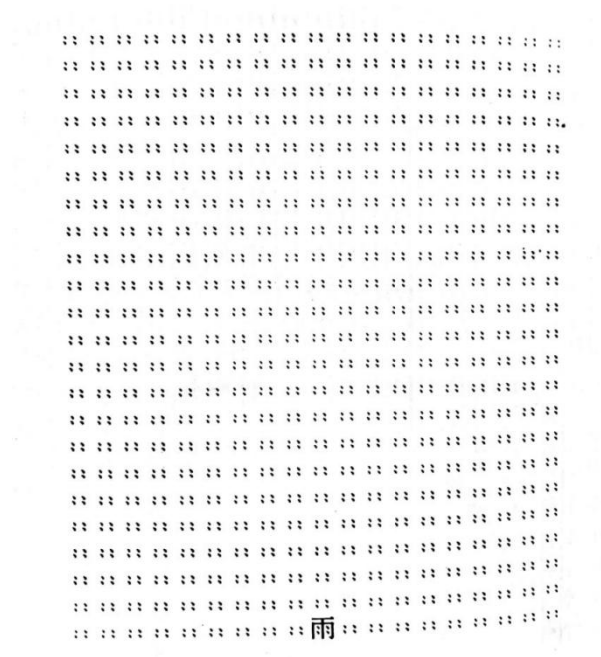


Figure 17 Niikuni, S., 1966. *Rain*. [image] In: E. Williams, 1967. *Anthology of Concrete Poetry*. Something Else Press.

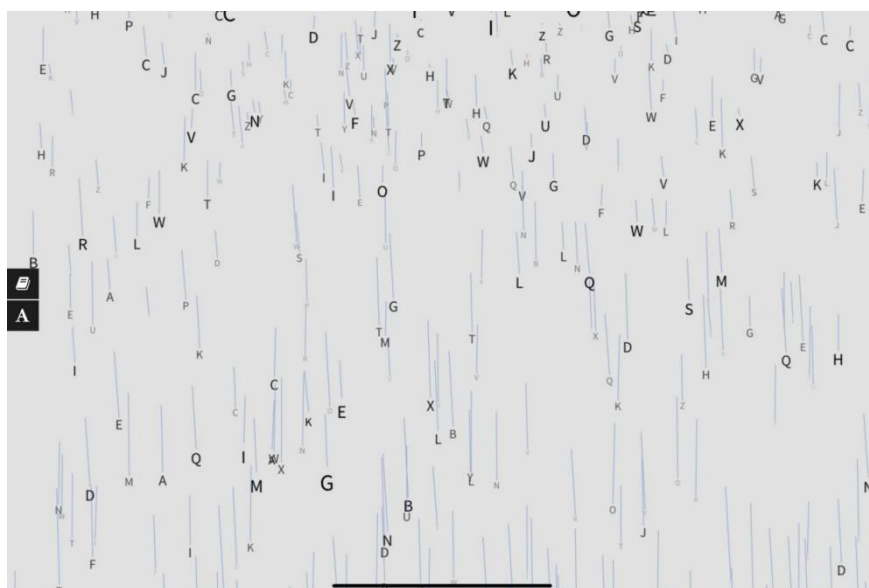


Figure 18 Veneroso, P., 2016. *Gogoame*. [online] Available at: < <http://gogoame.sumbioun.com> >.

The rapid development of technology in the 21st century, especially current interactive design, releases interactive poetry from the confines of the web page or computer games. As a way of presenting digital poetry, current interactive media have significantly enhanced the readers' sense of participation and experience, and allow them to interact with the poem through gestures, expressions, words, and any other physical form, thus becoming part of its content. From printed concrete poetry in the 1950s to digital (interactive) poetry nowadays, the role of the reader is gradually changing. The reader is at the same time the audience, the participant, and the creator. Current digital (interactive) poetry fills poems with multi-dimensional and non-static elements, to the effect that they become fully random. From a researcher's perspective, it is challenging to study a topic which is full of surprises.

4.2.1 Defining interaction

The term 'interaction' literally signifies a set of actions and behaviours between two or more agents. For example, two people conversing with one another is a completely interactive process. Interaction design considers ways to make such communication more effective. Certainly, the subject and setting can be human-to-human interaction, human-to-object interaction, or object-to-object interactions.

Research on interaction design began in the 1960s. By the mid-1980s, after the concept had been officially introduced and widely accepted, interaction design became an independent discipline. Early interaction design focused on human-machine interaction, especially the interaction between people and computer-operated interfaces (screens). A particular way of communicating with a computer system is the input of instructions into the computer for a certain idea and purpose, then control the execution of the program, followed by a corresponding feedback the system returns to the user after receiving their instructions.

Regarding this communication method, Yvon Rogers, Jennifer Preece and Helen Sharp (2011) presented the four most common types of human-computer interaction in *Interaction Design: Beyond Human-Computer Interaction*: instructing, conversing, manipulating and navigating, exploring and browsing. Instruction means that the user issues commands to the system, such as inputting a text command, clicking an option from a menu or an interactive window, issuing a command by voice or through a specific gesture, and pressing a single or a combination of buttons. Conversation refers to the dialogue between user and system. The form of speech, text, and body language communicates with the system through an interactive window. Manipulating refers to user interaction with an object in the virtual space by operating on the object, such as opening, closing, grabbing, placing, and so on. Exploring means that the user roams within the virtual space and discovers the world through observation and perception.

To make the interaction between people and machines (or software, websites) more convenient and simple, designers began to focus on user experience to understand the user's way of thinking and behavioral habits at first, then their goals and expectations, aiming at a goal-oriented design, so that the final product would be close to user expectations. Gradually, interactive design became people-oriented. As technology advances, interface interactions can be extended to gestures, sounds, and other somatosensory activities.

Therefore, interaction design entails much more than just designing a 'user interface'. Human-computer interaction is not as simple as letting the user move a finger or click a button on the keyboard. It can be designed to allow the user to experience a comprehensive sensory interactive experience. 'Visual Studio', 'Processing', 'Unity3D', 'OpenCV' and 'EU4', are the most commonly used development tools. There are instances when designers build virtual environments to create some wonderful interactive experiences with artworks, enabling the use of all senses (touch, smell, taste, in addition to sight and hearing). The sensory perception of the external world can be combined with the input and output devices of the interactive medium to create a perceptual interaction with humans, to achieve dialogue with the user in a virtual environment.

In a broad sense, interaction design has become a design approach, a wider concept. The artist Chris Milk is a pioneer of interactive experiences. His *The Treachery of Sanctuary*, created in 2012, is an interactive experiential triptych that allows viewers to use the motion-capture device Kinect and infrared sensors, and leads the audience through body and screen interaction to experience bird flight and internalise the meaning of the artwork. Three images represent the process of the artist's creation. In the first image, the human body becomes a flock of birds flying into the distance, representing the birth of the birds, and the moment inspired by the artistic conception. In the second image, the birds furiously eat an image of the audience, flying in a messy animation, which represents a critical reflection or difficulties in creation. In the third image, when viewers unfold their arms, the screen presents a beautiful, huge set of wings, which represent the success of the creation. Milk said that his work attempts to integrate technology into artistic experience, in order to explore whether technology can instigate substantial emotions.

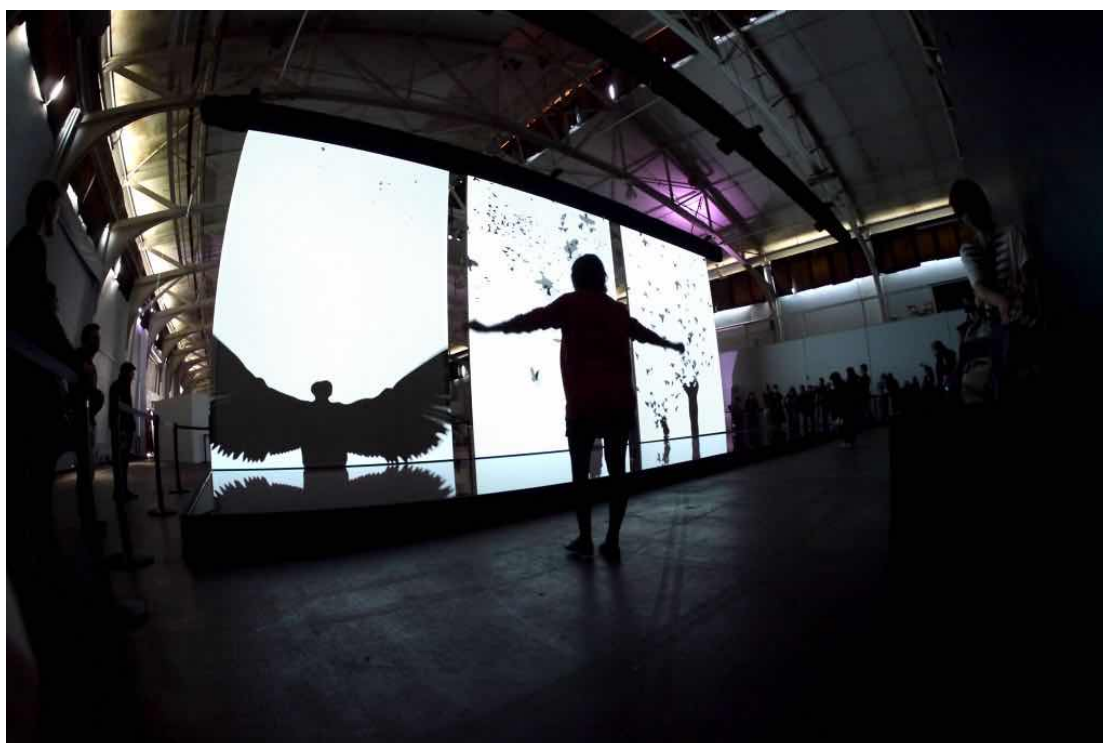


Figure 19 Milk, C., 2012. *The Treachery of Sanctuary*. [online] Available at: < <http://milk.co/treachery> >.

The *Rain Room*, created by Hannes Koch and Florian Ortkrass in 2012, is an immersive installation artwork that combines multiple sensory experiences. Following the London and New York exhibitions, it was also exhibited at the Xudeyao Art Gallery in Shanghai in September 2015. Before the exhibition, a report in Xinhuanet (a Chinese news agency) raised a number of questions; among them, the provocative “Would you like to spend 150 yuan to shower for 10 minutes?” stimulated people's interest. The answer many people reached after the experience was: this was a romantic and magical experience. The artwork became a significant justification of the recognition of the importance of the interaction between technology and art. In terms of technique, the tracking sensor on the ceiling senses the position of the visitor. From a technical point of view, this interactive device is a ground interactive projection, with sensors and projectors at the top (an IR camera or depth sensor) The projector is replaced by a water curtain. When a person moves, the water outlet on the ceiling closes temporarily to ensure that the visitor will always be in a rain-free zone. Thus, the audience walks through heavy rain without getting wet. *Rain Room* combines art, technology, and nature, and explores the relationship between them. The visitors who walked into *Rain Room* and the rain constitute two agents of interaction. The creator said that his motivation was the desire to explore reactions to this special experience.

