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Self in Psychodramatic Action“

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DEDICATIONS

To My Father Munthir: You live in our Memories

To My Mother May: For being my role model

To Michi: For being you!

To Christine Pichlhöfer: For inspiring my thesis and for your support

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CONVENTIONS

Throughout this work, the singular third-person pronoun ‘they’ as an epicene (gender-neutral) will be used instead of masculine or feminine pronouns for referring to the participants of any gender, Unless the gender is intended to be specified.

ABSTRACT

A role-playing game is utilized to enact and embody a player's multiplicity of positions and the interaction of these positions. The play provides a safe environment in which a player explores an issue from different perspectives. The motivation is born from the concept of inner speech, a tool at our disposal and a way of accessing our thoughts. Past studies have shown that inner speech can have a self-regulation and self-guidance function. Inner discourse can be dialogical, according to the Self Dialogic Theory (DST). DST states that there is a multiplicity of positions or voices with a dialogical relationship in a self. In this sense, the inner dialogue includes questions and answers, arguments and counterarguments, or assertions and negations among its positions. One possibility to trigger and externalize the inner dialogue is to play the roles of the different positions with a moderator or director to facilitate the process, as used in one-to-one psychodrama. Psychodrama is a method of communication via spontaneous role-playing. It acknowledges that situatedness, embodied, story-telling, and social context, play an essential role in learning, and it can be used to address and solve various problems. The general idea of this method is to create dramas at the moment, without script or rehearsal, and to depend solely upon the spontaneous creativity of the players. Psychodrama agrees with the DST view of the multiplicity of inner positions and calls them inner parts. This study explores the role of a dialogical self as a tool to negotiate a topic for the goal of learning in a broad sense. The methodology is mixed, quantitative, and qualitative. A quasi-experiment is conducted on one sample group (24 Participants). Pre-and post-intervention, the participants are asked to fill out a questionnaire that assessed attitudes and perspectives related to the topic. The quantitative and qualitative findings diverge. The quantitative result shows no statistical significance regarding the effectiveness of the intervention, while the qualitative result and the Meta-Inference show learning effects. Psychodrama is an individual (or group)- centered activity, while a serious game is a topic-centered activity. The change in psychodrama is to one's perspective to oneself and personal narrative, while in serious Play/games, the change is to one's perspective to the theme of the learning subject. Thus, in spite of that the intervention does follow psychodramatic theories and techniques, it opens the possibilities for a wide range of applications in the realm of serious play/games.

Keywords and Phrases: Inner speech, Dialogical self, Role-play, Serious play, Psychodrama, Mixed method, 4E cognition

ZUSAMMENFASSUNG

Ein Rollenspiel wird verwendet, um die Vielzahl der Positionen eines Spielers und die Interaktion dieser Positionen darzustellen und zu verkörpern. Das Spiel bietet eine sichere Umgebung, in der ein Spieler ein Thema aus verschiedenen Perspektiven erforscht. Die Motivation ergibt beruht auf dem Konzept der inneren Stimme, einem Werkzeug, das uns zur Verfügung steht und Zugang zu unseren Gedanken ermöglicht. Frühere Studien haben gezeigt, dass die innere Stimme eine Selbstregulierungs- und Selbststeuerungsfunktion haben kann. Diese innere Stimme kann dialogisch sein, so die Selbst-Dialogische Theorie (DST). Laut DST gibt es in einem Selbst eine Vielzahl von Positionen oder Stimmen, die in einer dialogischen Beziehung stehen. Insofern beinhaltet der innere Dialog Fragen und Antworten, Argumente und Gegenargumente oder Behauptungen und Negationen zwischen seinen Positionen. Eine Möglichkeit, den inneren Dialog auszulösen und zu externalisieren, besteht darin, die Rollen der verschiedenen Positionen mit einem Moderator oder Regisseur durchzuspielen, wie es im Psychodrama mit einer einzelnen Person verwendet wird. Psychodrama ist eine Methode der Kommunikation, in der spontanes Rollenspiel verwendet wird. Die Methode geht davon aus, dass Situiertheit, Verkörperung, Geschichtenerzählen und sozialer Kontext eine wesentliche Rolle beim Lernen spielen, was verwendet werden kann, um verschiedene Probleme anzugehen und zu lösen. Die Idee dieser Methode ist es, Dramen in dem Moment zu kreieren, ohne Skript oder Probe, und sich ausschließlich auf die spontane Kreativität der Spieler zu verlassen. Das Psychodrama stimmt mit der DST-Ansicht von der Vielfalt der inneren Positionen überein und nennt diese innere Anteile. Diese Studie erforscht die Rolle des dialogischen Selbst als Werkzeug zur Verhandlung eines Themas mit dem Ziel des Lernens. Die Methodik ist gemischt, quantitativ und qualitativ, was als Mixed-Methods-Konvergenz Embedded Design bezeichnet wird. Ein Quasi-Experiment wird mit einer Stichprobengruppe (24 Teilnehmer) durchgeführt. Vor und nach der Intervention werde die Teilnehmer gebeten, einen Fragebogen auszufüllen, der Einstellungen und Perspektiven in Bezug auf das Thema abfragte. Die quantitativen und qualitativen Ergebnisse divergieren. Das quantitative Ergebnis zeigt keine statistische Signifikanz in Bezug auf die Wirksamkeit der Intervention, während das qualitative Ergebnis und die Meta-Inferenz Lerneffekte zeigen. Psychodrama ist eine individuell (oder gruppen)-zentrierte Aktivität, während ein Serious Game eine themen-zentrierte Aktivität ist. Die Veränderung im Psychodrama ist die Veränderung der Perspektive auf sich selbst und die persönliche Erzählung, während in Serious Games die Veränderung der Perspektive auf das

Thema des Lerngegenstands ist. Obwohl die Intervention also psychodramatischen Theorien und Techniken folgt, eröffnet diese Art der Intervention die Möglichkeiten für ein breites Anwendungsspektrum im Bereich der Serious Games.

Schlüsselwörter und Phrasen: Inneres Sprechen, Dialogisches Selbst, Rollenspiel, Serious Play, Psychodrama, Mixed Method, 4E-Kognition

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1 Introduction

“What am I going to do?”

“No idea!”

“[...] But you have to do something.”

“Just forget about it.”

“How about doing it like that [...].”

“I might! It sounds not bad at all.”

“Yes, that's it!”

This is a conversation among different positions, but it is not an interpersonal conversation spoken aloud (overt speech). It is instead a private silent intrapersonal inner dialogue within a self (covert speech). The format of this conversation is experienced in a condensed way, as notes, referenced to a self only. Probably you experienced this phenomenon of *innerly* speaking within yourself, or you do that on a daily basis. Nevertheless, inner speech is not necessarily a universal phenomenon. Some people report no experiences of inner speech. They use rather other vehicles for carrying their thoughts than language. In the context of this study's experiment, all participants reported subjectively that they entertain inner speech with varying degrees. While self-talk plays an important role in the mental life of many, current research on the phenomenon of self-talk is relatively under-explored.

The research questions are influenced by and rooted in the work of Lev Vygotsky (1929, 1980, 1987; 1986). Vygotsky is a Russian developmental psychologist who, in the 1920s, observed that children at an early age start to have a private speech, i.e., a speech directed towards the self but spoken aloud. Later this speech develops to be increasingly muted until it is mostly silent and internal, the so-called inner speech. Hurlburt and Heavy (2008), while investigating the pristine inner experience using Descriptive Experience Sampling (DES; Heavey & Hurlburt, 2008; Hurlburt et al., 2013; Hurlburt & Akhter, 2006; Hurlburt & Heavy, 2006), they found that inner speech is one of many common inner experiences.

In the inner speech example, it seems to be more than one position involved in a dialogue. Inner speech has a dialogical quality as a conversation among different parts, positions, or voices with varying viewpoints. A recent theory based on the idea of the dialogical inner speech is the Dialogical Self Theory (DST; Gieser & Hermans, 2012; H. J. M. Hermans & Dimaggio, 2004; H. J. M. Hermans & Hermans-Konopka, 2010; Hubert J. M. Hermans et al., 1993; Hubert J. M. Hermans, 2003; Meijers & Hermans, 2018a). DST states that there is a multiplicity of positions that have a dialogical relationship in the self. Theories of the dialogical aspect of a self might originate from the work Mikhail Bakhtin (1981; 1984) by introducing the concept of Polyphony in literature studies, which means a diversity of simultaneous points of view and voices. Philosophical contributions to modern theories of dialogical (and social) self can be traced to the work of George Mead (1913). Charles Peirce (1974) defined the process of thinking as what a person is saying to themselves. Hence according to Mead and Peirce, the essence of thinking is a dialogue.

Inner speech may manifest as a solution, a shift in perspective, or an insight. Fernyhough and Fradley (2005) show that self-directed speech, whether the private speech in childhood or the later developed inner speech, has a primary role in regulating thought and behavior. This guides my hypothesis that having an intrapersonal dialogue among different positions can lead to learning and meaning-making in a broad sense. This kind of intra-discourse assesses opinions, beliefs, feelings, and values of different perspectives and alternate points of view. There is, as a result, a potential of transformative learning (Mezirow, 1978, 1991, 1994, 1997, 2003), which is the process of effecting change in a frame of reference, structures of assumptions that we use to understand our experiences (Mezirow, 1991, 1997).

This kind of experience is in the realm of the "inner." What we need is a method or a tool to externalize such experience and to measure it empirically. Role-Playing or pretended play is quite common among children. They use it as a game for fun and play, but also to understand their environments as playing 'house' or 'school' or any other imaginative pretend-play. Moreno, an Austrian-Romanian-American psychiatrist, and psychosociologist observed this phenomenon in children's play and wanted to bring it to the adults' world. As a result, Psychodrama (and Sociodrama) (Jacob L. Moreno, 1946) has been born. Psychodrama is defined as a method of communication via unscripted,

spontaneous role-playing mainly to regulate emotions. In this study, a Psychodramatic inspired serious play is used instead to regulate learning. According to DST and Psychodrama applications, this study explores the role of a dialogical self as a tool to negotiate a topic for the goal of meaning-making. The proposed intervention may lead to learning effects, gain new perspectives, change attitude, and maybe gain insight. The goal is to measure the intervention's effectiveness on a specific case, namely '*the attitude towards technological advancement*', with two research questions in mind. The first research question, '*Is there a change in the attitude towards technological advancement after the intervention?*', is tackled by a quantitative method. The second research question, '*Is there a change in perspective towards technological advancement after the intervention?*' is addressed with a qualitative method. Hence, the study used a mixed-method approach with a convergent core component (Creswell & Plano Clark, 2011).

The results inform and contribute to research and practice of new ways for approaching formal and informal learning within the realm of serious play and games. The play will open the possibility for a wide range of applications. This study is built on self-talk theories and practices to extend the current view and fill a gap between the concerned fields. Further, how a more general continuum could be built among learning by doing, learning by acting, learning by role-playing, learning by games as learning methods of formal learning settings, informal learning settings, and serious play/games.

The integration in this study is as at Multi-levels. First, Concepts and theories are integrated from different but neighboring fields. We see, for example, the phenomenon of dialogical self is observed in studies from the fields of developmental psychology, psychotherapy, and philosophy. Second, psychodrama is borrowed from a therapy context to regulate emotions and integrated into regulating learning in healthy subjects. Third, integration occurs at the methodological level through a mixed-method approach: Integrating quantitative and qualitative findings. Finally, various Philosophical considerations and underpinnings are considered.

The remainder of the thesis is organized into the following main sections. Section 2 provides a brief overview of the conceptual and theoretical background that informs and guides the study, such as the phenomenon of inner speech, DST, and the psychodramatic method. Section 3 then describes the methodological study design, including the Play/game

intervention. Section 4 presents and describes the findings. This is followed by Section 5 on discussion, where the meta-inferences, interpretations, observations, limitations are addressed, and the author's worldviews and cognition views are explained. Finally, the thesis is concluded in section 6.

2 Concepts and Theories

This section gives an overview of the literature background. In the first section, what is meant by inner speech is introduced and defined. The Inner speech concept is the start point that guides the study's research questions and hypothesis. Specific interest is the dialogical aspect of self-talk, whether it is private speech or inner speech. Moving forward, I draw on previous research on what kind of functions, or roles, self-talk entail. Together with the psychodramatic method, DST is obtained as a primary theoretical framework for designing the quasi-experiment (including the role-play intervention) and testing the results. Moreover, Concepts of serious play are explained, mainly how the psychodramatic inspired intervention can be framed more accurately as a serious play or prototype of a serious game. Finally, experiential learning is briefly introduced.