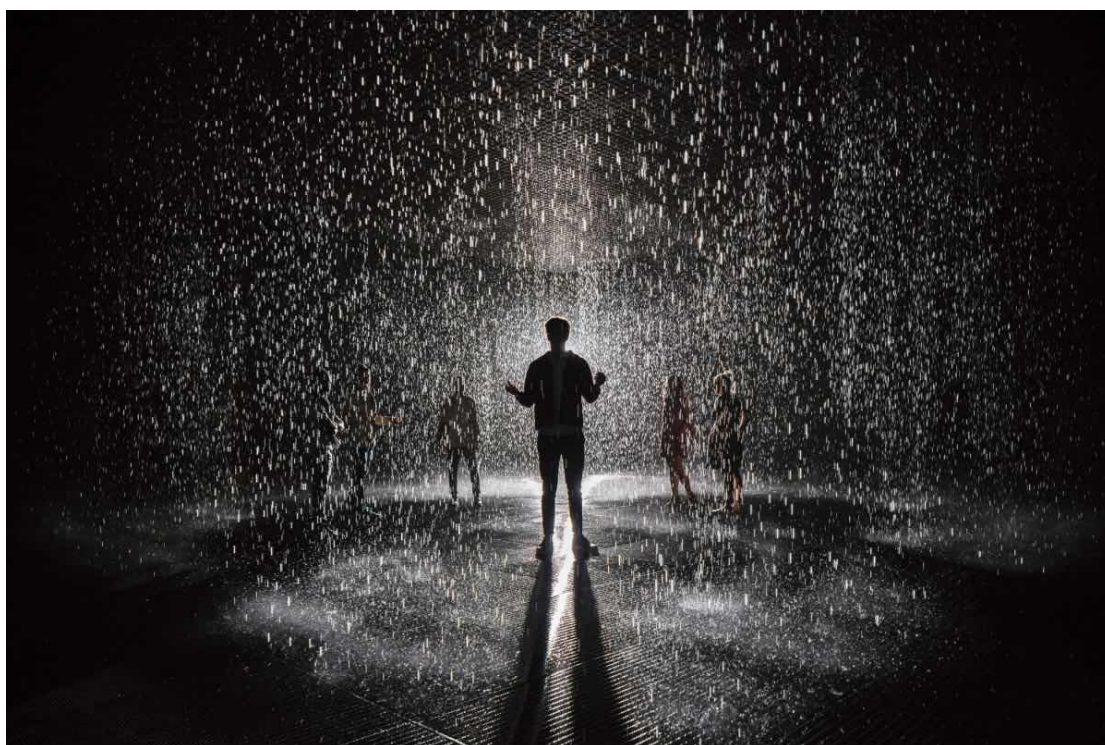


Figure 20 Koch, H. and Ortkrass, F., 2012. *Rain Room*. [online] Available at:
<https://www.lacma.org/art/exhibition/rain-room>.

A well-known digital media art group from Japan, Teamlab, has traveled around the world and sparked immersive experiences. Founder Toshiyuki Inoko said that their creations aim to present digital art within a real space and bring a new, entertaining, artistic experience to the audience while extending the boundaries of art. Unlike standing in a traditional picture or flipping through a picture book, the audience is an active participant in their work and eventually becomes part of the artwork.

Born From the Darkness a Loving and Beautiful World, an interactive digital installation, is the outcome of the cooperation of Japanese calligraphers Sisyu and TeamLab in 2018. This digitalized world is implemented by a virtual space within a 360-degree screen. The audience can move around this artwork as they wish and can walk around, dance, even run at will. Some Chinese characters, such as 'gold', 'wood', 'water', 'fire', 'earth', 'wind', 'rain', and 'saucer', are displayed in dynamic forms. Combined with interactive technology, this work is designed to be a dynamic image of nature. Viewers can see a new world full of magic by touching these words. For example, when the character for 'gold' appears, the audience can touch it and it will transform into a splendid exhibition of golden fireworks. When visitors touch the character for 'fire', a burning fire will appear on the screen. Upon touching the character for '蝶', a butterfly starts flying. Through this combination of graphic and textual communication, the Chinese characters are no longer restricted to their function as

linguistic signs. Anyone can understand their meaning through interaction. Teamlab opened a new door for audiences and poets.



Figure 21 Sisyu and TeamLab, 2018. *Born From the Darkness a Loving and Beautiful World*. [online image]

Available at: < <https://www.teamlab.art/w/whatloving-dark/> >.

The work of Teamlab is not limited to dark rooms; it can be integrated into the natural environment. Teamlab's 2019 artwork *Resonating Forest in the Ravine* fixed lighting patterns on trees in a valley, making them all sparkle. Teamlab illuminates a tree and light gradually brightens and dims, imitating a tree's breathing process. When a person passes near a tree, the light suddenly changes color and a unique sound is generated (created by Hideaki Takahashi). Gradually, all surrounding trees change color and produce the same sound. When a person sees a ray of light shining from the depths of the forest or hears the sound, they know that someone is there. This artwork implements an interaction between light and sound, which Teamlab cleverly connects to trees to create a poetic garden similar to Finlay's *Little Sparta* (1966).



Figure 22 TeamLab, 2019. *Resonating Forest in the Ravine*. [online image] Available at: <
<https://www.teamlab.art/zh-hans/w/resonating-trees-in-the-ravine/>>.

Whether it is Milke's *The Treachery of Sanctuary*, Koch and Ortkrass' *Rain Room*, or Teamlab's immersive interactive works, these representative specimens of interactive art emphasize the immersive experience based on the basic functions of interaction. This is the impact of interaction design on the user's emotions and user experience. These successful interactive experiential artworks show that contemporary interactive art has broken away from and surpassed obsolete concepts of interaction popular during the 1980s and 1990s. This further indicates that interactive technology contributes not only the interaction between humans and computers, but also more convenient and sensitive programs for art or poetry, thus producing an emotional gain through interaction. Current human-computer interactive technology has already made a large number of possibilities and new set of rules for artistic creation. The aesthetics and effect of these works may be different from those of concrete poetry, but they can be used as references in the use of media and integrative capabilities of technology and art.

4.3 Interaction + concrete poetry

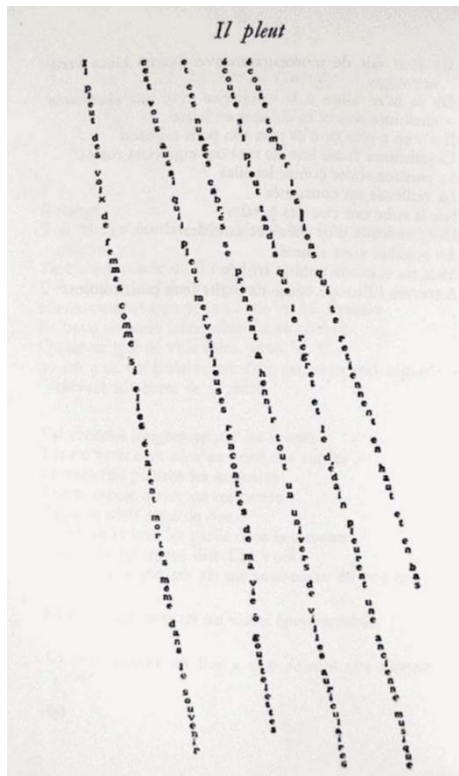
Concrete poetry is not a single type of poetry but includes a range of poems that prioritise visual expression over semantics. Alongside digital interactive media, concrete poetry has been used as a concept and is regarded as the antonym of 'abstract'. In other words, any element of concrete poetry, such as words, which only represents itself, is neither subject to the traditional rules of grammar and syntax, nor used to

construct sentences. “It is...an aesthetic communication scheme” (Bense, 1965). From the 1950s onward, poets have been exploring and inventing expressive forms of concrete poetry, from constellations to ideograms, kinetic poetry, e-poetry, and then to interactive poetry. The range has been expanding, yet what kind of poetry expression is produced when concrete crosses paths with immersive interaction design and tech?

In the first half of Chapter 4, I discussed the digital works of Auer, Mencia, and Veneroso, who contributed new pathways to concrete poetry in the new media era. These works manifest an evolution from concrete poetry to digital media poetry. However, many of these works were initially conceived as a continuation of concrete poetry or as new versions of concrete poetry already published in print. They may signify stages of the transformation of concrete poetry from print-based to digital but to study interactive concrete poetry from a more objective perspective, we should associate current technology with the essential spirit and ideas of concrete poetry movement to create an entirely new product, instead of a refurbishment of old materials (like renovating old houses).

According to the definition of interaction and as demonstrated by some interactive artworks, nowadays interaction design entails more than just designing a website or an interface program. It is only the beginning of the switch from printed page to digital interface. At present, the interactive designers have already completed a series of algorithms that attach more importance to user experience, thus creating new dialogues between concrete poetry and readers. The dialogue enables readers to participate in the experience of poetry through more than one sense (sight). The program receives feedback from different physical activities and psychological reactions of readers, and then generates corresponding expression that returns to the artwork. A dialogue between viewer and artwork is finally feasible and materialised.

Text Rain is an interactive poem created by Achituv and Utterback composed in 1999, and is based on Apollinaire's poem *Il Pleut*, composed in 1918. The shape of the user's body is projected on the screen, then hundreds of letters drop from the top of the screen onto the digital body of the viewer. The effect is rain-like. The letters respond to the participants' motions, so users control the trajectory of the falling letters. For example, when people stretch out their arms, they can cause the letters to remain on the outer contours of their arms; when they draw their arms close to their bodies, letters will continue to fall like rain. Through the interaction between the viewer's body and programming text, the poem creates an interesting dialogue between the two. Such form is worthy of being affirmed as the outcome of technological progress, but, it is also criticized. For instance, Simanowski (2012) in his *Digital Art and Meaning*, questioned the ‘deep meaning’ of ‘Text Rain’.



Before addressing this question, let us first examine another traditional concrete poem with the same theme as *Text Rain* (1999), *Rain*, created by Niikuni in 1966, the inspiration for *Gogoame*. As a leading figure in Japanese poetry, Niikuni is accustomed to approaching language from visual and auditory perspectives and to using many Chinese ideograms in his poems. In this poem about rain, he uses the Chinese character for ‘rain’ (雨) and similar symbols, like raindrops, to create an image. Symbols for ‘raindrop’ occupy the entire webpage and the Chinese character ‘雨’ is placed at the bottom, alongside other symbols. Non-Chinese speakers often picture a little house in the rain in their minds when they first see this artwork. There is nothing wrong with this interpretation, as ‘雨’ means rain and is a noun and ideogram at the same time. The comma-like symbols that we see are also a part of this ideogram (strokes). However, a classic Chinese book, *Shuo Wen Jie Zi* (Paraphrasing Texts and Words) (A.D.25-220?) states that “雨，水从雲下也。一象天，冂象雲，水霝其間也。凡雨之屬皆从雨。” which means, rain itself is the water that descends from the clouds, so ‘一’ appears on the top of this character as symbol of the sky, and the ‘冂’ underneath resembles the clouds; raindrops fall between them. Therefore, the framework of the character ‘雨’ does not signify a house, but the sky and clouds. Therefore, viewers who become familiar with this character and look at this artwork again may wonder why the character ‘雨’ is placed at the bottom of the screen. According to the analysis of the image conveyed by the character, ‘雨’ should be placed at the top, because ‘一’ and ‘冂’ symbolize the sky and clouds, which both lie above rain. The arrangement on screen does not conform to the natural phenomenon. Of course, Niikuni might not have understood the logic of the character ‘雨’, or he may have intentionally placed it at the bottom to express another message. In a nutshell, he successfully created an interesting visual poem by making good use of the Chinese character ‘雨’, its inherent symbolism and internal logic. More importantly, through the specific arrangement, people can appreciate the poetic meaning without knowledge of Chinese. Therefore, it may be a truly international poem.(see fig.17)

At this point I will compare one printed concrete poem composed and published in the 1950s and an interactive installation poem created in the 1990s; the most intriguing differences between them entail expressive form and medium. Clearly, the first one is printed on paper, a medium which relies on visual communication, whereas the interactive poem relies on the interaction between people and machine to produce poetry. It is hard to trace elements of the traditional concrete poetry of the 1950s in this kind of interactive installation poetry, such as *Text Rain* (1999). When people walk into the installation, they are attracted by interactive elements and focus on the gaming experience with the on-screen text. Evidently, as Simanowski (2011, p.58) notes in *Digital Art and Meaning*, “whereas in classical concrete poetry the visual effect was played out to add meaning to the linguistic dimension of the text, in contemporary

kinetic concrete poetry the representational function of the word has been dismissed in favor of the technical effects.”