2.1 Inner Speech

Inner speech, or the activity of talking silently to oneself, is an inner experiential phenomenon that is common and widely discussed. The phenomenon of inner speech is referred to in the literature with phrases such as inner talk, inner speeching, self-talk, subvocal speech, mental verbalization, internal monologue, internal dialogue, covert speech, and self-statements (Hurlburt et al., 2013). The inner voice(s) may happen as self-monologue (talking to oneself, or maybe better defined as hearing yourself talking), but it can be dialogic among two or more parts of a self. Even if it happens as self-monologue, self-talk entails that the self has not only a teller but also a listener. The separation between a teller and a listener as we talk to ourselves has the properties of a conversation of those two parts. It can also form an imaginary conversation with another person, called imagined interactions (Honeycutt, 2019).

Imagined interactions are:

A type of daydreaming, social cognition, and mental imagery in which people experience conversation with accompanying verbal and nonverbal features (Honeycutt, 2010, 2019).

Such experience takes place within the privacy of a self. It follows different rules to an external social dialogue as it is probably taking a condensed form of syntax and semantics.

The language in the realm of the ‘inner’ experience can be stripped down because the message is meant for oneself. Those inner voices can have an accent, a pitch, a tone of voice; sometimes in the voice of oneself, but it might take another voice; sometimes they speak in complete sentences; sometimes their utterances are more fragmentary (Fernyhough, 2016). McCarthy-Jones and Fernyhough (2011) distinguish among varieties of inner speech, which they termed condensed, expanded, dialogical, other people, and evaluative or motivational inner speech.

Hermans states that :

Imaginary dialogues play a central role in our daily lives and are interwoven with actual interactions; they constitute an essential part of our narrative construction of the world (2008, p. 187).

Scholars agree that such words and sounds, i.e., inner speech, play a vital role in our thinking. Therefore, this study assumes that interactions in a dialogical self play an essential role in meaning construction. Furthermore, it could offer, in some cases, novel solutions, insights, and a shift in perspectives. Furthermore, inner speech, in its different forms, is one aspect of various inner experiences. Figure 1 captures how inner speech is part of the pristine inner experiences according to Hurlburt and Heavy (2006) and what constitutes the types of inner speech (adapted from Morin, 2019, p. 5). Finally, it is Needless to say that the format, nature, frequency, and function of inner speech has a long history and is still debated amongst the experts.

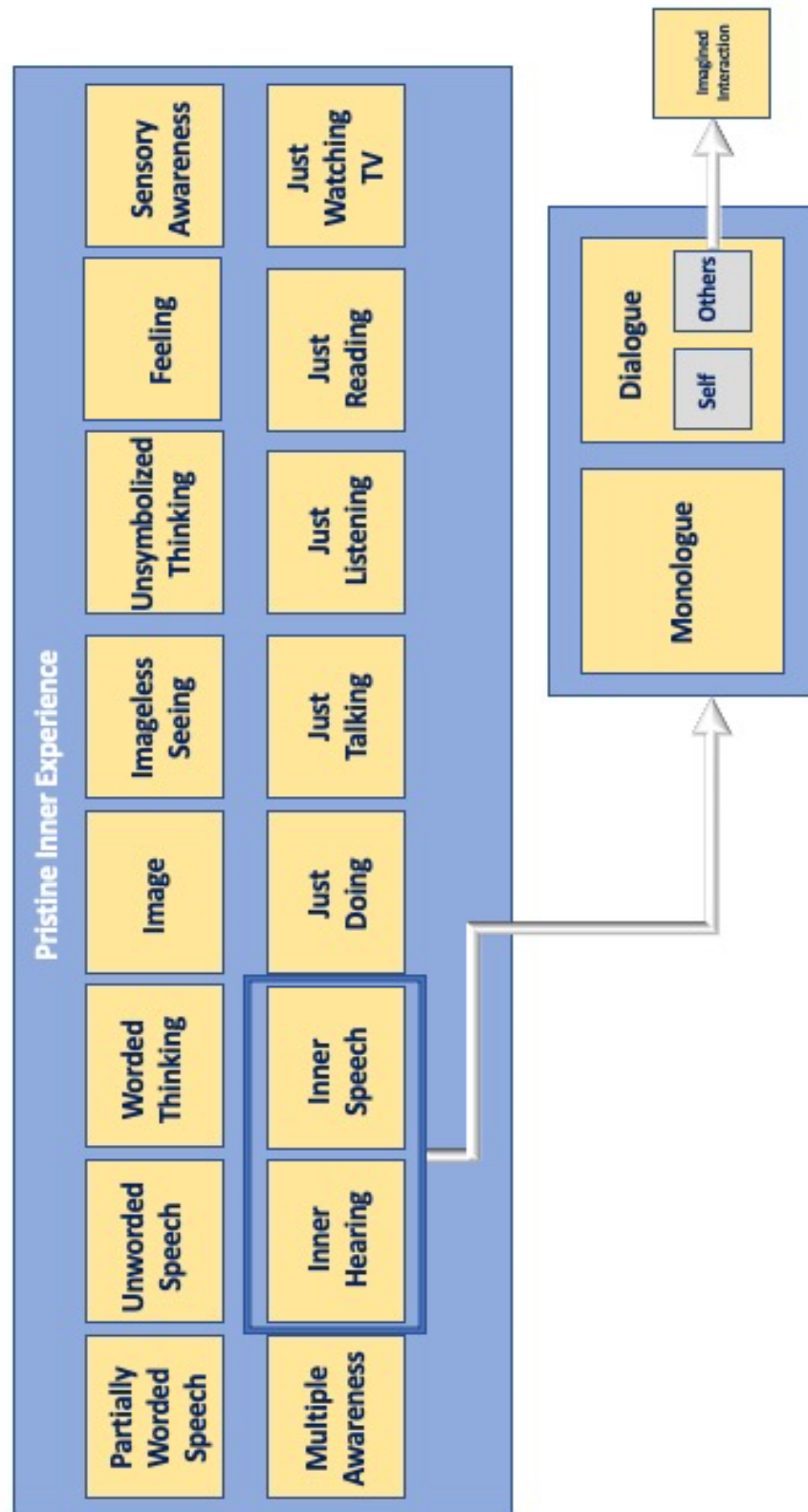


Figure 1: Building blocks of the pristine inner experiences, based on Hurlburt and Heavy, 2006, and the types of inner speech, based on Morin, 2019

2.2 The Role of Inner Speech

Vygotsky (1986) claims that inner speech is a condition of self-regulation of cognitive functioning and development. Many studies that followed support such a claim. This study uses Vygotsky's theory as an influence and as one of the guiding theoretical perspectives. Vygotsky found that children develop private speech, or audible speech-to-self, at around the age of 5 years. Later in life, private speech is internalized as speech-to-self or inner speech. Internalized speech-to-self serves as a self-guiding function but is inaudible. Private speech in children develops from children's conversation with others until, through development, it becomes internalized, a muted version of the external dialogical exchanges. From that, we can understand how that kind of wordily polyphony thinking share similar features of the conversations we entertain with others.

At the same time as Vygotsky's work on private (and inner) speech, the developmental psychologist Jean Piaget had different explanations on private speech. Piaget claimed that this kind of speech is nothing but a shred of evidence on the child's egocentrism: or in other words, that the child is rooted in his viewpoint. Piaget (2002, p. 17) explains, "Speech does not communicate the thoughts of the speaker; it serves to accompany, to reinforce, or to supplement his action." Vygotsky noted that if private speech (later inner speech) has no function but as a mere accompaniment to action and behavior, then why to use private speech by children affected by the task difficulty. Vygotsky observed that children use private speech to plan and ultimately solve a problem at hand. If Vygotsky's claim was correct that private speech with children has a function in regulating thoughts and behavior, then talking to ourselves continues to have a value and function in adulthood. Otherwise, it will vanish. It seems that there are a number of additional functions of private speech that go beyond the self-regulation function, such as practice for a second language, the weaving of autobiographical memories, and the creation of a fantasy world (Fernyhough, 2016). Vygotsky believed that a transformation of the linguistic properties accompanies the transformation of private speech into becoming silent inner speech as the language becomes more abbreviated and condensed, making it less intelligible to the external listener (Fernyhough, 2016). Fernyhough and Fradley (2005) show that self-directed speech, whether the private speech in childhood or the later developed inner speech, has a primary

role in regulating thought and behavior. Other psychological studies demonstrate the role of inner speech not only in regulating our thoughts and behaviors but also in motivating ourselves for actions, evaluate those actions, and become conscious of our own selves (Fernyhough, 2016). Another view is that “we talk to ourselves to display metacognitive abilities, that is, we talk to ourselves to consciously access and control our own thoughts” (Fernández Castro, 2019, p. 247). Coming with a precise definition of metacognitive is difficult as it became a multidimensional concept, differing across researchers, disciplines, and implementations. The early description(s) by Flavell is:

One's knowledge concerning one's own cognitive processes, or anything related to them; knowledge and cognition about cognitive phenomena; the active monitoring, consequent regulation, and orchestration of the cognitive processes (1976, p. 232).

Since Flavell coined the word metacognition, the definition expanded to a broad sense as *cognition about cognition* or *thinking about thinking* or 'a critical analysis of thought.' The claim is that there is a connection between metacognitive capacities and inner speech to monitor and regulate the cognitive processes through language directed to oneself. In these processes, the agent actively *organizes/dis-organizes/re-organizes* their thoughts using linguistics self-talk to achieve meaning-making. Inner speech can plan, direct, encourage, question, cajole, prohibit and reflect (Fernyhough, 2016).

2.3 The Dialogic in Inner Speech

Fernyhough (1996, 2001) holds the position that inner speech in itself is dialogic. This might be at least partially true that inner discourse can be dialogic. The theory that inner speech is dialogic originates from the writings of Vygotsky (1929, 1980, 1987), Mikhail Bakhtin (1984), George Mead (1913), and Charles Peirce (1974). Peirce considered thinking, or at least part of our thinking processes, as a dialogue between different aspects of a self. While Mead conceived thinking as internalized “others”.

For Mead (as for Hegel):

The self is fundamentally social and cognitive. The self is not identical to the individual and is linked to self-consciousness. It begins to develop when individuals interact with others and play roles. What are roles? They are constellations of behaviors that are responses to sets of behaviors of other human beings [...]. Role playing involves taking the attitudes or perspectives of others (Aboulafia, 2020).

Bakhtin studied the concept of Polyphony in literature studies. For example, Dostoevsky creates his characters with these kinds of dialogues when writing his polyphonic novels. The belief of the dialogic aspect of inner speech begins with a child's experience of conversational exchanges with the people they interact with, internalized to be shaped as intrapersonal dialogic exchanges of multiple perspectives. Such dialogical emergence in childhood (Private speech) and its development in adults (Inner speech) is supported by psychological and neuroscientific studies of normal (and disordered) cognition (Fernyhough, 2016).

Fernyhough explains:

Each perspective in internal dialogue represents a particular orientation to a particular element of reality. In addition, the perspectives accommodated in dialogue bear relations to each other (2009, p. 44).

Dialogue means that there are at least two sides involved. Those sides or perspectives could agree or disagree and entertain an inner conversation. When a person obtains one perspective or another as they talk to themselves, they are still in the domain of a self, but at the same time, they step out to comment on what a self is thinking or doing. Hence, a self can be viewed not as one distinct self but a multitude of sub-selves that constitute a larger self. A person can have an inner experience in the form of a dialogue for a problem or task to be solved, to resolve conflict, as a motivational function, to regulate one's actions and construct meaning. The inner dialogue may have the form of questions and answers, arguments and counterarguments, or assertions and negations. This is, in a nutshell, what the Dialogical Self Theory claims (DST; Gieser & Hermans, 2012; H. J. M. Hermans & Dimaggio, 2004; H. J. M. Hermans & Hermans-Konopka, 2010; Hubert J. M. Hermans et al., 1993; Hubert J. M. Hermans, 2003; Meijers & Hermans, 2018a) . DST adapts a view of positions or

positioning, while Psychodramatists talk in terms of '*Innere Anteile*' or inner parts, voices, and roles. They both refer to the same phenomenon, in my view. The various terms that refer to the Inner positions will be used interchangeably to show an integration of the dialogical self-theory and the psychodramatic method.