In Niikuni's poem the word ‘rain’ and the symbol for ‘raindrop’ are two independent entities. The meaning they convey is not derived from textual information expressed in a traditional linear structure, but from the interaction between their pictographic meaning and content, as stated in the Noigandres *Pilot Plan* (1958): “it deals with a communication of forms, of a structure-content, not with the universal message communication.” The reading of this poem begins with appreciating the relationship between its structure and words. By combining graphic space, words and symbols for ‘rain’, it intertwines image and text in a presentation of poetry that traditional linear semantics cannot produce. As to the *Text Rain* (1999), it describes rain, in a way that relies on computer programming to produce words and convey the dynamic effect of rain. This effect not only gains people's attention, but the interactive design requires readers not only to view the poem and comprehend its meaning, but also to participate in the work through a series of actions and motions (such as talking, dancing, waving, and facial expressions). Simanowski explains that, apart from the interactive experience between people and the digital rain of letters, the content of *Text Rain* is not random. Many people might not notice that in the process of interaction with the text on the screen, the letters form words or phrases as they fall to the ground or onto the digital body of users. These texts are selected from the poem *Talk, You* in Evan Zimroth's book *Dead, Dinner or Naked* (1993). In other words, *Text Rain* (1999) is a joyful ‘playground’ that invites the viewer to interact with it, as well as a poem that requires the viewer to read it.

Simanowski argues that, if *Text Rain* (1999) does not entail reading of texts, it belongs to digital art rather than to literature in terms of its function, because literature is based on language units and every word has its own meaning that can be read word by word. The difference between digital art and digital literature does not lie in material, but on the material's function: “there can be linguistic painting and text without linguistic meaning (sound poetry but also concrete poetry), which then is perceived as art rather than as literature” (Simanowski, 2011, p.40). He finds that digital art and digital literature can be further distinguished according to the material's function. If the text is an important element of an artwork, then it can be classified as digital literature; if the text is only a visual object of interaction, then the artwork is a specimen of digital art. However, if the artwork is created as a concrete poem, then it is neither literature nor art; alternatively, it can be classified as both, because concrete poetry “aimed at both visual and linguistic functions of the text” (Simanowski, 2007, p.51).

Let us return to *Text Rain*. When participants interact with the rain of letters, they do so in a more relaxed manner than the demanding process of reading a text. Therefore, *Text*

Rain may be a piece of digital (interactive) art. But after further consideration, we find that it also requires reading a text, so it can be classified as literature. How do we resolve this conflict? Perhaps by acknowledging duality in form of expression we can realise that the 'game with the cascading letters' is the deeper meaning of this poem (Simanowski, 2011). In fact, the attribution of many interactive artworks is very vague. Again, with regard to *Text Rain*, after we define its attributes and focus on the interaction between people and digital medium, can it be classified as an item of interactive installation art? Deeper perception and focus on people's experience may resolve this conundrum and allow us to classify it as poetry or as another type of art in line with the effect it intends to achieve; if it appeals strongly to feelings and experience, it may also be classified as an item of experiential art.

The comparative analysis of *Rain* and *Text Rain* reflects not only two kinds of poetic experiments from different historical periods and different cultural backgrounds, but also a relationship between concrete poetry and interactive concrete poetry. Ted Nelson (1994), for example, suggested three links between concrete poetry and digital poetry: "1st) the spatialization that occurs in the concrete text is similar to the topographic and iconic writing of digital interfaces; 2nd) the creation of non-sequential reading paths (with multiple trajectories resulting from the breaking-up of language units) is similar to the non-sequential writing of hypertext; 3rd) the explosion of the text into a network of allusions anticipates the notion of literature as a system under construction of interlinking documents." He suggested that this combination of texts explores new possibilities of language and confirms the defining principles of concrete poetry, still in use by digital poetry.

Nelson's analysis is very useful for the purpose of this thesis, because it shows the coherent evolution of concrete poetry from traditional printed forms to digital media dynamics. However, his analysis of this relationship still aimed at drawing comparisons between the characteristics of early digital-media poetry and the concrete poetry. What we need is to advance our understanding of the relationship between interactive poetry with immersive experience and traditional concrete poetry.

Perhaps more representative cases of contemporary interactive media are needed to draw comparisons. Let us turn to one of Sisyyu's artworks, a drawing of a waterfall. Between the lines, when someone approaches the artwork, Chinese characters appear, all containing the component '心' (heart). When viewers stretch out their arms to interact with the characters, the characters move together with them and give the overall impression that viewers and characters mingle in dancing. The poem evokes a sensation of nature, where viewers can interact with the words and immerse themselves into the experience. They blend in with nature, and enjoy its effects. This artwork may be considered as an item of installation art or of calligraphy. If the focus is on the

interaction with words and poetic message, then it is a poem that reflects the progress of poetry from meaning-driven aesthetics to sensory and technical aesthetics.

This artwork exhibits another difference between immersive interactive text and traditional poetry: the change in reading methods. The issue appeared first when I compared *Text Rain* with *Rain*, but this poem better illustrates the change, it allows insight not only into changes in the audiences' reading behaviour, but also on the overall change in the reader's role. The latter has undergone total transformation from being simply a recipient of information to an organic part of a poem. As far as interactive poetry is concerned, 'reading' signifies the process by which viewers attempt to understand the unique visual language of digital poetry, that is, to receive the message conveyed by computer code that generates letters, shapes and understand the content via human-machine interaction. Immersive interactive design differs from interactive design in terms of artistic expression. The former mainly relies on advanced materials, such as screen, projection, or sound, which can construct a multi-dimensional experiential space with the combined use of human-machine interaction technology. It focuses on the psychological response of the audience through a multi-sensory stimulation. In Siyu's work, interaction is not the main source of the poetic meaning conveyed. Message and meaning originate in the poetic environment created by the program, which makes the audience willing to enter it and integrate with the text.

This interactive poem reveals that words can have double meaning in such works; besides being an artwork of a textual form, the poem is also an item inviting playful interaction (Simanowski, 2011).

Since the 1970s, concrete poetry has had conceptual requirements for interaction with and integration of readers, such as the concepts of 'playground' and 'invitation' in Gomringer's 'constellations'. Today, scientists have created such a medium, which provides not only dynamic visual effects for concrete poems and simple web interface options and links, but also new forms of poetic expression, just like the first computers had become a medium to create dynamic poetry for print. Nowadays, the most outstanding contribution of interactive technology to the creation of concrete poetry is that it fulfills the interactive and experiential requirements of concrete poetry.

What is interactive concrete poetry? The term is rarely used in scholarship, and so case analysis and theories offer only limited scope for fully understanding the concept. The first reason behind the small number of cases of concrete poetry using interactive media is interactive technology itself. Since relevant scientific progress occurred after the 1980s, interactive technology remains in an experimental stage, despite the fact that it is developing rapidly. That is to say, it is still a work in progress, so art produced by interactive technology also remains experimental. Consequently, the number of items

and volume of research that combine concrete poetry with interactive design is very limited. Second, since the development of concrete poetry in the 1950s, artists have described their experimental artworks in terms including visual poetry, sound poetry, kinetic poetry, e-poetry. As I mentioned above, the term concrete poetry contains a variety of types of poems. If a poem must be classified in a specific category, then the classification must be defined by its individual characteristics. Accordingly, if we want to determine the genre or category of an interactive poem or define an interactive work, we need to focus on the emphasis of the work itself. In other words, since the topic of our study is interactive media and concrete poetry, it must be based on the poetic experiment with the concept and ideas of the concrete poetry movement in the 1950s.

When immersive interactive design is applied to poetry, it can provide a plethora of forms of poetic expression. However, for this work is to be defined as concrete poetry it would need to be designed around the concept of 'concrete' in both visual and interactive forms. For example, we would need to consider whether its content is related to its form, and whether the multi-dimensional poetic space it constructs creates a conceptual playground which is open for everyone to participate in. Therefore, based on these requirements, I created an interactive concrete poem to test and experiment further on our assumptions. Through this experiment, I displayed the definition and characteristics of interactive concrete poetry and replied to Simanowski's (2011) question: how does an interactive poem convey poetic meaning?

4.4 Project One: *Four-Minute River*

4.4.1 Purpose

The purpose of *Four-Minute River* is to explore the definition of interactive concrete poetry and the ways it uses and presents poetic visual language. After a thorough scrutiny of previous scholarship and case studies of concrete poems, digital poems, and interactive installation art works, a question arose: Should poetry have to be in a readable language? With this in mind, I visited the poet Richard Berengarten. He explained his own perception of language as "Language is time, language is memory" (Berengarten, 2016). The evolution from a baby's babble to the full formation of language is a long process. Language is a development from the sound of a baby sucking milk to uttering 'mom'. As mentioned in *Language in the Crib*, the wonder of non-language speech of children lies in that this original form of communication is able to convey information about emotions. This is not only literature, but also a cognition or feeling from life and a language sign which is in accord with Bernstein's interpretation of poetics in *The Practice of Poetics* (1992): he views poetics as a creation and a process itself. Any work can potentially produce something new and demonstrate initiative instead of being predictable. Poetics does not only lie in writing

but also in performance; in fact, I prefer to understand it as experience. Therefore, I set out to explore how concrete poetry expresses meaning by new media and interactive technology with children's babbling soundscape.

Four-Minute River is an interactive concrete poem comprising visual and audio effects and interactive experience. Its theme is the symbolization of the development of language in just four minutes. This interactive poem allows easy access to all readers regardless of their native language and everyone can understand and sense the poetic message it conveys. In what follows, I present and analyze this experiment from three aspects: sound, vision, and interactive experience.

-Sound

The creation of the sound or audio is the epicenter of this digital poem. After defining the question and purpose of the case study, I took to the streets with my voice recorder in a quest for the sounds of the city, especially the voices of babbling children, and recorded them talking among themselves. I then mixed the soundscape and processed the audio, reducing ambience and isolating the interaction between two children to express the sound of poetry. The voice of a babbling child reflects the original language independently from nation and cannot be defined. Nevertheless, it can express a kind of poetry imbued with life and emotions conveyed by a set of abstract language signs in accordance with what I want to express.

In contrast to other sound poets, I did not embed rhythmical music in my audio clip and followed Eliot's impersonal theory to promote and express the most objective material existence through various media without inserting the author's feelings. Eliot (1921) said that "Poetry is not a turning loose of emotion, but an escape from emotion; it is not the expression of personality, but an escape from personality." so, "The emotion of art is impersonal" (Eliot, 1919) . Accordingly, poets should suspend their personal emotions from artistic creation. In this way, objective information can be communicated to viewers.

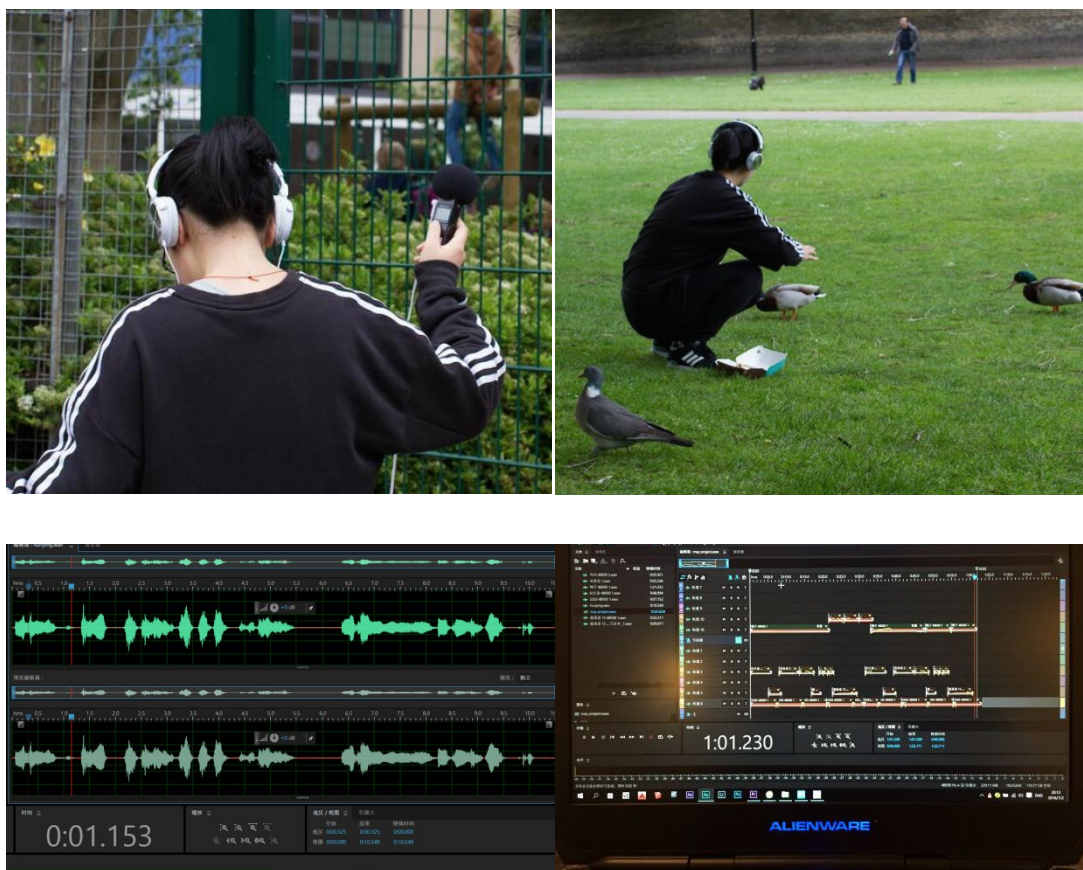


Figure 25 Zhang, M., 2016. the sound record of *Four-Minute River*. Cambridge.

-Visual

I used the form of a river to symbolise the development of language as a river of time (time = language) in a concrete way. Accompanying texts are created by the language sign of my sound and the letters in the video are linguistic signs manifesting the communicative aspect of language.



Figure 26 Zhang, M., 2016. *Four-Minute River*. Cambridge. [video] Available at: <https://youtu.be/0D8bOdAcitE>.

-Interaction

This poem comprises visual and audio effects and human-machine interaction and integration. When people come near the project, they can feel the visual and audio effects, and the strong emotion. Meanwhile, as they move, texts corresponding to the parts of the body change as if viewers were entering a river of sound. Viewers interact with visual, audio, and textual elements and can remain in the work for as long as they like to feel and experience the poetics.

4.4.1 The poetic expression of *Four-Minute River*

Four-Minute River is an essential element in my exploration of interactive concrete poetry as it enhances my understanding of the whole process from conception to creation, from problem solving to final presentation. The poem not only explores the essence of human language, but also reveals possibilities and ways to convey poetry in concrete poems with the use of interactive media. Although the combination of vision, sound, and interaction is not ideal, it successfully shows what the poems wants to convey and displays the multi-dimensional expression of concrete poetry in an immersive interactive medium. As a concrete poem, *Four-Minute River*'s concreteness is not expressed between words and structures as in traditional concrete

poems, but is reflected in the multisensory experiences offered to participants during the process of interaction.

The early stages of creation and design were based on the idea that the outcome would be a concrete poem. First of all, visually, words were arranged to shape the form of a river flowing. In this case, the text seems to favor a physiognomy, the representation of motion that emulates natural phenomena. However, these words embody a higher level of mathematics of composition (sensible rationalism), that is, the expression of a constructivism that adds individual subjective initiative (Noigandres group, 1958). The textual element is not simply a typographic element, but a phonetic symbolism of a babbling child. Although it is not readable, it represents the foundation of human language and has a linear structure. Therefore, even without the support of sound or interactive technology, the textual element in this work embodies the concept of 'concrete'.

The audio element of this work comprises phonetic symbols that represent vocalisations of children who have not yet learned how to speak; they reflect the essence of human language, so in a sense this non-language is a form of communication that transcends borders and boundaries. When examined separately, audio symbols can be completely independent as a type of concrete poetry (as sound poetry). In addition, in this poem, babbling patterns match dynamic textual effects on screen, thus enhancing the multisensory experience of the participants.

Finally, the interactive element of *Four-Minute River* uses the common human-machine interaction method and the kinetic camera to track the human body, to input the captured information into the computer, and project the information to interact with the audience. The term interactive design is not directly connected with concepts of concrete poetry, but the interactive experience of design can relate to it. As Simanowski (2011, p.61) said, "the philosophy behind this playing with form, this shift toward the visual quality of text, is a desire to free the word from its pure representational, designational function." The interactive design has rendered *Four-Minute River* a welcoming playground that invites all viewers to participate in the work, to interact with words and sounds, and to become part of the creation of the poem. Therefore, this artwork manifests ideas and concepts of the concrete poetry movement from multiple angles.

4.4.2 Challenges and implications in the process of creation

In the production process of the work, the most important problem is the perception of concrete poetry in interactive works, as the concept and creation of contemporary interactive poetry are more open and diverse than those of the 1950s and 1960s. *Four-*

Minute River, as part of my research, has a research purpose. Therefore, from a creative perspective, whether in relation to visual, audio, or interactive design, I always remind myself to approach this work from the perspective of a concrete poet.

However, it is difficult for a person with limited programming experience to complete an interactive work of art. Even if we choose to work with a programmer the results will depend upon the quality of communication between artist and programmer, and a shared understanding of the potentially abstract nature of the content.

To a certain extent, artists need to reach a compromise with technology. For example, in my own research, the word ‘river’ was designed in a total of four versions. The main difference between these versions is that different programming languages will lead to different effects of water flow. Fortunately, after many communications with programmers, the desired results were achieved.

4.4.3 Post-production reflections

Reflection and evaluation of work is an important component of my research, as it helps in tracking problems and thinking about the relationship between technology and art. In addition to summarizing and analyzing the problems deriving in the process of creating *Four Minute River*, I will discuss and reconsider the works according to feedback from various audiences after each part of the work had been completed.

Some of the reflective thinking about *Four Minute River* became evident in the exhibition process. Upon completion, *Four-Minute River* was exhibited in the Ruskin Gallery, Anglia Ruskin University in Cambridge, in 2016, North China University of Science and Technology, Tangshan, in 2017 and 798 Art Hall in Beijing, in 2017. These exhibitions not only promoted the interactive poems to the public, but also allowed more people to interact with the artworks, thus giving me more opportunities to test and reflect, and insightful feedback.

For example, in my double solo exhibition ‘From Space to Space’ with Zuyi Kang in Beijing 798 in 2017, one obvious problem is that while, as an interactive work, it is open to every participant in the process of interaction, as each one completes the composition of the work, the audience seemed to engage more with playing with the dynamic texts. This phenomenon made me rethink the role of participants in an interactive concrete poem. By definition, an interactive poem depends upon the participation of its audience, and the different interactive behaviors of participants determine the possible readings of the work. This raises the question of how best to ensure that participants respond to an interactive poem in terms of underlying meaning, rather than simply interacting as they would with a game.

In my opinion, playfulness is not only a positive quality in the work and demonstrates the concepts of ‘invitation’ and ‘playground’ mentioned by Gomringer, but also a good way to attract the audience to experience and complete the work. Nonetheless, the problem remained that people did not seem to have paid much attention to content except playing with texts, and a good volume of feedback only evaluated overall quality of the work according to the smoothness of programming.



Figure 27 Zhang, M., 2016. *Four-Minute River*. ‘Theorem’ [exhibition] Ruskin Gallery, Anglia Ruskin University, Cambridge.



Figure 28 Zhang, M., 2017. *Four-Minute River*. 'From Space to Space' [exhibition] 798 Art Center, Beijing.

This phenomenon resembles the problems reported by. Kruglanski, an interactive poet and writer born in Israel, is committed to creating literary works on interactive media, and uses a personal computer and peripheral equipment to create her artworks. Her poems explore the role that interaction plays in constructing meaning and reinforcing poetic intent. As an experienced practitioner of interactive poetry, in her 2007 article entitled *Interactive Poems* (which was published in *Media Poetry*), she discussed interactive poetry based on her own practical experience and summarized her thoughts about problems she encountered while composing her poems. For instance, in regard to her interactive poem *As Much As You Love Me* (2000), she was disappointed to find that viewers paid more attention to the gaming aspect while they were interacting with the work. In her later works she tried to break away from the fixed script and create poems that provide people with different experiences every time. She observed that people like cutting-edge technology and if poets cannot fully grasp and achieve a good balance, they will end up turning poetry into merely a game. Therefore, those who consider themselves poets ought to think about how they can integrate the gaming aspect into their work without it becoming the actual message received by viewers and the only aspect of interaction. In other words, current digital poets need to think about ways to make the most out of the use of technology. Therefore, I reconsidered the relationship between interactive media and concrete poetry and whether this extensive focus on technology will diminish the meaning of the work itself. More and more works of art are showing what computers can do for us. (Simanowski, 2011)

Neil Postman presented his views on the relationship between technology and human life in his book *Technopoly, the Surrender of Culture to Technology* (1993). He says

that, with the development of science and technology, human beings regard technology as a friend and fully trust and rely on it. But in fact, technology without ideology may be void, so people should regard it as a tool to help us build a better life, instead of relying too much on it and trusting technology to the effect that it compromises culture, our way of life, and our ability to progress. In other words, technology should not negate or replace culture and art, because it is only a tool. Thus, when we evaluate digital or interactive artworks that put the emphasis on the effect of technology rather than content, we can say whether an artwork is technically accomplished or not, but we cannot measure its artistic value, because such artists are prioritising technology above consciousness. However, when Postman expressed his views in the 1990s (before the ‘second digital revolution’ of online interactivity), computer science was still a work in progress about to undergo unforeseen development and cutting-edge technology was limited to personal computers and TV. Perhaps if Postman's point of view is reviewed in the context of current technology, it need not be so negative. The focus on form rather than content reminds us of the dictum of Theodor Adorno in 1984: what makes a piece of art socially meaningful is not content, but form. With this view, it is easy to understand why some artists dedicate their technical expertise to achieving a magnificent performance, which purpose is to capture the attention of the audience. (Simanowski, 2011, p.71)

In July 2018, looking to respond to the question of the relationship between interactive media and poetry, I had an conversation with Chinese new media artist Haozhe Li, who once worked for Teamlab. As a new media artist with a background in both computer and art, he might be able to provide a more objective, comprehensive viewpoint.