2.4 The Dialogical Self Theory

“You are not a unity; you are a multiplicity who tries to become a unity. “

Hubert Hermans

DST (Gieser & Hermans, 2012; H. J. M. Hermans & Dimaggio, 2004; H. J. M. Hermans & Hermans-Konopka, 2010; Hubert J. M. Hermans et al., 1993; Hubert J. M. Hermans, 2003; Meijers & Hermans, 2018a) states that there is a multiplicity of positions that have a dialogical relationship in the self. In a broad definition, the dialogical self can be defined as a dynamic multiplicity of I-positions that takes place in ourselves, that is in movement, and in change. Changes depend upon contextual situations, where many elements play a role: personal, social, cultural history, future perspective, and people and tools one may come into contact with (Hubert J. M. Hermans et al., 1993; Hubert J. M. Hermans & Dimaggio, 2007; Hubert J.M. Hermans, 1999). As a spatial construction, the self can be depicted as a landscape where a multiplicity of positions moves around (Meijers & Hermans, 2018b). Simultaneously, the mind functions as a soundscape because I-positions can assume a voice that allows dialogical relationships between positions to emerge (Meijers & Hermans, 2018b). DST also distinguishes internal and external I-positions, in which external influences can be integrated as part of the self. An external I-position is an imagined other that becomes part of the self (Stewart, 2018). External I-positions agree with Vygotsky's theory. However, many positions are simply outside the subjective horizon of the self, and the person is not aware of their existence. Positions may enter the self-space at some moment in time, depending on changes in the situation (Hubert J.M. Hermans, 2001). Figure 2, adapted from Verhofstadt-Dene'Ve (2012, p. 133), shows how the self can be represented as a space composed of a multiplicity of positions, represented by dots in two concentric circles. The Internal positions, depicted by dots within the inner circle, are felt like part of (my)self (e.g., I as a critical, I as an ambitious learner, I as an enjoyer of life).

In contrast, external positions, depicted by dots within the outer circle, are conceived as part of the environment (e.g., my teacher, my colleague, my friend).

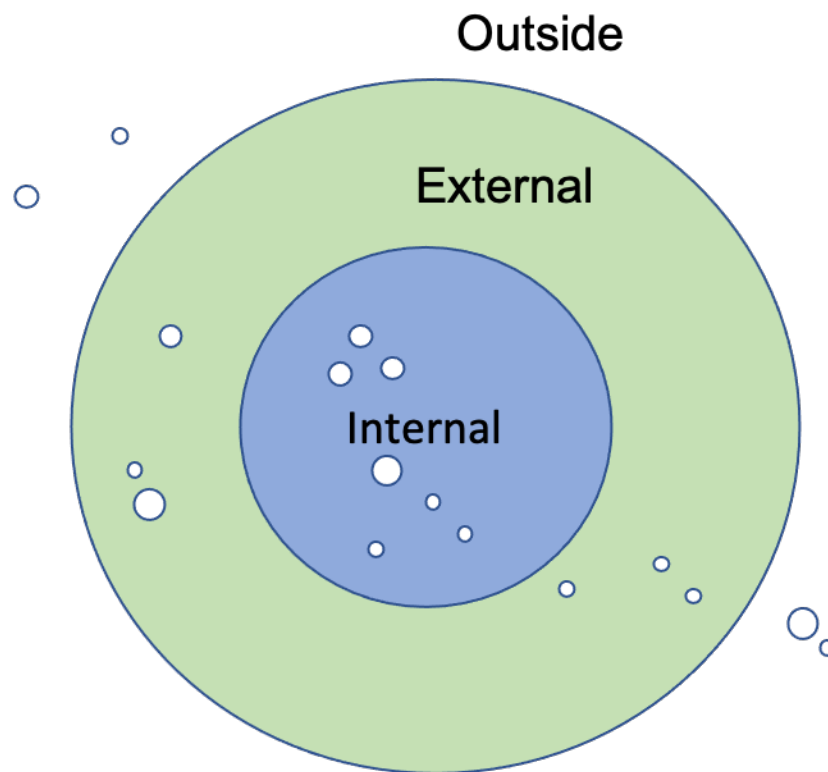


Figure 2: A spacial representation of the multiplicity of position according to DST, adapted from Verhofstadt- Dene`ve, 2012

Among the basic elements, these distinctions include internal and external I-positions and counter-positions (Raggatt, 2011). The dynamic elements include the concepts of core position, meta-position, promoter position, and third position (Raggatt, 2011). The basic positions (in addition to the third position from the dynamic elements) are used in this study's play/game intervention. The goal is to evoke a dialogue *within* a subject. Three kinds of (imaginal) interchange can be distinguished: internal-external, internal– internal, and external–external, according to (Hubert J.M. Hermans, 2001). Adapted from Raggatt (2011), Table 1 shows the definitions of all the positions mentioned above.

Table 1: Descriptions of DST's positions, based on Raggatt, 2011, p. 31

Basic elements	
Counter-position	An alternate (often conflicting) location appropriated by the I
Internal position	An I-position with a distinctive inner voice and personal history
External position	An 'other-in-the-self'; the voice of a teacher, a parent, a partner
Outside position	Persons, groups, institutions in the outside world
Dynamic elements	
Core position	A position on which the functioning of other positions depends
Meta-position	A superordinate position – the product of two or more positions
Promoter position	A position that gives order and direction in the development of the position repertoire
Third position	A mediator between two conflicting positions

Hermans (2008) shows that Four features are central in DST: (a) the-other-in-the-self, (b) multiplicity-in-unity, (c) dominance and social power, and (d) innovation. The self is composed of positions that are native to one's own voice(s) and also constitute of additional positions acquired from social and cultural interactions. The separation is usually not clear, as we have observed in this study. The separation is not also necessary as the multiplicity act as the sum of its units (positions).

Hermans explains the openness to innovation as:

A new position or combination of positions, due to its relative autonomy, can bring in new knowledge and information, different from the knowledge and information associated with already existing positions in the self, under the influence of dialogical interchange, existing and established positions can, under conditions of low resistance, learn from newly introduced positions so that a process of repositioning is begun (2008, p. 192).

In the positional or positioning view of a dialogical self, and according to (Hubert J. M. Hermans, 2008), innovation emerges as (1) a new position can be introduced into the system, leading to a reorganization of the self. (2) when positions move from the background of the system to the foreground. In that case, the positions are already part of the system, but they become accessible due to a reorganization of the self. (3) when two or more positions support each other or develop some form of cooperation to form a new subsystem in the self. As part of a coalition, positions that have a common purpose or orientation can meaningfully go together. However, it is also possible that a coalition emerges between positions that were previously exclusive opposites of each other but later found some way of working together (for more details, see Hubert J. M. Hermans, 2003).

According to Herman (2008), Positions are not to be understood as “stable centers of knowledge“ but as perspectives that change with interpersonal interactions (or intrapersonal ones). The I-fluctuate in a dynamical relation among the multiplicity of positions, each with a distinct voice. A theatre metaphor can be used to show that each voice is a character of its own, interacting to tell a narrative. There is a protagonist, maybe an antagonist, and supporting characters. We do not want just one actor to have the spotlight, or a scene be centered around one character, but allow others to contribute. It is usually the case that one or more positions are more dominant than the others. The general aim of applying DST in its different applications is to obtain a resourceful and healthy organization all positions in a self

Inner speech is in the domain of *inner* experiences. Thus, the next step is to bring the *inner* to the *outer*. Moreover, to allow other less dominant positions to have the stage to contribute to the narrative and to measure the effects of such discourse. Therefore, Psychodrama inspired role-play is the tool I use for such intervention.

2.5 Psychodrama

“Show me, do not tell me.”

Moreno

Role-Playing is a simulation methodology that acknowledges that social context plays an essential role in learning and can address and solve various problems, also as a method to regulate a self. The role-playing method stemmed from Psychodrama. Psychodrama (Jacob L. Moreno, 1946) is a method of communication via spontaneous role-playing. Psychodrama developed in the beginning as a group method. In the last two decades, psychodrama's applications are seen increasingly as a one-to-one method. It is mainly used as a method for psychotherapy, but It is also utilized to a lesser extent in education and training, among other applications. The psychodramatic method involves unscripted enactment that emerges from the interaction of the elements on the stage. Moreno saw a person arise out of the gestalt of roles that internalize all the significant people experienced in an individual's life (Carter, 2010). Moreover, the psychodramatic method emphasizes using the inner positions and calls them '*Innere Anteile*' or inner parts. Psychodrama is used under different names; role-playing is probably the most common one. The general idea of this method is to create drama as it was being presented, without script or rehearsal, and to depend solely upon the players' spontaneous creativity (Nolte, 2018).

Psychodrama theory distinguishes between impulsiveness; a state driven by impulses without reflection, and spontaneity; includes elements of thought and personal choice at the moment (Chesner, 2019). The opposite of spontaneity is what Moreno termed “cultural conserve” (Jacob Levy Moreno, 1941). The term means that humans adapt habitual ways of being (thinking and doing). This is our tendencies to follow the same patterns, which leads to “Cultural conserve”. The opposite is the openness to have a vast repertoire of roles, perspectives, and voices. With Psychodrama, we are giving the stage to less dominant ones, to break the limitations of “Cultural conserve” and expand our perspectives. The spontaneity aspect creates openness and readiness, and for something surprising to emerge and arise. It allows the participants to experiment with their repertoire of inner parts that are not salient to them, providing a fresh perspective to be examined.

Playing roles or role-playing is an activity that is not uncommon in childhood to seek an understanding of the self and the surrounding. Moreno introduced the natural activity of role-playing as a valuable tool into the world of adults. Moreno noticed how children engage in a role-playing game spontaneously. He immediately recognized that acting situations had a therapeutic value. Moreno envisioned that this could be used as a method for disturbed patients to regulate their emotions, change their perspectives, construct meaning and ultimately heal. While it is not strange for children to engage in these kinds of role-playing to understand their world, why not use it in healthy adults to understand their world and themselves.

The role-play method engages the whole person as an embodied, embedded, enacted, and situated agent. Therefore, the process of a psychodramatic session is holistic, to integrate sensory, mental, and physical elements with emphasis on moment-to-moment awareness. It allows for the embodiment and enactment of information and knowledge. Moreno was, therefore, interested in the embodied and enactive cognition. However, he did not state it clearly as a paradigm of his method.

The more alternative perspectives in the enactment of characters, the more we can create solutions, gain insights, and appreciate the knowledge, opinions, values, and beliefs of the alternative. Moreover, it generates empathy of the alternative positions(s), and Theory of Mind (ToM) is at play here.

The scene in such a play involves narration—telling a story. Because telling a story provides structure and meaning (Adam Blatner, 2000). Narration or telling a story tends to be in the past. In contrast, Psychodrama adds vividness and ownership to the experience by enacting the story rather than *as if* it is happening here and now. When the protagonist starts to turn to the director and explain what happened, the director needs to help the players to redirect this behavior: “Show us, do not tell us. It is happening now” and I am not part of the scene (Adam Blatner, 2000). Psychodrama is a tool for making sense of multiple intertwined narratives—each narrative encompasses a particular role.

Moreno saw an individual as a role player. The repertoire of roles in a person is accumulated out of necessity, and as a response to act in the environment. Adam and Allee Blanter (A. Blatner & Blatner, 1988) explain that roles can be learned and revised and can be lost,

modified, or redefined. The roles exist not as a standalone but as in relationships to other roles. Central to Psychodrama theory and practice is the theory of role. We can see a prototype of the theory of role attributes to the sociologist George Mead (Mead, 1913).

According to Mead:

The self is not there from birth but develops from social interaction, and observations [...] individual develops a self by role-taking, the observation, and internalization of the opinions and feelings of the other (Mead, 1913).

Mead concluded, to my understanding, that the interaction with the others and within the others leads to the emergence of the self.

Moreno (1933) describes the choice of playing a role in a chosen setting as for the purpose of exploring, experimenting, developing, training, or changing roles. There are often conflicts among these roles. Roles do not exist in isolation but in the context of the situation and with the interaction of the other roles in the self (interpersonal), just as intrapersonal social interactions. In ordinary life, we play various roles; we are not the same all the time. Many of our beliefs, opinions, and behavior tend to one role (perspective) or others. Nevertheless, the other roles (perspectives) are part of an extensive repertoire we acquired through interaction with others. Others can be real people, but also fictional characters in novels, movies, and other cultural media. Each person's personal history of the repertoire of perspectives is unique. The interactions of these perspectives have the possibility to change us.