Our opinions about how artists balance the relationship between art and technology in creation have switched. Li (2018) thinks that the reason why the use of technology weakens the content of works is that many artists are keen on using the latest AI technology without precise knowledge of the field. The complexity of Artificial intelligence(AI) far exceeds most artists’ ability to grasp such technical issues. A deep understanding of the design behind artificial intelligence requires a lot of time and experience, and it is therefore quite difficult for artists to incorporate artificial intelligence(AI) technology into their creations as they do with more familiar media. Most of the time, artists’ choice of media is driven by their passion for exploring new technology. Unfortunately, often they blindly surrender themselves to the pressure from clients or curators. Thus, limited understanding of medium renders their works shallow. Since the integration of art and technology is a great breakthrough in art, to the point that it may bestow an element of ‘magic’ to artworks, it is understandable that some artists hope to make a breakthrough in this field. However, most artists, like Li, choose focal points based on their initial, creative idea. As a result, they do not compromise

the content and concept they want to express by putting new technological breakthroughs at the core of their works.

Interactive concrete poetry imposes more strict limitations on artists than interactive artistic work. Interactive technology embeds the gaming element into poems, to the effect that gaming has already become an important component of contemporary interactive poetry. An interactive concrete poem however, viewed as poetry, will not negatively affect the poetic attributes of concrete poetry, as long as its visual and interactive elements relate directly to context and meaning. Therefore, to create a meaningful interactive artistic work requires artists and poets to use technology carefully, and not allow it to antagonize the poem. In addition, artists, poets, and viewers can work together to improve their understanding of interaction design and aesthetic perception of interactive works.

Chapter 5: The application of typography in interactive concrete poetry

As my understanding of interactive concrete poetry grows, typography, an important element of concrete poetic communication, has become even more significant. The expressive possibilities which typography has to offer elevate the format of poetry from purely conveying information in a text-based environment to the level of presenting lyric content visually (Urban, 1984). In concrete poetry, various subtle changes in form, weight, and proportion of letters and words can become important factors in expressing meaning and emotion. Therefore, both poets and designers who want to explore poetry from the visual aspect of the text, need to understand how to approach their subject-matter through typography. For the purpose of this study, to further understand the aspects of poetic communication of concrete poetry, the study of typography is an essential requirement.

Looking back on the development of concrete poetry, I see that each concrete poem expresses theme and content through a unique form and medium, and that it also manifests a unique expressive typography. The creation of print-based concrete poetry in the 1950s and 1960s mainly depended on the typewriter. Therefore, the typography was characterized by the innovative expression based on the fixed system of the typewriter; the main medium of expression of digital kinetic poetry in the 1970s and 1980s was the computer or other electronic media like video. Accordingly, kinetic typography, dynamic typography and temporary typography supported the generation of screen-based digital concrete poetry. Nowadays, the application of interactive media has added new forms of typographic expression, leading to new breakthroughs and possibilities. One of the most conspicuous features of concrete poetry in interactive media is that viewers who engage and interact with the work through body movement, become a part of the work. Thus, to understand the typography of concrete poetry in the interactive media, it is essential to start with the aspect of interactivity. However, the focus of this section will not be solely the discussion of technological innovation and development of the media, it will also entail an investigation of poetic content in expressive typography. In what follows, my analysis of the typography of interactive concrete poetry will revolve around three questions:

1. What is the effect and significance of expressive typography on concrete poetry, and especially on print-based concrete poetry?

2.What is the typography of interactive concrete poetry?

3.Through the analysis of VR Poetry, a case-study of an interactive project, how does typography assist poetic communication in interactive concrete poetry?

5.1 Expressive Typography in concrete poetry

“三十辐，共一毂，当其无，有车之用。

埴埴以为器，当其无，有器之用。

凿户牖以为室，当其无，有室之用。

故有之以为利，无之以为用。”

——老子《道德经》

Thirty spokes join at a hub: their use for the cart is where they are not.

When the potter's wheel makes a pot, the use of the pot is precisely where there is nothing.

When you open the doors and windows in a room, it is there where nothing is that they are useful to the room.

Therefore substance is for benefit, void is for usefulness.

——*Dao De Qing* by Laozi (translated by Thomas Cleary)

Dao De Qing, a representative work of ancient Chinese Taoism, dated to the Spring and Autumn period, is attributed to Laozi (initially named Li Er, 580 B.C. – 500 B.C.), and is considered a cohesive summary of Laozi's philosophy and perception of the universe. In Chapter 11 of *Dao De Qing*, Laozi presented three examples: cart wheels; pots; homes. Laozi believed that the function of carts does not rely on the axles, but on the empty space between them, because it is due to the seemingly hollow space that carts can run. Regarding pots, contrary to common belief that vessels can hold liquid because of their structural component, clay, Laozi saw that their usefulness relied simply on the internal, intangible space. Similarly, for Laozi the function of buildings also depended on the space between the visible, tangible elements, such as bricks, windows, and doors. After listing these three examples, he concluded that the function of being is for benefit, whereas usefulness lies with non-being. That is to say, it is space (non-being) that defines the values and attributes of things.

Laozi's philosophy provides a good starting point for reflecting on concrete poetry. In my view, the meaning of concrete poetry is actually achieved by non-being, by empty space that is both invisible and intangible, rather than letters or symbols. In other words, it is the very existence of the words and the space between them that leads to the materialisation of concrete poetry.

But then, what is space in concrete poetry? In their *Pilot Plan for Concrete Poetry*, the Brazilian poets stressed that 'space' (or graphic space) exists in concrete poetry as syntactic agent, and that the content of a concrete poem is conveyed through its own structure (namely structure = content or form = content). The meaning of typography in concrete poetry would be to find new ways to arrange and use the space between characters, and a new method to structure a poem. As the Italian designer Massimo Vignelli (2007) argued, typography examines the relationship between 'black' and 'white', where typography is 'white' (the space between characters) and the text is 'black'. Typography conveys information by arranging the space between characters, just like music, which is also defined by the space between notes. Concrete poetry cannot be separated from the arrangement of and the relationship between character and space, because the poetic expression is conveyed by such a relationship.

In the literature review I mentioned that typography has always influenced concrete poetry. Such impact is manifested in the influence of typographic experiments on concrete poetry in its early phases, and then on the exploration of the screen-based dynamic typography of concrete poems in the new media. In other words, alongside the change of medium, the understanding of space and application of typography are constantly changing.

From the beginning, concrete poetry depended on the typewriter, as most concrete poems of the early period were created with the use of this medium. Hence, a clear understanding of the typewriter is the first step toward fully understanding the typography of concrete poetry. One feature that distinguishes the typewriter from printing is that all letters have the same width, which provides a consistent, mechanical spacing and alignment to the creation of poetry. Accordingly, poets were inspired to create poems and instill more graphic ideas into them and, thus, to explore new possibilities. To further understand the technology of the typewriter and the expression of typography in the typewriter, I created two poems: *Another Me* and *A London Bird*.

Another Me is a concrete poem which consists of only the letter 'i'. Apart from conveying its own semantic meaning in this poem, 'i' also delivers a deeper meaning by means of permutation and superposition; it conveys the feelings of a person with dual personality. In the process of creation, I first arranged all 'i' letters into a matrix (which represents the personality of a person). Then, I removed the paper from the

typewriter, rotated it at a certain angle, reinserted it into the typewriter, and typed in an identical matrix to represent another personality on top of the original letter matrix. Where once there were two well-ordered matrices with the same letter-spacing, they now overlapped and produced a new kind of texture. Through this texture, one can view a visual illusion of movement. It is the visual illusion that reflects the feelings of the clash between the two personalities. This concrete poem conveys the context and meaning beyond the text itself only by using the letter 'i'. Such an effect should undoubtedly be attributed to the unique mechanics of the typewriter and the poetic content of expressive typography.

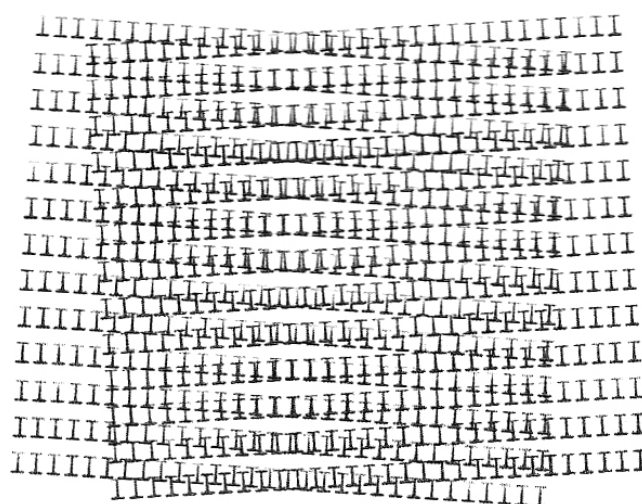


Figure 29 Zhang, M., 2016. *Another Me*. Cambridge.

Of course, not everything expressed with the use of the typewriter or expressive typography can be classified as poetry. To explore possibilities of works similar to both painting and poetry, I created a piece of 'borderline' work, entitled *A London Bird*.

In *A London Bird*, I explored another possibility of concrete poetry's typography, more concrete in visual expression. The background of this poem is a story about me and the city of London. Eight years ago, I left home for the first time and came to this mystifying city, feeling deeply confused and lonely. Once, when I was chasing a bus, I saw a dead sparrow on the side of the road. I thought that council services would remove the carcass quickly, but when I returned several hours later I found the little bird still there with a yellow flower lying beside it. I stopped immediately as I felt the love and warmth from the city. I transformed this experience into a concrete poem and added the forms of a bird and a flower by typing punctuation marks into the typewriter. I tried to restore an objective scene without using emotional descriptions or vocabulary of any

kind. The only expressive means were the punctuation marks, such as ‘,’ and ‘?’ . I chose ‘,’ to construct the body of the bird because the comma itself indicates a pause in a sentence, thus denoting that the meaning is not finished, in the same way that although the bird's life had ended in the story, the story itself did not come to an end. Instead, the appearance of the flower evoked a plethora of emotions. Hence, in the poem, I shaped the flower with the use of ‘?’ , which can either represent doubt over the identity of the person placing the flower, or the unknown of the city. Therefore, the meaning conveyed by the poem remains relatively open.

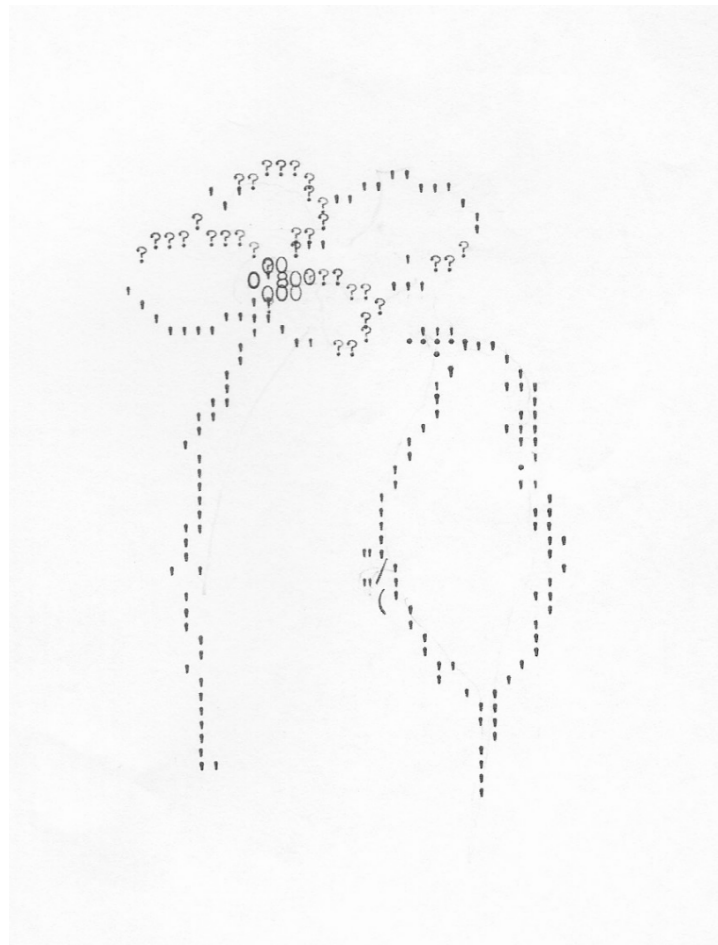


Figure 30 Zhang, M., 2016. *A London Bird*. Cambridge.

The visual element of the poem is so strong that the poem becomes more like a piece of ‘pattern poetry’ or a piece of typewriter art. Nevertheless, I termed it a concrete poem because the message and meaning conveyed do not spring out of the meaning of the icon of the flower and the bird formed in the poem. Its impact lies in the deeper content behind the picture shaped by the combination of the simplest of marks and spaces, in the absence of any readable text or words. Another contribution lies in its complex typography, which prompted me to further explore the mechanics of the typewriter and

the possibility of expressive typography of concrete poetry with the use of such a limited medium.

During the process of creation, I realized that the typographic characteristics of typewriter concrete poems mostly derive from the machine itself. Thus, poets ought to have a comprehensive understanding of the medium of concrete poetry they use and be sensitive to typography. Concrete poetry requires authors to master both the poetic aesthetic and the techniques of typographic design.

If we go back in time, we see that concrete poets in the 1950s and 1960s had already developed their own unique typographic styles. For example, the defining feature of typography of Gomringer's 'constellation' is demonstrated by the use of graphic space between letters and words. Gomringer substantially benefited from the semantic application of space and used a typewriter to construct a 'play area' to keep readers engaged. The features of his typography are often described as emotional and lyrical (Solt, 1968).

The common characteristics of Brazilian concrete poetry are the use of a bold, penetrating typeface, and the reinforcement of the visual message by creating contrast between the size of the letters and the space between them. The Brazilian poets made use of free and individual typography, accommodating the typeface as an integral part of the poem.

Some poems put more emphasis on pattern preference than communication, as in the case of Houédard's typewriter poems. Their defining feature is to integrate words into pictures with the use of certain typographical techniques of the typewriter. Arguably, his obsession with the typewriter's typographical technology has made his style unique. Although such poems are questioned for overusing expressive typography, for instance, being classified as typewriter art rather than poetry, I believe my *Another Me* constitutes an informed response: such poems cannot be considered just pictures, but poetry, provided that they apply the principle of space to the semantic potential of words.

In addition, concrete poems included in Solt, Williams and Benne's anthologies deserve further attention, as they all show use of unique typographical characteristics and convey different context by challenging the application of different styles of typography.

Besides typewriters, alongside the progress of the concrete poetry movement, radio, tape, computer and digital media were used to achieve more complex typography. The above-mentioned works, such as de Campos' *Sem Saída*, Melo e Castr's *Singagens* and Auer's *Worm Applepie for Delhi* demonstrate the transition from print-based concrete

poetry to digital concrete poetry. The constant experimentation with new media have not only led to changes in material and media of concrete poetry, but also to changes of perception. New functions, such as kinetic, dynamic, three-dimensional and temporal features, were added into the expressive typography of concrete poetry and shaped new techniques of expression in rhythm and emotion. To return to the questions I set at the beginning, in the context of the current human-computer interactive media, what is the current state of typography in concrete poetry? How have its roles and meanings changed compared with concrete poetry in the 1950s to 1960s?

5.2 Typography in interactive concrete poetry

The widespread application of digital media, such as computer and video, ushered in the transformation of concrete poetry from print to digital. Continuing changes to the media used by concrete poetry have provided more choices to reduce, supplement, or replace the role of language as a medium to convey meaning and emotions, and more technical methods to minimize the role of the author, thus achieving materiality and objectivity of the text, a goal pursued by concrete poetry. In light of this trend, the typographic design of concrete poetry transcends two-dimensional visual representation and adds dynamic, temporal, and other typographic features. Especially in reference to the typography of concrete poetry in the context of contemporary interactive media, its interactivity offers new visual experience and profound expression of meaning to concrete poetry.

In interactive concrete poetry, readers can perceive a poem in a more open way in terms of perception and action rather than simply seeing and reading the text. They can be much more than passive receivers of the text and become active participants in such works. When users type instructions on the computer, the computer immediately responds; in the same way, participants can choose and control the typographic content of the interface at will to actively access the desired information. Therefore, in such a medium, interactive typography can be regarded as a technique which provides the layout for interactive information, based on computer interaction with the use of an electronic screen or wall projection as carrier; an integration and intersection between design (typography) and design (programming). This understanding proceeds from the perspective of design, mainly for web design, interactive interface and interactive text, which purpose is to emphasize the function and convenience of using web and searching information. However, when interactive typography is applied to concrete poetry, its purpose is not only to emphasize directive function of the text on the screen or the interface and the accuracy of information, but also to help construct poetic dialogues among the text, visual space, and participants. I will now discuss several characteristics of typography in interactive concrete poetry.

The emergence of three-dimensional graphics and programming software provided new ways for three-dimensional programming and typographic design, which presents the text of some poems in 3D, in a way similar to architecture (Miller,1997), while the space where the text is located is also a three-dimensional environment. 3D type and 3D environment mainly refer to the virtual-3D visual experience showing on screen. Since the screen is flat, it represents distance through difference of scale to create a virtual 3D world, which enables the audience to immerse in a 3D environment similar to the real world.

Typographic design in a three-dimensional environment increases the spatial depth and movement by increasing the dimension visually, but it doesn't mean that typographic design in the three-dimensional environment does not need to abide by the principles of two-dimensional typographic design. As Cho (1999) wrote: when we study 3D typography, we should not regard it in isolation as a unique or special case, consider it in relation to 2D typography. During the process of dimensional typographic design, the designer may unconsciously resort to reduction of dimensionality (e.g. to observe a two-dimensional effect from a three-dimensional perspective). For instance, the designer may consider the arrangement and size of each line and point to ensure the quality of the overall picture. In 3D design, the designer will place the object on a 2D plane and determine whether the composition of the product has achieved the desired 3D effect by viewing two-dimensional layouts from different angles. It is similar to an architect who continuously adjusts his or her work to achieve the optimum 3D effect by viewing a series of two-dimensional compositions, such as front, left, rear, or top view, by way of parallel projection. It is for this reason that most 3D-design software offers various viewing windows, such as front, left, and top view.

So, what does typography with three-dimensional characteristics contribute to the poetic communication of concrete poetry? Brownie (2015) argued that, because each side of a three-dimensional object may have a different 2D shape and carry different information, designers can bestow different meanings on a 3D object. For instance, a single 3D type can be deemed as a specific word when viewed from the front, but a completely different word when viewed from another side. Each message can be read from a different perspective. Although each viewing conveys different information, they are all correct. Thus, 3D typography not only increases the visual spatial depth of the poem, but it also adds new meaning to every word in the poem.

Other types of typography in interactive concrete poetry can achieve the change from static to dynamic, and present the temporal characteristic. Traditional typography constrains the relationship between text, image and space by the rigidity of the page; however, typography in interactive media no longer poses such restrictions. All components can be modified according to instructions given to the user and their

relationship can be transformed temporally. As Brownie (2015, p.59) said, “Any text that is interactive necessarily has a temporal dimension, since it exists in different states before and after user interference.” It exists temporarily and then it is gone. Its state is determined by time and its meaning can be considered from this transformation process.

The effect of temporal typography on concrete poetry is to change not only its space layout by including the aspect of time, but also the nature of information (the change in textual meaning). That is, temporal typography helps concrete poetry to convey meanings that would otherwise have been conveyed by language and enhances its expressive force. It conveys emotions, such as joy, sadness, agitation in forms other than language, beyond the meanings of language by using the inner rhythm and motion of the text, and the expressiveness of the text style (Brownie, 2015). As the aspect of time offers additional expressive possibilities to the poetic communication of concrete poetry, the impact of temporal typography on concrete poetry exceeds the potential spectrum of traditional static typography.

Apart from being three-dimensional and temporal, another important characteristic of typography of interactive concrete poetry is, unsurprisingly, interactivity. Some misunderstanding may occur when the term interactive is used to describe the typography of interactive works, due to the wide applicability of the term, as it can be used to describe interaction in both computer-generated and non-computer-generated works (Brownie, 2015). Therefore, Megan Sapnar (2003) suggested a more specific term to describe the typography of interactive media, that is, reactive typography.

The concept of reactive typography originates in the interaction between the user and the work. For instance, in an interactive work, the user reacts in accordance with the content of the work, whereas the work responds to the user in ways based on the user's action. Through a series of reactions, reader and work together construct a complete story. Reactive typography has contributed to interactive concrete poetry not only a temporal dimension, but also a new framework for the reader's perception.

If reactive typography is a kind of typography linked to the user's behavioral response, generative typography examines ways to derive typographic behavior from the content of the work itself. The concept of generative typography originates in the behavioral design of each text of the work; that is, the designer can embed data in each letter in the poem so as to cause it to respond to specific interaction. The text itself is endowed with a certain behavior, thus reacting to environmental data and causing more unpredictable reactions on the part of the user. Generative typography, widely expected to be a new way to manifest the design of text in the future, affects the behavior of the font with the use of a unique code driver and algorithm. Both reactive typography and generative

typography are parts of the same temporal interactive system, yet the significance of typography is manifested through them from different perspectives.

As can be seen in various typographic features of interactive concrete poetry, the expressive typography of print-based concrete poetry has been transformed into a living experience with three-dimensional, temporal, and interactive characteristics. To further analyze the role of such type of typography in poetic communication, I have created an interactive concrete poem based on VR media.

5.3 *VR Poetry*

VR Poetry is an immersive interactive concrete poem that uses VR technology to integrate Chinese ink landscape into Western concrete poetry. The source of inspiration came from an ancient Chinese poem from the times of the Northern and Southern Dynasties (A.D.420-589), where it is written that “The forest is more peaceful while cicadas are chirping; the mountain is more secluded while the birds are singing” (translated by Xu Yuanchong). When participants put on their VR helmets, a virtual ink-style 3D environment appears vividly in front of their eyes, as is described in the poem, which can be rotated to a full 360 degrees. The environment comprises static elements, such as mountains, water and bamboo forests, as well as dynamic elements, such as birds and insects. I chose the VR helmet as the visual medium for this poem because of the sense of reality in the immersive experience that VR offers to users, generally unattainable by other media. Arguably, VR is the ideal form currently available to achieve a reasonably realistic virtual space. In such an environment, participants seem to enter a new world full of poetry. The elements of cicadas and birds in the forest are replaced by the English letters ‘oe’ and ‘chirp’ respectively (the onomatopoeia of cicadas and birds). They are flying within the virtual space, in contrast to the quiet, empty bamboo forest. Their motion reflects the silence and tranquility of the landscape, thus creating a lyric atmosphere, which combines motion and silence.