Moreno acknowledged the concept of role and its theories. He stated that creating a role is of two stages: (1) role perception and (2) role enactment. Role-playing is a function of both. There are often conflicts among these roles. Roles do not exist in isolation but in the context of the situation and with the interaction of the other roles in the self (interpersonal), just as in the intrapersonal interactions. Therefore, we can see that psychodrama takes a self in terms of the roles that define it.

Psychodrama offers a stage on which we can *do to know*, allowing our inner self to come to a stage to examine novel situations, ones that we accepted or take for granted. This method is a tool, and we can test its applicability in regulating learning as it does with

regulating emotions. Psychodrama allows knowledge to come to the surface, to be (re)-constructed in the present moment. All in a spontaneous manner, while it reveals the *inner* realities of its subjects. The participant's inner positions create the content of the scene without a script. Role-playing in psychodrama is an effective tool in the creation of pluralistic roles. When we act roles and improvise them at the moment, we off-load the various perspectives in new directions that we might not be attentive to them in our everyday lives. Those roles, perspectives, or positions emerge in new and sometimes unexpected ways.

Psychodrama has the feature of explicating what is otherwise experienced as internal. Our inner self (or selves) can come forward and be examined. Inner dialogue becomes tangible as an external dialogical self. The form, but not the content, might change in this process, as inner dialogue can be more condensed, quick, and as notes to the self. While in the intervention, the discourse was as a regular social out-loud conversation.

Moreover, through the act of Psychodrama, the participants take different perspectives. Perspective-taking is the cognitive capacity to consider the world from other viewpoints (Galinsky et al., 2008). The dimension that interests this study is the conceptual perspective-taking rather than the perceptual. The thoughts, attitudes, and feelings of different perspectives within an individual self are central to the intervention. It is not clear and not a focus of this study to investigate empirically whether embodying the "other" has a perceptual dimension. In the psychodramatic intervention in this study, participants are evoked to enact "other" perspectives within themselves. They performed a form of imagined simulation among the perspectives chosen from DST. Perspective-taking is related to theories of social cognition, Theory of Mind (ToM), and empathy. Studies such as (Batson et al., 1997) suggest an association between perspective-taking and empathy for the other. Perspective-taking allows hearing a counter-argumentative voice as well as a supportive voice. Negotiation of meaning and regulation of multi-voiced self-produced as an outcome.

2.6 Serious Play and Serious Games

Instead, the intervention is situated as a serious play or a low-fidelity prototype of a serious game than a typical psychodrama session. The ‘serious’ indicates that the play (or the game) has a goal beyond mere entertainment. In his Book ‘Homo Ludens’, Johan Huizinga (1951, p. 28) defined play as “[...] a voluntary activity or occupation executed within certain fixed limits of time and place, according to rules freely accepted but absolutely binding having its aim in itself and accompanied by a feeling of tension, joy and the consciousness that it is ‘different’ from ‘ordinary life’ ”. Huizinga refers to play, distinguishing it from game as having its aim in itself, i.e., intrinsically motivated activity. In a game, the conflict and the goal to resolve are what motivate the player.

Nevertheless, the desired outcome of this study’s play design, in a broad sense, is learning about a subject, whether in formal or informal educational settings. However, it might not be apparent to the player during the play. According to Feinstein et al. (2002), a role-play is when the participant acts out the role of a character with a set of rules that define a situation while interacting with others who are also role-playing. The novelty we present with this study is that the interaction is intrapersonal.

While the intervention design is inspired by and shares many similarities with psychodrama, it diverges on important points. Jori Pitkänen (2019) summarizes the difference between Psychodrama and Educational Live Action Role-play (LARP). We consider in this context that what applied to LARP applied to the big umbrella of serious Games and the genre of educational role-playing. The main difference is in focus, as psychodrama’s focus is on the individual (or the group) and the purpose is one’s life (and one’s challenges in life), while the focus of serious games and Educational Role-Playing Games (RPGs) is on the phenomenon or the subject to be explored from the individual’s perspectives. Therefore, the latter aims to explore the phenomenon or the subject to create a better understanding, i.e., the difference is that the change in psychodrama is to one’s perspective to oneself and personal narrative, while in serious games, the change is to one’s perspective to the theme of the learning subject. In other words, Psychodrama is an individual (or group)- centered activity, while a serious game is a topic-centered activity. Moreover, the roles played in psychodrama are usually social roles, while in a role-playing [game], characters are played.

2.7 Learning through experience

One applicable method of experiential learning is through psychodramatic role-playing. The theory of experiential learning was proposed by the psychologist David Kolb (1974), who was influenced by the work of other theorists, including John Dewey, Kurt Lewin, and Jean Piaget.

According to Kolb's theory, this type of learning is defined as:

The process whereby knowledge is created through the transformation of experience. Knowledge results from the combinations of grasping and transforming the experience" (Kolb, 1984, p. 41).

The experiential theory proposed by Kolb takes a more holistic approach and emphasizes how experiences, together with cognition, environmental factors, and emotions, influence the learning process. The cycle of experiential theory (Kolb, 2015) has four stages: (1) having a concrete experience followed by (2) observation of and reflection on that experience which leads to (3) the formation of abstract concepts (analysis) and generalizations (conclusions) which are then (4) used to test a hypothesis in future situations, resulting in new experiences. Figure 3 adapted from (Kolb, 2015, p. 68), shows the cycle of four stages of learning according to Kolb's theory

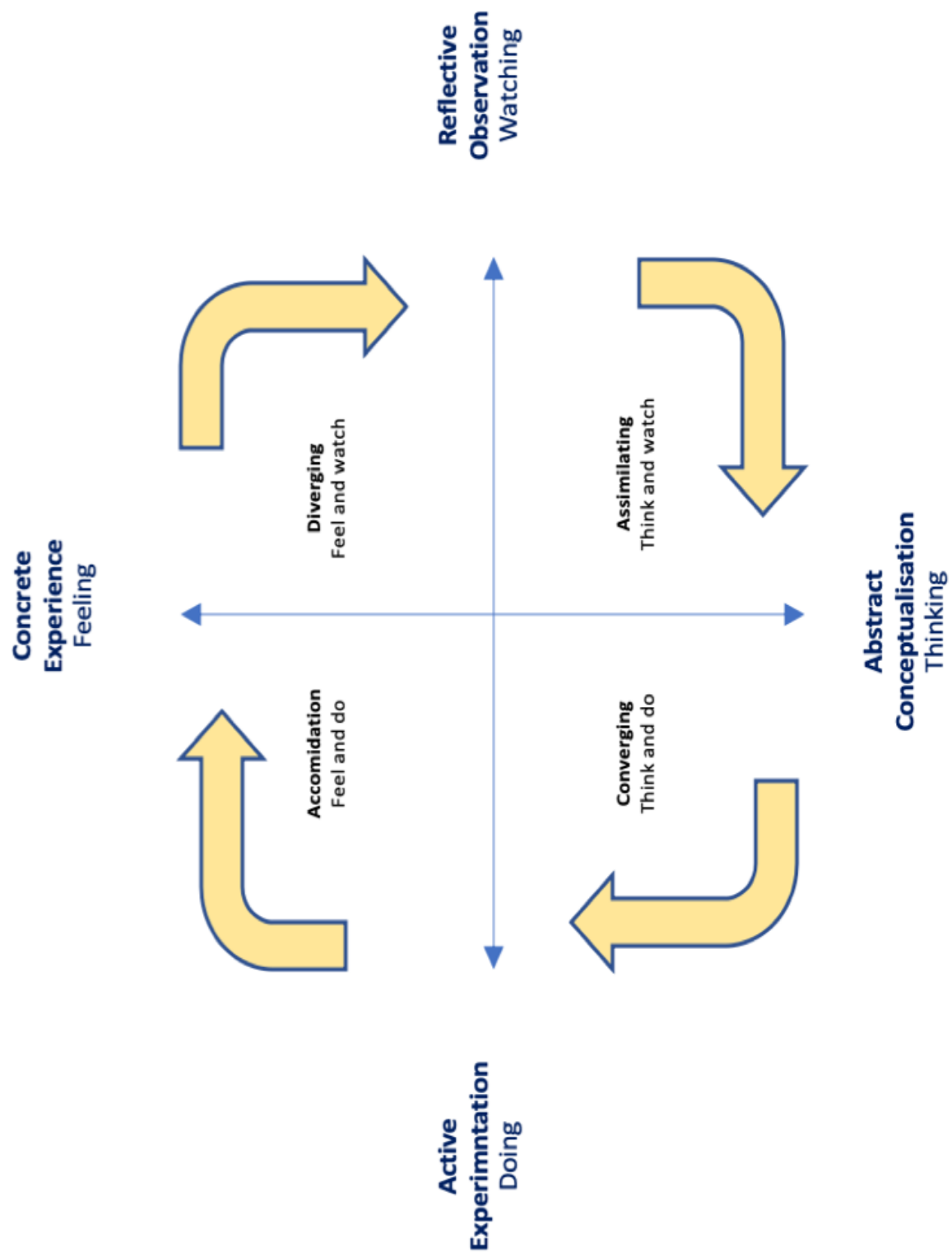


Figure 3: The cycle of the four stages learning according to Kolb's theory, based on Kolb, 2015, p. 68

3 Methodology

This study employed a mixed-method approach with a convergent core component (Creswell & Plano Clark, 2011). The aim is to assess the change, due to an intervention, in the participants' attitude and perspectives toward a case study: technological advancement. A quasi-experiment (including an intervention) was conducted on 24 adult participants.

The rationale for conducting a mixed-method has threefold reasons: (1) the research questions required two methodological directions for collecting and analyzing the data, namely quantitative and qualitative. (2) those methodological approaches reflect different philosophical (ontological and epistemological) underpinnings, which provide us with more robust and credible findings, whether it enhances the validity of the results or provides competing or alternative findings, than if we rely solely on either of those methods. Finally, (3) with mixed-method research, it is possible to make integration and synergy of quantitative and qualitative at the results level (Meta-inferences).

In this chapter, I present the study design by describing the participants, specifying the instrument, explaining the procedure, and drawing on the data analysis.

3.1 Sample

Twenty-four adult participants were recruited with a convenience sampling. No participant is excluded from the study as they all participated successfully in the intervention and provided answers to the questionnaires. The sample population is all adults with an age range from 20-50. 33.3% Participants ($n = 8$) are in the age group 20-29, While 41.7% participants ($n = 10$) are in the age group 30-39, the rest 25% participants ($n = 6$) are in the age group 40-49. The study includes 54.2% Male participants ($n = 13$), 41.7% Females ($n = 10$) and 1 participant with other gender identity. The majority of the participants hold a graduate degree, 50%, participants ($n = 12$), while 33.3% participants ($n = 8$) hold a bachelor's degree, the rest 16.6% participants ($n = 4$) are high school graduates or have some college degree. 83.4% of participants ($n = 20$) report speaking comfortably three languages or more. 54.2% of participants ($n = 13$) reported having inner speech as often.

33.3% of participants (n = 8) reported having inner speech as always. 12.5% participants (n = 3) reported having inner speech as sometimes. Participants' characteristics are shown in Table 2.

Table 2: Participants' characteristics

Participants (N=24)	n (%)
Gender	
Males	13 (54,2%)
Females	10 (41.7%)
Non-binary	1 (0.04%)
Age	
20-29	8 (33.3%)
30-39	10 (41.7%)
40-49	6 (25%)
Education	
Postgraduates	12 (50%)
Graduates	8 (33%)
High school	4 (16.6%)
Languages	
3 or More	20 (83.4%)
Less than 3	4 (16.6%)
Subjective rating of Inner Speech	
Sometimes	3 (12.5%)
Often	13 (54.2%)
Always	8 (33.3%)

3.2 Procedure and Instrumentation

Data collection was obtained from (1) quantitative source: close-ended questions with four items (each with a 5-points Likert scale) and (2) qualitative source: open-ended questions with one item. The questionnaire is conducted in paper format at two points in time. The participants filled the form before the intervention, this time including the demographic questions. The same questions are filled again after the intervention directly. Additional two open-ended questions are asked after the intervention to understate the players' subjective experiences further. Figure 4 shows the study's method design.