To create this effect, I first divided the 360-degree circular 3D space into several planes with different view angles. Through constantly adjusting, comparing and matching these planes, I fully integrated each element of the poem into the whole 3D environment. Besides visually enhancing 3D effect, the poem increases the kinetic by applying temporary typography, which enables the letters ‘oe’ and ‘chirp’ to represent the flying patterns of cicadas and birds, as they shuttle back and forth in the bamboo forest. By changing the sizes of ‘oe’ and ‘chirp’, I conveyed changes in distance, so that participants can feel cicadas fly nearby from a distance. The motion of ‘oeoe’ and jump of ‘chirp’ is composed of static planes frame by frame, and of smooth kineticism with the use of temporal typography, thus conveying the meaning beyond the letter itself.

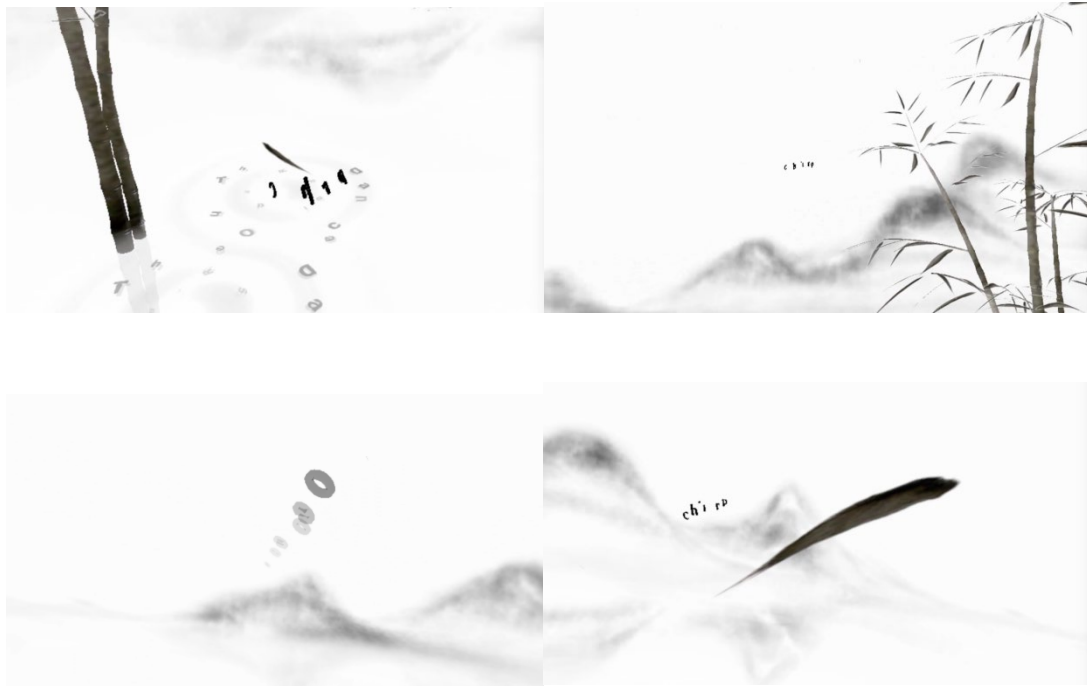


Figure 31 Zhang, M., 2017. *VR Poetry*. [video] Available at: < <https://youtu.be/HmM2OS9lp3M> >.

In addition to achieving kineticism in a three-dimensional environment, this project also manifested an interactive experience of poetry. When the reader walks within a limited space, his/her feet will cause ripples on the ground, which enhance the participant's visual impression of being in the forest and the artistic concept of the quiet and secluded forest.

After completing the *VR Poetry* project, I reflected on the outcome. First, this work achieves the transformation of interactive poetry from 2D to 3D and kinetic expression and reflects the application of 3D typography and temporary typography. I realized the significance of typographic design in poetic communication in interactive media. However, there are some limitations. For example, this project contained only one human-computer interactive experience (namely, the ripples formed underneath the user's feet whilst walking). This inevitably restricts the scope of the study of reactive typography or generative typography in this poem. Second, I pinpointed another issue: although the VR helmet can provide users with a more realistic VR impression than the screen, it is not real space after all. Based on a screen (through the helmet and lens), it cannot really allow viewers to walk into a poem. To that end, I created another interactive installation poem entitled *Mimosa*.

Chapter 6: Final Project: *Mimosa*

6.1 From Brossa's Visual Poetry to *Mimosa*

Barcelona is particularly rich in environmental typography. Among the many contributors to the lyric character of the city, Joan Brossa is a key figure. Brossa was a poet who explored pathways of visual expression in poetry. In 1984, he presented his visual poem *Transitable Visual Poem in Three Times* in Barcelona and achieved something that paper or any other object simply cannot: making poetry accessible to everyone. He blended his poems into the city and integrated letters with the colors, culture, history and architecture. In his own words, 'Real space is the supporting substance of the poem, with all the plethora of possibilities it entails.' Similarly to Finlay's garden, his poems belong to the city and the world. In February 2019, I visited Barcelona and wandered from Brossa's *Barsino* to *Grasshopper*, then *Homage to the Book*, and finally viewed the *Transitable Visual Poem in Three Times* in Horta Velodrome, which proved inspiring for my research.

The *Transitable Visual Poem in Three Times* is a poem made of concrete and embodies Brossa's vision to create poetry without borders. It comprises three parts representing birth, life, and death. Along the route suggested by the poet, visitors step into the poem, starting from a 12-meter-high sculpture of the capital letter A. As viewers continue to walk, they come across several punctuation marks (commas, full stops, question marks) scattered on the grass, where people can freely wander. In the end, visitors reach a sculpture of a broken letter A, fractured and overturned, which represents an abrupt ending and destruction.



Figure 32 Brossa, J., 1984. *The Transitable Visual Poem in Three Times*. [photograph] (by Meizi Zhang, 2018)

Essentially, this poem creates not only a wordplay, but also a multi-dimensional poetic dialogue about the meaning of life. To partake in the dialogue, visitors must walk in and complete the entire route to fully grasp the meaning of this work of art. From the A to the punctuation marks and then to the broken A, visitors will be amazed at the variety of signals and emotions they received from viewing various symbols, as they will experience the multitude of human emotions, from happiness to sadness. As Aldridge (1972) said, “Viewing a concrete poem is an experience of meaning that takes place between the viewer and the placement of the words, while ‘normal’ poetry is enhanced by listening to the rhythm of the words spoken.” Brossa usually uses letters rather than semantic or readable words to vividly project such an experience of meaning. His works therefore cannot be regarded simply as sculptures or architectural monuments, but as visual poetry.

As I mentioned above, Brossa's work proved a source of inspiration and caused me to reflect on the poetry I created. During my research, I tried to demonstrate the impact of technological progress on printed concrete poetry through my *Four-Minute River*, and I used VR technology to offer people the opportunity to explore a poem and its cultural context within a virtual, three-dimensional space. Initially I planned to use some of the most cutting-edge technology to upgrade concrete poetry onto a new field. However, after viewing Brossa's visual poetry and wandering into the space between the two letters, I began to reflect on the works I created before. I considered that people never walk into poetry, because they remain restricted within a two-dimensional interface. Although I discussed the 3D typographic design in VR poetry, it was still restricted into the screen. I decided to detach interactive concrete poetry from the

screen, so that I can create a true poetic space and construct lyric dialogues from the real world, as well as a form of interactive concrete poetry that allows participants to walk into the artwork to fully immerse themselves into the dialogue. After all, to remind ourselves of Brossa's vision, real space supports the poem with all the wealth of possibilities this entails.

6.2 Final Project: *Mimosa*

Mimosa is a plant which exhibits patterns of interactive behavior, as it reacts to external stimuli by opening or closing its leaves and has been occasionally named the shy or sensitive plant to account for its characteristics. It is therefore an appropriate choice for the project described below, as well as a challenge in presenting it through a concrete poem combined with interactive media.

My final project, *Mimosa*, is an interactive installation built in a closed dark room and consists of 85 three-dimensional letter lamps arranged in a matrix form. The letters included in the artwork (m, i, o, s, a) form the word 'mimosa', can be viewed from multiple angles and present the viewer with a range of choices, as there is sufficient space among the letters for participants to wander around. The subject of the poem is the mimosa, whose poetic expression is not only reflected in the semantic meaning formed by the letters, but also in the interactive environment among participants. When participants touch a letter, it suddenly brightens before gradually regressing to its initial form after five or six seconds. This represents the mimosa's responsive, interactive behavior to external stimuli.

6.2.1 The typography of *Mimosa*

Compared to other interactive concrete poems, the most important breakthrough of this project is the successful detachment of interactive poetry from the screen and the subsequent presentation of a poetic creation within a real space. Regarding its visual typographic design, I placed the letter M at the center and scattered other letters around it. The purpose of this arrangement was to determine the way the mimosa itself stretches from the rhizome and reacts to its surroundings, and to present a 'plant' installation consisting of 85 3D-letter lights. I selected Helvetica as the typeface for the design of 3D letters, a modern yet not overly expressive font. Helvetica is easily legible, as its design does not absorb or distract people's focus; this is of particular importance, since poetic communication in the concrete poem *Mimosa* mostly depends on typography, rather than on the expressive design of a single font.

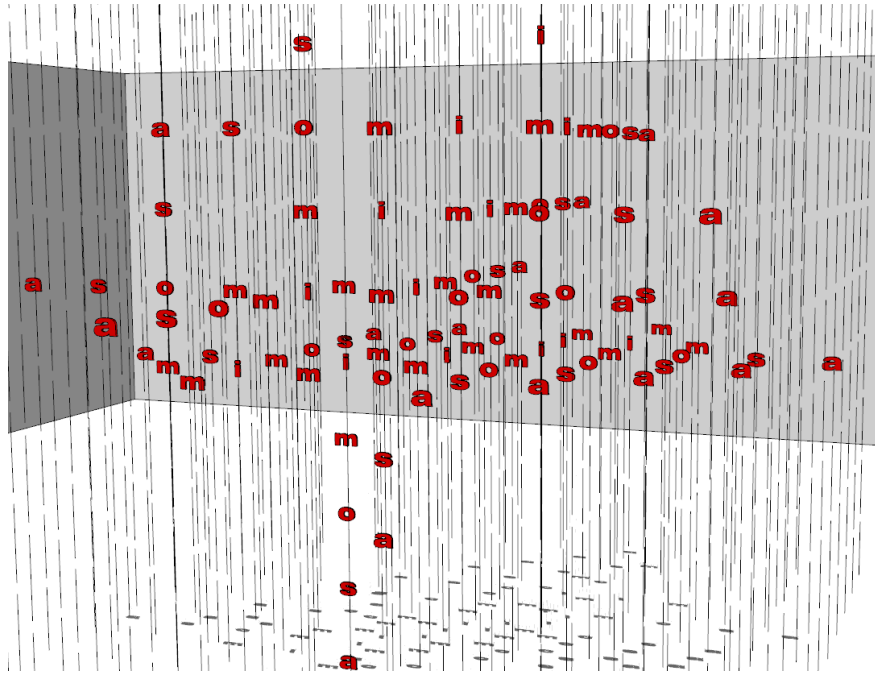


Figure 33 Zhang, M., 2019. the design process of Mimosa. Cambridge.