For the quantitative part, the dependent variable's scores within a group are measured. The questionnaire's items for the quantitative part are based on (Boser & Michael, 1998) to assess one construct: the players' attitudes towards technological advancement, the dependent variable. The Likert scale had an acceptable level of internal consistency, as determined by a Cronbach's alpha of 0.639. The Independent variable is Time.

At Condition #1, the dependent variable is measured for Timepoint #1. Then, at Condition #2, the same dependent variable is measured for Timepoint #2. An intervention is conducted between these two time points.

After the dependent variable has been measured at Condition #1 and Condition #2, the scores at the two conditions are compared. The goal is to detect whether the mean score for Condition #2 (post-intervention) is changed, either higher or lower than for Condition #1 (pre-intervention).

The research question for the quantitative part: *Is there a change in the attitude towards technological advancement after the intervention?*

The Null hypothesis: *There is no difference in the attitude towards technological advancement after the intervention.*

For the qualitative part, we want to determine if there is a change identified between Condition #1 and Condition #2 in thematic content, i.e., Positive, Negative, Insight, or Solution has emerged. Also, in the sub-Thematic content, e.g., Health care, Jobs, Natural Environment under the Positive theme. The same conditions for the quantitative part are

applied for the qualitative part. At Condition #1, or the pre-intervention, an open-ended question is asked. Then, at Condition #2, or the post-intervention, the same question is asked again.

The two additional questions are asked to obtain more data from the participants. Question (3) asks the participants to subjectively and retrospectively compare their perspectives before and after the intervention, i.e., compare their answers. Finally, question (4) asks if there are any comments about the intervention game experience (called exercise in the questionnaire).

The research question(s) for the qualitative part: *Is there a change in perspective towards technological advancement after the intervention? are there insights or solutions that emerged after the intervention?*

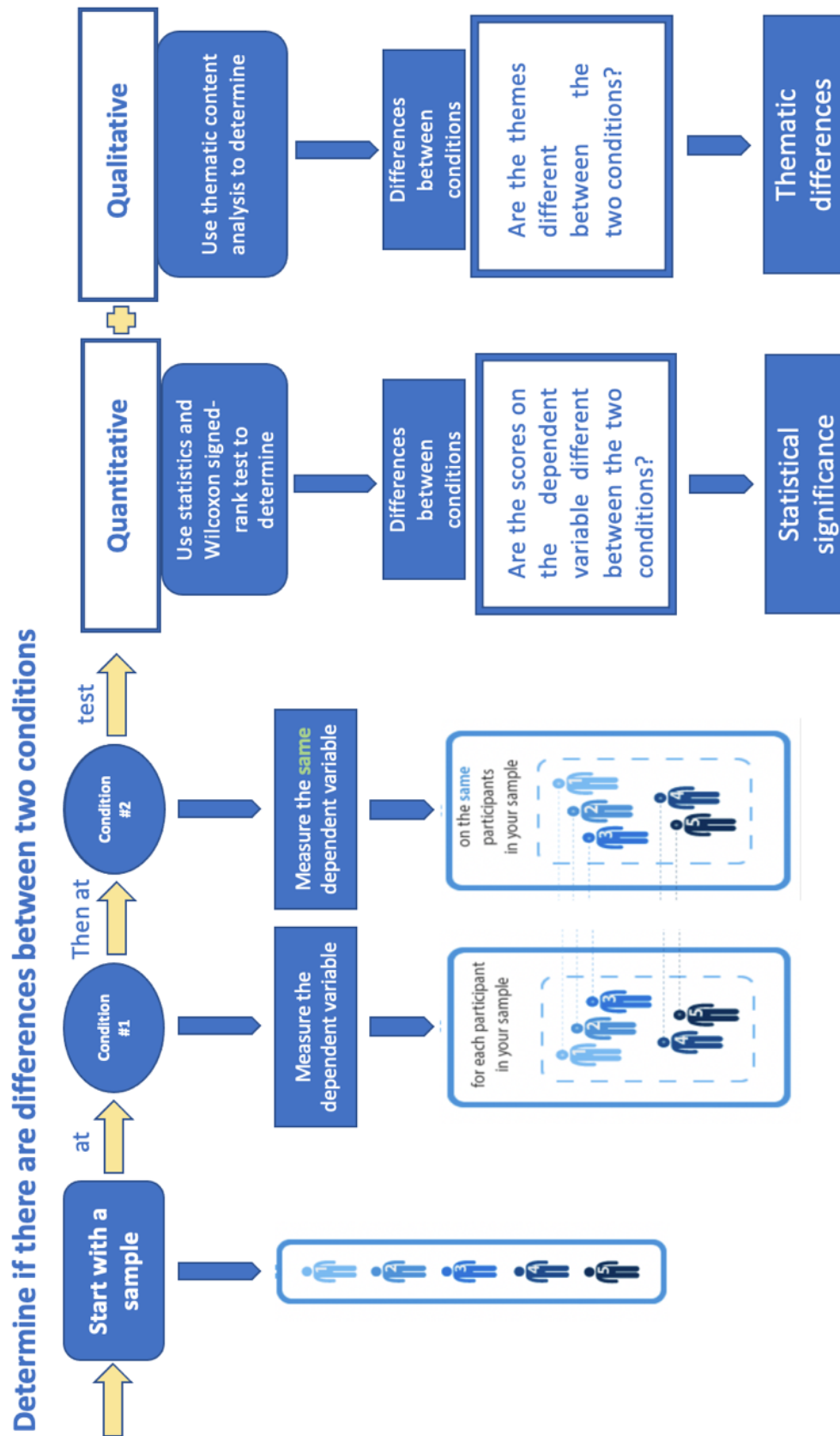


Figure 4: The method's study design and procedure

3.3 The Role-Play Intervention

Inspired by the psychodramatic method, a role-play (or a serious play, or a game prototype) is used to trigger and evoke a dialogue among the different positions of the self; the positions are pre-defined according to DST (Table 1). The intervention's scene starts with the director explaining the context, i.e., a group of people sitting in a café, discussing the consequences of technological advancements. One character will be the protagonist, while other imaginary ones (empty chairs at this point) will listen to their opinion (the protagonist) on the topic. The character's chosen name is written on a small piece of paper and attached to the chair as a minimalist way of creating avatars' identities. The play's initial character is the protagonist; the participant starts with this role. Then there is at least one Auxiliary ego. As called by Moreno (Jacob L. Moreno, 1946), auxiliary egos in the intervention are the various positions of DST. According to DST, these auxiliaries are the core positions (I-positions, counter-position, internal or external). Besides the core positions, we included a role for meta-position and a role for a promotor from the dynamic positions. The players do the enactment in a special section of the room (the stage) to mark out the unique and different "as-if" status of the drama (Adam Blatner, 2000).

The section of the room has many empty chairs in a round shape. The main principle is, "If we can't stage it, see it, hear the words; then we don't really know what the problem is" (Adam Blatner, 2000). The next step is the re-enactment of the character by the researcher while the participant observes what they have said from a different position. The researcher is also the director of the scene. The director leads the participant through the scene of the play and the various characters. Although, the director never imposed their voice. The director reminds the participant that they (the director) are not part of the scene. Their role is to direct and mirror the positions of the participants. Moreno (Jacob L. Moreno, 1946) explains that the director does not participate in the production itself. They are like a conductor in a theatre piece; they supervise, direct, and observe.

The protagonist, the dominant position, will share their opinion on the topic. The opinion is what the participant filled in the questionnaire under the question *'What do you think the consequences of technological advancement?'* Meanwhile, the director is standing behind the chair of the current character. After the protagonist decides that they have no more to

say, the director asks the participant to de-role from the character. Then, the director proposes to choose a new character from a list. The characters (according to Table 1) are:

1. Alternate or conflicting position
2. Another supportive position
3. A position of someone you know
4. A position combined two other positions
5. A position as a mediator between two conflicting positions

The next step is when the director introduces a new character and invites them to choose a chair. The character's chosen name is written on a small piece of paper and attached to the chair (prototype of a new avatar). Now the director will re-enact the first character's opinion to the new character by re-playing what they have said. The doubling done by the director is to bring the material, or flow of ideas and insights, to be perceived by the participant as a re-play of what the participant said. It is the dramatic equivalent of introducing a videotape playback. The director needs to reassure the protagonist that it is okay to disagree or to correct the double. The participant will have the chance to see this position from a new perspective (character). Next, the director will be standing behind the current character's chair while they share a new perspective that has not been fully considered. The following steps are iterative until the participant decides that there are no more characters and nothing more to add. Then the director will 'cut the scene.'

3.4 Data Analysis

Quantitative surveys are uploaded and organized using SPSS (Version 27.0.0). First, simple descriptive statistics (frequencies) are conducted. Then the Wilcoxon signed-rank test, a non-parametric test, is used to determine whether any difference is statistically significant between scores in the two conditions (Field, 2013). There are Three assumptions for using Wilcoxon signed-rank test. Assumption 1: we have one dependent variable that is measured at the ordinal level. Strictly speaking, the Wilcoxon signed-rank test is designed for continuous data, but it is frequently used with ordinal data (Sheskin, 2020). Assumption 2:

we have one independent variable consisting of two related groups (same participants in each group). Related groups indicate that the two groups are not independent (Sheskin, 2020). Assumption 3: a Wilcoxon signed-rank test requires the distribution of the two related groups' differences to be symmetrical (or approximately symmetrical) in shape (Sheskin, 2020). We cannot expect the distribution to be perfectly symmetrical in shape, particularly when we have a small number of participants in the study.

The open-ended answers are digitalized, uploaded, and organized using MAXQDA software (Version 20.3.0). Themes and codes are identified and synthesized as they emerged. The themes are identified in 6 steps process; familiarization, generating initial codes, generating themes, reviewing themes, defining and naming themes, and writing up. A comparison between the two conditions determines if there is a difference. Also, word clouds and code clouds are used to determine the most frequently used words or codes. A merge of quantitative and qualitative strands of data is compared and contrasted for meta-analysis.

4 Results

This section describes the quantitative and qualitative results separately. The quantitative result shows no significant P-values for the 4-questionnaire items. On the other hand, the qualitative result show shift in perspectives in the main thematic categories and a change in the sub-thematic categories.

4.1 Quantitative Results

A Wilcoxon signed-rank test was conducted to determine the effect of dialogical self in the psychodramatic intervention play. Table 3 shows results such as the change in negative, positive directions and the ties (no change) for all four questions' items and the P-values and Z-scores for the four questions' items.

For Item #1, 'Technology is good for the future of humanity', of the 24 participants recruited to the study, the exercise elicited a decrease in the attitude scale (Negative ranks) in 2 participants post-intervention. In contrast, the other 2 participants' attitudes increased (Positive ranks) post-intervention. The difference was not statistically significant, $z = -.378$, $p = .705$.

For Item #2, 'Technology makes everything works better', of the 24 participants, the exercise elicited a decrease in the attitude scale in 4 participants post-intervention, whereas the other 3 participants' attitudes increased post-intervention. The difference was not statistically significant, $z = -.632$, $p = .527$.

For Item #3, 'Technology is very important in life', of the 24 participants, the exercise elicited a decrease in the attitude scale in 3 participants post-intervention, whereas 1 participant's attitude increased post-intervention. The difference was not statistically significant, $z = -.736$, $p = .461$.

For Item #4, 'Technology has brought more good things than bad', of the 24 participants, the exercise elicited a decrease in the attitude scale in 7 participants post-intervention, whereas the other 2 participants' attitudes increased post-intervention. The difference was not statistically significant, $z = -1.732$, $p = .083$.

Table 3: Detailed descriptions of the subjective rating on Likert scale, P - values, and Z - scores of the 4 items questions between post- and pre-intervention

Wilcoxon Signed Ranked Test					
Questionnaire Item	Ranks	N	Sum of Scores	P-Value	Z-Score
Technology is good for the future of humanity	Negative	2	4	0.705	-0.378 ^a
	Positive	2	6		
	Ties	20			
	Total	24			
Technology makes everything works better	Negative	4	17.50	0.527	-0.632 ^b
	Positive	3	10.50		
	Ties	17			
	Total	24			
Technology is very important in life	Negative	3	7	0.461	-.0736 ^b
	Positive	1	3		
	Ties	20			
	Total	24			
Technology has brought more good things than bad	Negative	7	36	0.083	-1.732 ^b
	Positive	2	9		
	Ties	15			
	Total	24			

a. Based on Negative ranks

b. Based on Positive ranks

4.2 Qualitative Results

Several main themes have been identified using thematic code analysis, comparing pre-and post-open-ended answers. In Q1, ‘What do you think the consequences of technological advancement?’ The main Thematic categories are Negative, Positive, Neutral, Advice,

Insight, Hope, and Solutions. Figure 5 shows the main categories and their frequencies in the documents (participants). We can see, for example, Insights showed in 3 documents before the intervention and in 6 documents after the intervention. Solutions showed only in 1 document before the intervention and in 5 documents after the intervention. Figure 6 shows the main categories for all 24 participants in the pre-and post-question—the size of the square size shows how frequent the code is in each document. Figure 7 shows a more detailed picture of not only the main thematic codes but their sub-codes also. We can see the change in the participants' answers to the question and their shift in perspectives. Although, they might not score a significant difference in the attitude scale from the quantitative analysis. In Appendix A.1, the questionnaire used in this study can be found.

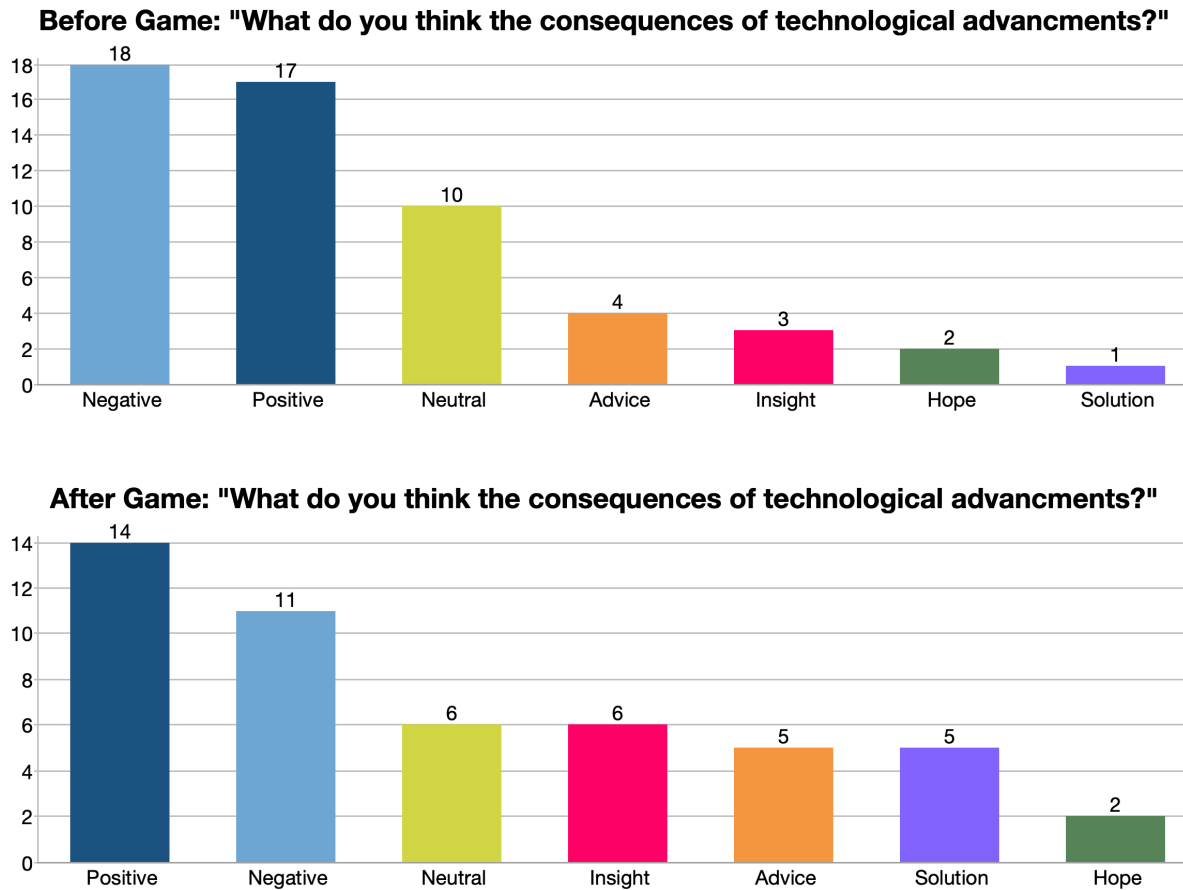
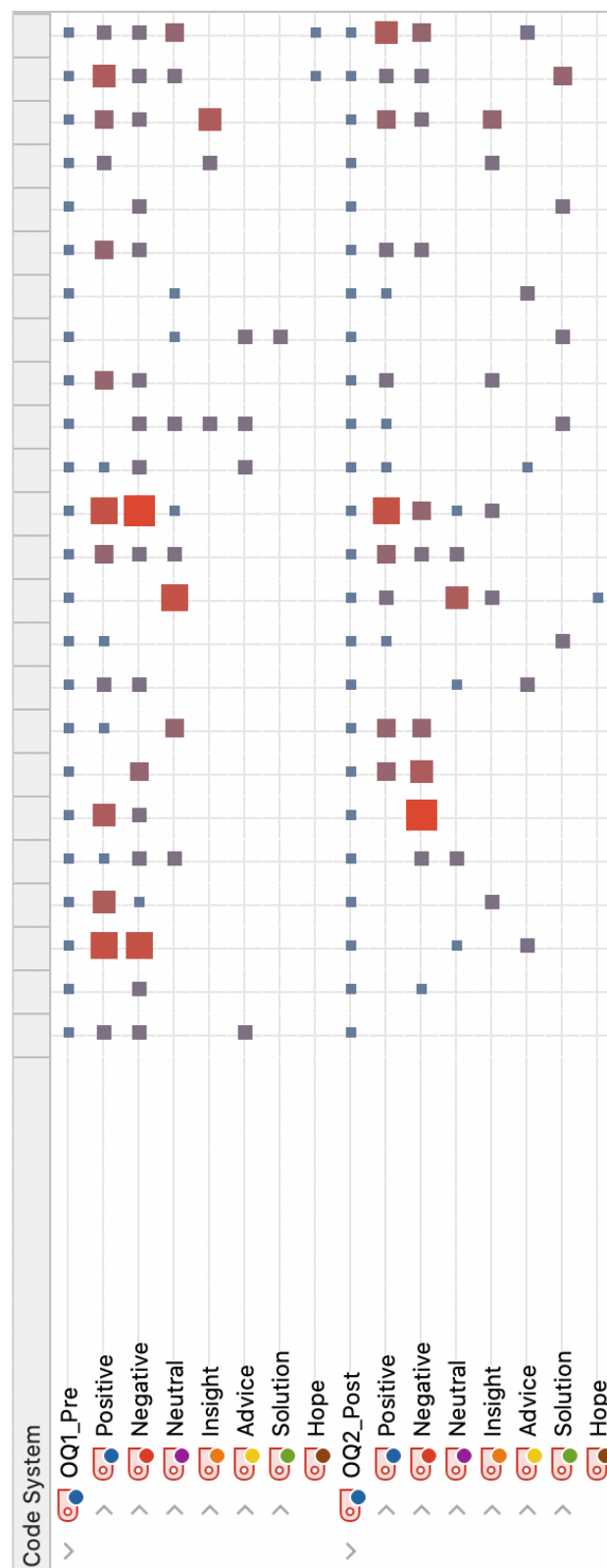


Figure 5: The main thematic categories per document (participant) between pre-and post-intervention



OQ1_Pre: Open Question 1_Pre- intervention

OQ2_Post: Open Question 2 (same question) _post-intervention

Figure 6: The Main thematic categories for all documents (participants) between pre-and post-intervention

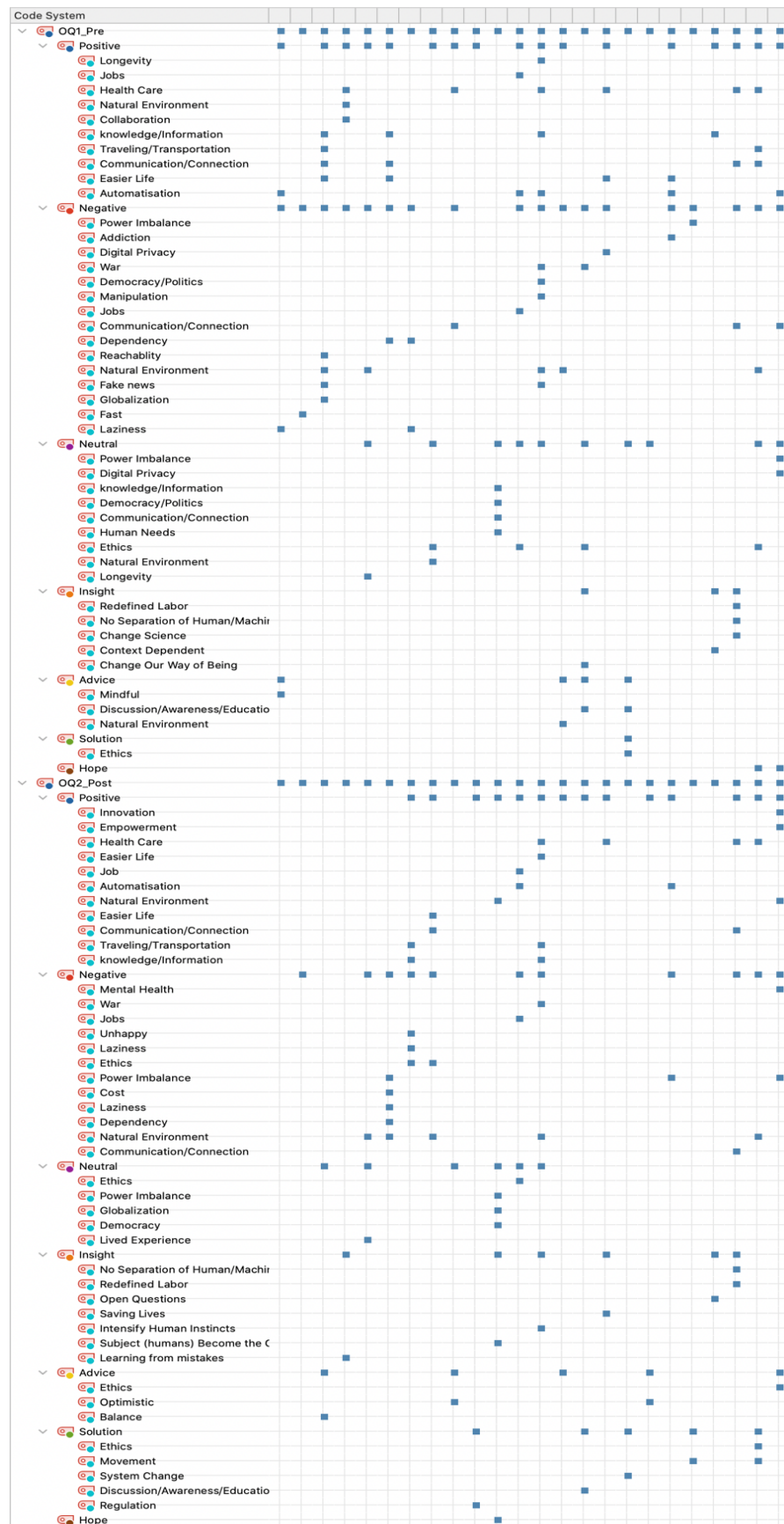


Figure 7: The Main thematic categories with their sub-codes for all documents (participants) between pre-and post-game

5 Discussion

The research questions and hypothesis align with prior literature documenting the role, function, and expected results of experiencing a dialogue within a self. Moreover, using Psychodrama as a tool or a serious play/game to externalize this kind of dialogue is shown a change in the qualitative findings for the goal of regulation, transformative learning, and meaning-making.

5.1 Meta-Inferences

The results of the quantitative and qualitative analysis show a divergence in the findings rather than a convergence. This is due to the different nature of the two methodological approaches. With further integration of the results, we can see two distinct groups. In group 1, there was a change in the qualitative findings (except for 1 participant) but not in the quantitative findings. While In group 2, there was a change in both quantitative and qualitative findings.