In the static phase before any interaction has occurred, all letters are dimly lit, so that participants may identify and read them. The letters are of the same size and brightness, to ensure that the typography does not provide any visual guidance in this phase. The sequence of identification of all letters and the plethora of possible word formations depends on the choice, intention, and perception of the participants. They can touch any letter they select in the letter matrix and can spell ‘mimosa’ in different styles, or even choose to form other words. When they stretch out their hands close to or to touch any letter, it will become brighter, an effect meant as a replication of the mimosa’s response to external stimuli. Brightened letters do not return immediately to their initial condition, but fade gradually after five or six seconds. This design not only reproduces and adheres to the natural characteristics of the mimosa, but also allows a certain amount of time for viewers to identify words or texts. By studying such interaction, we can see that a kind of temporal typography has been generated. Meanwhile, the interaction between text and participants reflects the application of reactive typography and generative typography.

6.2.1 The technical requirements of *Mimosa*

The completion of this kind of poetic work requires complex technical support. The generation of interaction in this work relies on detecting the infrared (10um) radio-activity of the human body. Infrared radiation emitted by the human body is enhanced by the filter and gathered at the infrared sensor source, which releases a charge when it receives the infrared radiation of human body, and generates a signal. This mechanism

has two advantages. First, it is very sensitive to the infrared radiation of the human body, thus quite capable of controlling the ease of interaction. Second, it can adjust the distance of detection and the time of induction output, and thus create not only a delay of five to six seconds after the first interaction, but also a response when participants only approach the installation without touching. From the perspective of environmental protection, sensors do not generate any type of radiation and the entire installation does not take up much space.

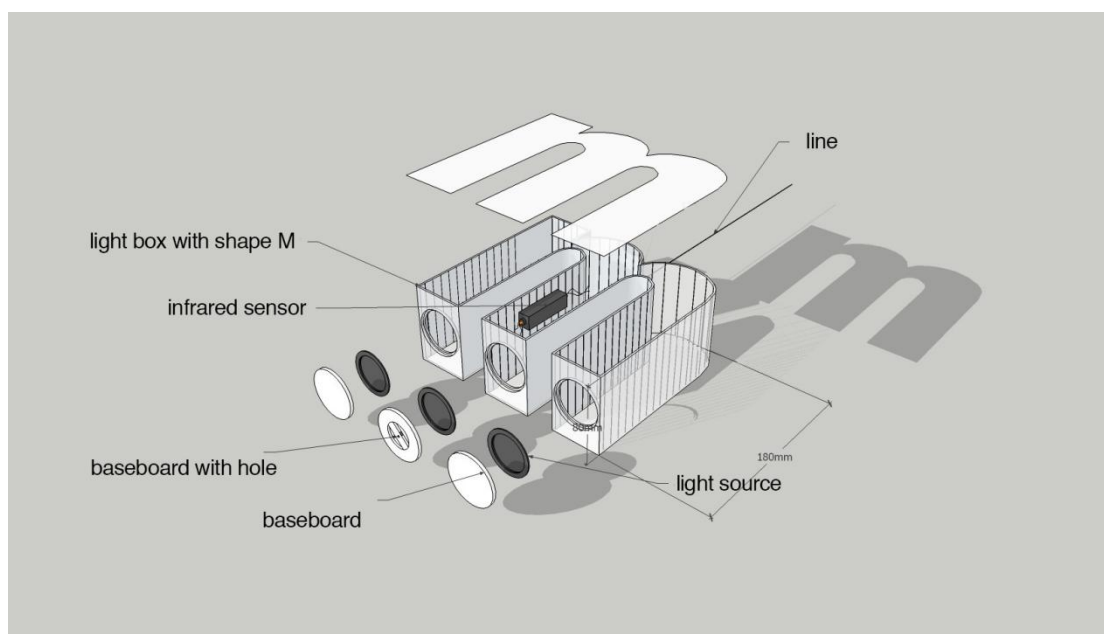


Figure 34 Zhang, M., 2019. letter 'M', 3D font example of *Mimosa*. Cambridge.

Overall, the concrete poem *Mimosa* creates an interactive, real three-dimensional environment and invites viewers to actively participate and visually and mentally reshape the whole construction after physically walking into a poem. Its significance derives from the text and interactive behaviors, and it involves the support of other types of interactive typography. As in *VR Poetry*, it shows again the essential role typography of interactive concrete poetry. In retrospect, *Mimosa* helped me realize that creating an interactive concrete poem ought to be people-oriented in principle, which is an indispensable concept in all designs based on human-computer interaction, because concrete poetry requires designers not only to create an appealing environment from the poet's perspective, but also to build an open platform for readers and invite everyone to participate. To ensure that participants become an important part of the work, designers must evaluate their work from the participant's viewpoint; a thorough consideration of the possibility of their behaviors is of the utmost necessity in the process of artistic creation.

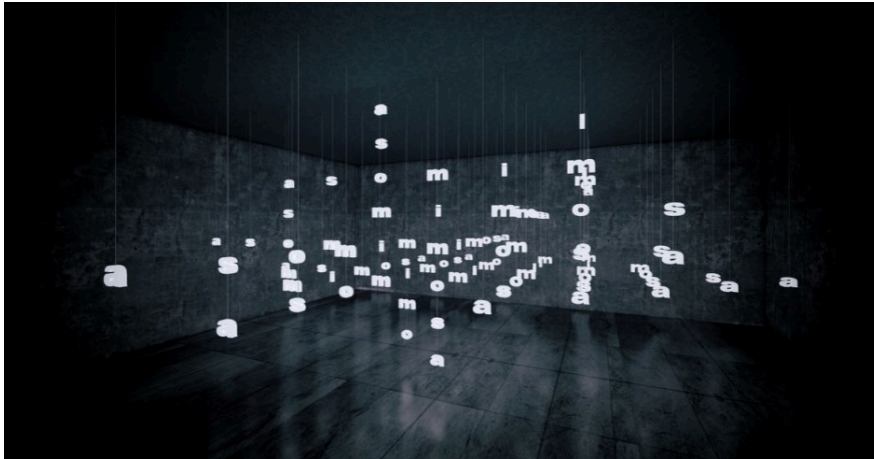


Figure 35 Zhang, M., 2019. the design visualiser of *Mimosa*. Cambridge.

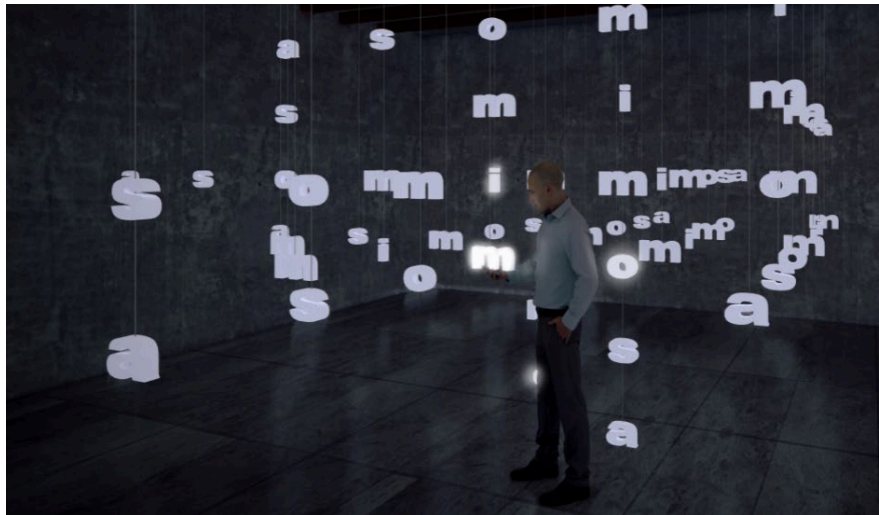


Figure 36 Zhang, M., 2019. the interactive design visualiser *Mimosa*. Cambridge.

Chapter 7: Conclusion

7.1 Summary

The purpose of this research was to explore aspects of poetic communication in interactive concrete poetry and fill the relevant gap in scholarly knowledge. To that end, I explored the forms and methods of poetic communication through a number of concrete poems with the use of various media and analyzed many aspects, such as visual representation, media, typography, and communication of meaning, in full consideration of the importance of practice.

At the beginning of the study, by means of four print-based concrete poems I explored the characteristics of concrete poetry in the 1950s, which used the typewriter as a medium. Furthermore, I explored patterns and outcomes of the transformation of concrete poetry from print-based to digital and kinetic. *Four-Minute River*, the interactive poem I created during the research, revealed the forms and patterns of poetic communication of interactive poetry in interactive media, and provided a clearer understanding of interactive concrete poetry through practical engagement with the material. Moreover, this allowed reflection on the meaning of interactive concrete poetry and the role of typography in poetic communication. All these factors confirmed the choice of *VR Poetry* to explore the effect and significance of interactive typography on poetic communication of interactive concrete poetry, including 3D, temporal, reactive, and generative typography. Certainly, *VR Poetry* communicates meaning in its own way, but presents neither too many interactive characteristics nor the significance of reactive and generative typography as discussed above. Therefore, after summarizing the problems in the practices above, I created one last work, *Mimosa*, a concrete poem with immersive and interactive functions, which incorporated previously established theoretical and practical breakthroughs. This artwork demonstrated the function and significance of interactive typography in interactive installation works, provided responses to academic questions in this field and filled the gap in scholarly knowledge.

7.2 Conclusion

As a form evolved from concrete poetry, interactive concrete poetry creates new possibilities by making use of advanced technology and clearing a pathway to previously unexplored aspects of poetic creation. The use of interactive media detaches poetry from the subjective consciousness of the author and invites all readers to participate. Access is not restricted to reading text, but communication of meaning occurs via an interaction between readers and the work and requires the participation

of readers , who now become viewers and active participants. Although it differs considerably in form of expression from traditional concrete poetry, interactive concrete poetry had always maintained the concept and spirit of constructivism of the concrete poetry movement in the 1950s; that is, in the view of the text as a material object, and of content and form as interdependent.

Similar to the use of the typewriter in the earlier phases of concrete poetry, poets experimenting with interactive concrete poetry ought to understand its typography and the challenges posed by new media, because most of the latter require not merely computer-word processing, but also complex programming to complete the behavioral design of a letter or word (or any other dynamic form of expression with an interactive function). However, that kind and level of professional knowledge far supersedes the skills most artists, designers, or poets possess. Consequently, if a designer intends to develop an interactive concrete poem, he or she must have not only the aesthetic knowledge of typography, but also at least sufficient knowledge of advanced programming and coding skills to be able to conceptualise interactive works.

In addition, designers and artists also need to realize that although the medium can change reading habits and approaches to poetry, and each poet can express their own themes by integrating their creativity and various media, a medium is just a medium, these experiences and techniques would not in themselves constitute concrete poetry. In other words, it can become concrete poetry, but need to satisfy other requirements as well in order to do so. Therefore, this demands of readers and designers an improved understanding of interactive works. When engaging with an interactive poem, readers must further probe into its meaning, so that they can proceed beyond the first impression without confusing special effects with poetic expression, whether for its visual or interactive function.

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