In group 1, 41,16% of the participants ($n = 10$), a mismatch between the Likert scale's subjective rating from the quantitative analysis and the thematic categories emerged from the qualitative analysis. In Figure 8, we can see the participants (highlighted) who recorded no change to the 4 Item questionnaires (quantitative). In contrast, we can see in all, aside from participant 12, at least a slight shift in perspective in the qualitative results. For instance, participant 2 scored slightly less negative attitude after the intervention (showed by a smaller square). Participant 9 showed both negative and positive aspects before the intervention, while they reported a neutral perspective after the intervention accompanied by Advice "[...] but there is no need to be pessimistic about the future with technology and how it will affect our lives." Participant 23 showed an inclination towards a more positive attitude before the intervention. Their positive reflections decreased after the intervention but this time offering a solution "[...] Sustainability and ethical movements in this field are currently the trends as it should be in making technology help the world a better place for all living beings, not only humans." Participant 24 showed positive, negative, and neutral views on the topic before the intervention with slightly more neutral views, while after the intervention, their positive views were the most dominant; also, their opposing views

increased. They provided advice after the intervention "[...] what is important is the right way of using it. "

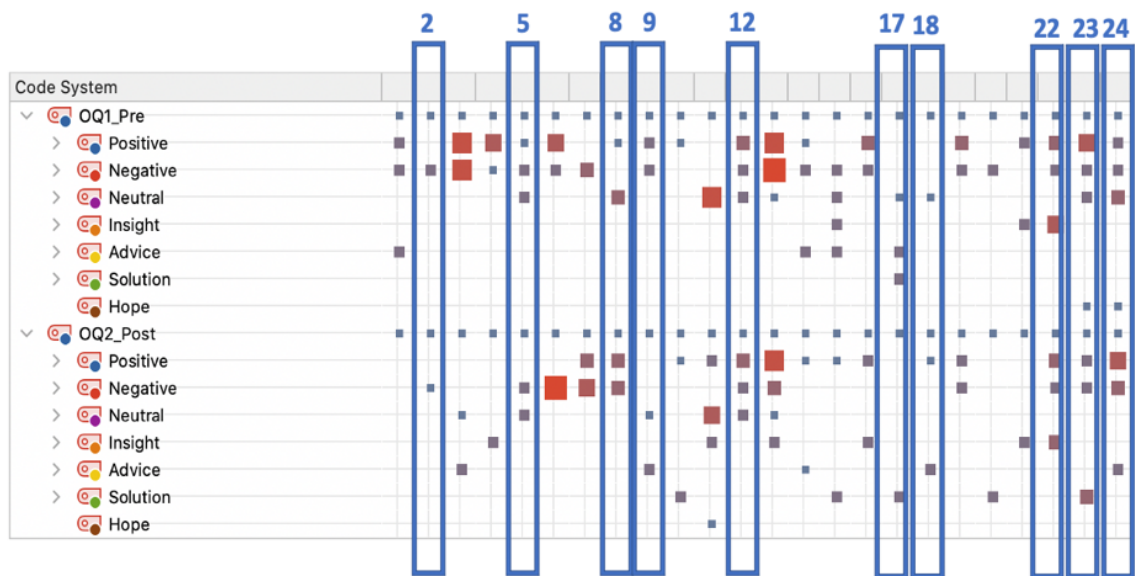


Figure 8: The no-change (in quantitative analysis) group compared to the qualitative analysis

In Group 2, 58,33% of the participants ($n = 14$) found a change in the Likert scale's subjective rating from the quantitative analysis, and the thematic categories emerged from the qualitative analysis. In Figure 9, we can see the participants (highlighted) who recorded a change to the 4 Item questionnaires (quantitative). For instance, participant 3 scored high (showed by a large rectangular) on the positive and negative aspects of technological advancements, while their reply after the intervention was neutral with the advice given "[...], Mankind has to focus much more on the pros and cons of technological advancement, to find a way to get into a balance make all people on the globe winners. ". Participant 10 showed the same positive attitude before and after the intervention. The difference is that they offered a solution in the latter "If it is not regulated or handled in a more holistic way taking into consideration our relationship to the planet and with each other, it will be quite problematic!". Participants 4, 11, 13, and 16 also showed a shift in perspective with some insights after the intervention, such as "I realized that technological advancement is a tool for learning: we want to learn also to be forced to learn." (Participant 4). "The subject (humans) become the object. "(Participant 11). "[...] ultimately technology does intensify human instincts. And it can feedback and create new instincts. [...] we are at crossroads

where we see both these instincts” (Participant13). Finally, participant 16 reported, “In the context of Covid-19, it has been very clear how countries that have access to high medical technologies performed better to [...] the causes and to develop vaccines, e.g., Germany. In this sense, I think that the consequences of technological advancement in medicine are saving lives.” (Participant 16).

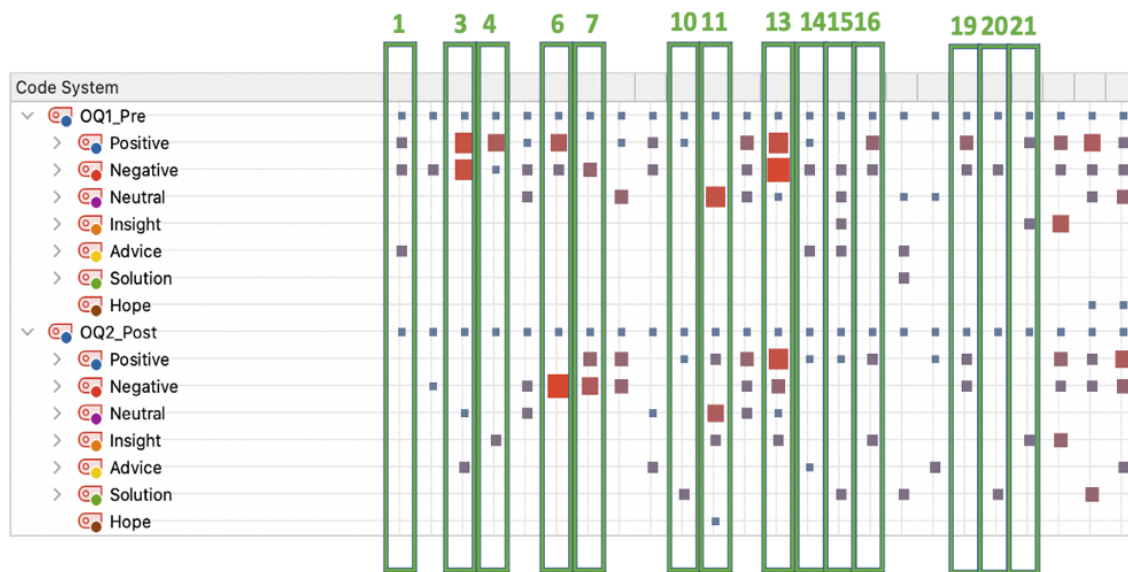


Figure 9: The change (in quantitative analysis) group compared to the qualitative analysis

The participants also have been asked to provide their retrospective subjective opinion about their answers before and after the intervention as follows: 'How do you compare your viewpoint/answer to the question (What do you think the consequences of technological advancements?) before and after the intervention exercise?'. The code (See Other Perspectives) was the most salient as it has been found in 15 documents. This means that the participants were aware that the study's intervention was showing them new and alternative perspectives, what I coded - See Other Perspectives.

Moreover, in the survey, a final question has been asked, any comments about your experience of the exercise? 'to provide more insight from the participants in their own words. Using a word cloud, we found that the most frequent word in the participants' answers is "interesting" with all its derivatives. This gives us an indication that the

intervention was rewarding and engaging to the participants. Figure 10 shows the words cloud with the most common words.



Figure 10: The most frequent words about participants' experiences of the intervention

5.2 Interpretations

The analysis suggests that the players may subjectively rate a change in their attitude on a Likert scale but not with a significant result on a Wilcoxon signed-rank test. In contrast, the themes we elicited along suggest a shift in perspectives and learning effects. The game makes it possible for the players to negotiate the topic at hand from fresh, new perspectives that were not fully considered. The results show that the interactions, and playing roles in a dialogical self, help the player construct meaning by doing. Furthermore, it could offer, in some cases, novel solutions, insights, and AHA moments. Adults can still use private speech, as children do, to regulate their thoughts and construct meaning.

According to DST, the self is involved in a constant change and innovation process, constantly striving to balance many tensions within the I-positions featuring the self (Ligorio, 2011). The findings, and in compliance with DST, show “the constructive learning process is an ongoing dialogue built on a repertoire of relatively autonomous I-positions [...] The dialogical self is, in its best form, an open, changing flow of positioning, counter

positions, and repositioning.” (Stewart, 2018). The general aim of applying DST is to obtain a resourceful and healthy organization of the I-positions composing the self in any setting. Moreover, Fernyhough (2016) argues that the polyphonically dialogical self helps us understand a feature of human consciousness, including openness to alternative perspectives that might be one of the hallmarks of creativity. There is no doubt that a better understanding of the mental voices can take a step forward to understand what a mind is? Furthermore, how a mind does what it does? For that, we need better tools to investigate what is in the realm of a ‘private’ experience.

5.3 Observations

In the game settings, there were six chairs with the possibility to add more if necessary. All the chairs were similar except for one chair was different (the red chair). Most of the participants chose the red chair for their protagonist, the main character. However, it has been observed that through the game, the protagonist did not allocate more time to talk or a more critical role. In other words, the protagonist’s voice was not in any way more dominant than the other voices. It has also been noticed that participants, who score higher on their subjective rating of inner speech, showed quicker adaptiveness to the game intervention and shift from one character to another.

In an informal talk with the participants after the quasi-experiment, many participants reported using the names of people they know. It is not clear whether these voices became part of the self as an extension to the participants’ social environment or more accessible to come up with familiar names. The participants reported informally that those characters do not reflect these persons’ positions, except for one participant (participant 6). They reported in the comment question that “It was odd for me to realize that instantly I take side with my dad because of loyalty, but also (I) agree with his opinion genuinely.” Participant 10 chose all the characters with their first name with a variation (1, 2, alpha). They explained that they feel all the voices are their own, but they differ in perspectives. Participant 13 reported that the game was psychologically (maybe) not good for them as they reported at the end that they have a slight experience of psychosis.

5.4 Limitation

Inner speech as a universal experience (shared by everyone) is not what we claim here, especially as the medium of thinking can take other forms than words and sounds. Nevertheless, many people use the inner speech form of vehicle for their inner thoughts. Thus, this testimony can be affirmed or rejected by the readers' personal experiences.

One question that can come to mind is, how is inner speech different from thinking? Inner speech is just one way of experiencing our thoughts. However, experience thinking can take other forms like images or unsymbolized thinking (Hurlburt & Heavy, 2006). Moreover, some people sometimes think in other vehicles besides languages such as sounds, numbers, visuals, colors, tastes and odors, tactile feelings, kinesthetics, and emotions (Wiley, 2014). Also, we do not know for sure if inner speech is a universal phenomenon. Talking to oneself is part of the human experience and mental life.

Nevertheless, it is not intended to say that it is the only one or that it is universal. Hurlburt and Heavy (2006) investigate the pristine inner experience using DES, a phenomenological qualitative first-person method designed to produce high fidelity descriptions of randomly selected pristine inner experience. The results estimate that inner speech (or inner speaking), on average, occurs during 26% of waking life (Hurlburt et al., 2013). The result was obtained from a sample of 30 individuals representing a heterogeneous student population (Hurlburt et al., 2013). The frequency ranged from 0% to 75%. Five of the 30 participants had no inner speaking in their ten samples (Hurlburt et al., 2013). Inner speech (and Inner hearing) is part of the pristine inner experiences, according to (Hurlburt & Heavy, 2006). This means that inner speech is not prevalent and does not happen all the time. Besides that, they have also found participants who had no moments of inner speech. I hold the view that inner speech can be dialogical. This view has had influences, and many researchers adapted this view.

Nevertheless, there are also criticisms of this view. Gregory (2019), for example, explains that Inner speech involves only one participant. There is no distinct interlocutor, as there is in external dialogue, and the only person available to respond to a remark one makes in inner speech is oneself (Gregory, 2019). He presents arguments that inner speech is not dialogic. In my view, and according to the DST, the self has many positions that can have

a dialogue in one person. In the imagined interactions, it is unclear whether we can distinguish the voices innate to us or integrated from our social environment or whether this interaction happened in more than one voice. In (Hurlburt et al., 2013), using DES investigations, the authors suggest that it is rare that inner speaking occurs in another person's voice. These findings raise questions about this study and its applicability. Is this method applied only to some people who demonstrate the capabilities of inner speech? Can otherwise people acquire inner speech? Or whether aloud dialogical self (private speech) can be evoked in any person?

Studies such as (Hurlburt et al., 2013) conclude that questionnaires (subjective rating) overestimate the frequency of inner speech by comparison to DES results (though not the result of any direct comparison of questionnaires with DES results). They justify by concluding that it could be the result of differing definitions of inner speech.

The known notion of perspective-taking known in social psychology, i.e., precedes the concept of Theory of Mind (ToM). Perspective-taking means the social construction of meaning derives from one's implicit theories about what the other knows, feels, thinks, and believes (Krauss & Fussell, 1996). In this study, the '*others*' evoked by the researcher to avoid egocentric bias; the tendency to value one's own perspective higher than that of others (Ramin, 2020). Whether the '*others*' perspectives are mentalized (mental stimulation) by playing a role in a third-person perspective, or the '*others*' entered 'the domain of a self according to DST needs further investigations. In other words, where is the separation (or the merge) between self-other? Also, What defines "One's own perspective" in the process of negotiating a subject or a problem in our self and mind from different perspectives.

Concerning the methodological study design, the statistical tests probably have not been able to identify significant relationships within the data set due to the small sample size. Therefore, further studies are advised to consider the sample size and Statistical power.

5.5 Worldviews

A challenge in a mixed-method design is the underpinning philosophical assumptions such as ontological, epistemological, and axiological. The quantitative design usually takes a positivist stance, while qualitative usually explain an interpretivist and constructivist stance.

These are competing worldviews for an explanation of reality (what exists? And in which ways it can be represented?), and knowledge (what we know and how we know it?), also value (why we do what we do in such a way?). The answer to what kind of worldview we obtained for this work follows Dewey's view, a Pragmatic view of multiple forms of reality. Pragmatism is a research philosophy based on the epistemology that there is no single way to learning but many different ways of understanding because there are multiple realities (Saunders & Rojon, 2012). One exists as construction in mind but also one in the objective world. The results from the two sources find a place in a single study. Each form of existence and knowledge can be compared and combined, which leads to an increase in the credibility and value of the study findings.

5.6 Cognition Views

“All know is doing. All doing is knowing.”

Varela

My view of cognition followed the 4Es (Embodied, Embedded, Extended, Enactive) as inseparable, a unitary view, an alternative to the classic computational cognitivist approach to cognition. I also adopt a constructivist approach to learning and meaning-making. Considerations apply to the concept of self as a multiplicity of positions may find a plurality of factors that includes the 4Es, constructivism, situated, experiential, affective, and narrative elements. The play method in this study influenced by, and contributes to, understanding of the 4Es. Schön (1992) coined the phrase “reflection in action”. The term means that there is an openness to think critically and construct meaning while we are in the process of doing it, which is also a view of Enaction cognition. In Maturana and Varela's maxim (Varela et al., 1974), “All knowing is doing. All doing is knowing.”

Hurlburt (2013) calls Inner speech *inner speaking* to emphasize that it is not passive, but it is active in its nature. According to this view or views, I support the claim that sensory-motor and affective processes are intrinsic to cognition, while there is no need to refer to any representationalists approach. Organisms are not passive receivers of input from the environment but are actors in the environment such that what they experience is shaped by how they act (Hutchins, 2010). The 4E paradigm views cognition as not a property of one

individual but is relational to the social and environmental factors. The enactivist approach emphasizes that *perception is for action* and that action-orientation shapes the cognitive process (Gallagher, 2017). The brain is not denied importance but, in this view, understood to be an integrated part of a more extensive dynamical system that includes a body and (physical, social, cultural) environments (Gallagher, 2013). A more radical biological Enactivist theorist suggests “that the brain or, rather the system as a whole- in which the brain in its interwoven relations with body and environment is attuned by evolutionary pressure and by individual’s personal (social and cultural) experiences- responds to the world rather than represent it.” (Gallagher, 2017)

The story is not complete without the concept of agency. In (Di Paolo et al., 2017), the authors propose an explanation of agency in an Enactivist account. Contrary to be described as "in-the-head", This account is a world-involving view, rather than intrinsic. In their alternative view, a sense of bodily self as an agent corresponds to what we experience during the ongoing adventure of establishing, losing, and re-establishing meaningful relations between the world and ourselves (Di Paolo et al., 2017). The awareness for different aspects of agency experience, such as the initiation of action, the effort exerted in controlling it, or the achievement of the desired effect, can be accounted for by processes involved in maintaining the sensorimotor organization that enables these interactions with the world (Di Paolo et al., 2017). This agency is constituted of a closed system network, but also the nodes of this network are open to other processes in the environment, in a constant participatory sense-making (Di Paolo et al., 2017).

The enactment of the dialogical self in psychodramatic action is a form of participatory sense-making to resolve tension and construct meaning. That potential is transformed every time you enact and embody a new position in a dialogue, in which you might end up in new open, unresolved tension. All experiences, even if its non-linguistics, have a particular openness to language. This is what Di paolo called linguistics bodies (Di Paolo et al., 2018). The tension involves incorporation (Di Paolo et al., 2018). Incorporation is the idea that navigating through sense-making strategies (i.e., through participatory intrapersonal dialogue) opens to new problems with contradiction and tension needs for more sense-making, i.e., incorporate the solution for the first thought in the next one. Linguistics bodies is a novel theoretical framework for an embodied, non-representational approach to

language that extends and deepens enactive theory, bridging the gap between sensorimotor skills and language. Each of us is a linguistic body in a community of other linguistic bodies (Di Paolo et al., 2018). For example, if you say the word, "I am tired" you may or may not feel the consequence of tiredness in the body. Nevertheless, you experience the linguistic affordance somehow, but you cannot experience being tired in the language alone. You need a body for that. Linguistics bodies would not be the bodies we are if we did not have the history and capacities or regular engagement with language (Di Paolo et al., 2018).

Di Paolo points out that we do not have a pre-giving body. "The" body in embodiment, according to him, is so prevalent. The human body does not exist. Using it in plural makes a substantial difference; there are bodies (billions of them). These are minded, autonomous, self-individuation bodies (Kyselo, 2014). The living organisms actively and continuously produced a distinction between themselves and their environment (Di Paolo et al., 2018). Whether biological, sensorimotor, or linguistics bodies and the concept can further be extended to other forms of bodies. Thinking, writing, talking to oneself form a system that needs the ongoing enactments of living bodies to be sustained, repaired, altered (Di Paolo et al., 2018).

In (Di Paolo et al., 2018), the notion of "involvement" is introduced. Involvement means that mind is not only happening in the realm of our experience but also as a material embodiment, and the world is very much a constitutive part of our cognition. Everything we do occur in the world. The world disrupts our sense-making. (Di Paolo et al., 2018) calls it a "material-social-historical embodiment".

Life is an ongoing circling flow of individuation while creating conditions that take you back to potentialities, which take you into more potentialities (more freedom) (Di Paolo et al., 2018). The whole idea of how we construct ourselves through roles and perspectives is a mental flow of individuation. The parts constitute the whole, the individual.

From enactive principles of sense-making and participatory sense-making, human interactive sense-making can be explored. Human interactive sense-making contains within itself stages of contradictions and struggle that surpasses to negotiation (Di Paolo et al., 2018)). The negotiations are with the environments, others, and one's own various needs and feelings. All of the above applied to linguistics sense-making. What means by linguistic

sense-making is spontaneous expression, exploration, and negotiation, which entail an act of agency (Di Paolo et al., 2018). Negotiation and exploration are happening while entertaining dialogue with the others (interpersonal) or within others (intrapersonal).

Negotiation and exploration are happening while entertaining dialogue with the others (interpersonal) or within others (intrapersonal). The enactment of the dialogical self in a psychodramatic action is a form of participatory sense-making for the goal of resolving tension and construct meaning. That potential is transformed every time you enact and embody a new position in a dialogue, in which you might end up in new open, unresolved tension.

Constructivism holds that an individual is not a passive agent. The agent sense of "a" reality and the meaning found in life is not there to be *discovered*, rather to be *constructed* from life experience and hypotheses of the environment. In this way, experience has an impact on the way people view and understand the world. Thus, it has many applications, e.g., learning, teaching, and therapy. According to this view, the reference to reality as "a" reality, not "the" reality because there is no one objective view of the world, constructivism theory suggests. Instead, every person creates (construct) their own version of reality. This version holds a perspective or perspectives built out of each individual's unique life experiences, including the influences of the social interactions.

Important themes in constructivism include order, sense of self, and active agency (Mahoney & Granvold, 2005). Out of a need for order, people find patterns and create meanings to organize the world easily. In addition, people are active agents in their own lives (Martin & Kulinna, 2005). Brain, body, emotions, situatedness, and embeddedness are honored in this view. Cognitive constructivism in learning is based on two different senses of construction. The first is that people learn by actively constructing new knowledge. The second is that people learn with particular effectiveness when engaging in constructing personally meaningful artifacts.

Self-talk is a reflective process where the agent is involved in ordering subprocesses. In these processes, a person actively organizes/dis-organizes/re-organizes their perceived experience. Self-talk is also a form of learning about the environment, other agents, and the self. Learning, according to the Constructivists worldview, posits that it is an active process.

Finally, Mirror neurons contribute to the participatory intrapersonal sense-making, not by simulating others' actions and not merely repeating a version of the other inside one's head, but by being a part of more extensive sensory-motor processes that respond to different interaction affordances (Gallagher, 2017). That means on this account, the '*other*' is perceived as someone to whom I can respond or with whom I can interact (Gallagher, 2017). Studies show the dialogic-monologic comparison activation in a number of regions collectively known as posterior midline structures. It is known that these areas are particularly associated with thinking about other minds (ToM) (Ferryhough, 2016). These findings are crucial to support Vygotsky's theory about dialogical inner speech. Therefore, we have the capacity to reflect the thoughts, feelings, and attitudes of other people within ourselves, what so-called social cognition. The participant's social interaction among the characters they created leads to some (novel) shared meaning, whether agreement or disagreement. This could not have been accomplished by asking the participants only to report their opinions and only from one single perspective in themselves.

5.7 Future Research

The divergence of the quantitative and qualitative findings calls for further investigations of the phenomenon of dialogical self and the intervention used in this study as a tool for learning. Therefore, Future empirical and theoretical work based on DST and Psychodrama as a serious play and serious games method is encouraged. Furthermore, future interdisciplinary research should also embrace experiential action methods, such as psychodrama, to inform, and be informed by, cognitive paradigms such as 4E.

One suggestion is to come up with a tailored questionnaire for such a study. Other suggestions are to replicate the study, testing its applicability as a tool in the realm of serious games and as a tool in formal education. For example, students can be asked to tackle an academic concept from different perspectives using the same intervention. Then measure their learning outcome accordingly. However, measuring learning outcomes is a difficult task to be tested empirically. Therefore, future research should come up with study designs to test the learning outcome in natural settings.

When we talk about inner speeching or dialogical self, we cannot avoid talking about self. A question can be raised ‘what is this self that does these conscious mental processes?’ Also, is it a *static self* or a *dynamic set of sub-selves*?. These questions are tackled, and still do, by philosophers of mind to reflect on them and raise new questions.

As in society, there are power structures and relationships; we can also see power relationships in the society of mind. Again, this goes beyond the scope of this study, but future research should touch on that.

The proposed idea can be investigated empirically using the micro-phenomenological research method. The two main question(s) could be: (1) what are the participants' lived experiences by the proposed method to enact/embodied and externalize their inner dialogue? And (2) what are the meaning, structure, and essence of the lived experiences of this method? Micro-phenomenology is suitable for these kinds of questions as it studies the pre-reflective subjective experiences to enable individuals to become aware of and describe the dynamics of their experiences. Micro-phenomenology allows us to study our lived experiences very precisely. Petitmengin states that “[...] in order to study cognition one can no longer limit oneself to data that can be observed and recorded from the outside, and that it is essential to take into account its subjective dimension, as it is lived from the inside” (Petitmengin, 2006, p. 1).

Petitmengin states further:

“The reason for this is the description of a cognitive process in the first person, i.e., as the subject experiences it, is far more precise and richer than an indirect description. [...] describing one’s own subjective experience is not a trivial activity, but on the contrary extremely difficult [...] because a substantial proportion of our subjective experience unfolds below the threshold of consciousness “ (Petitmengin, 2006, p. 2).

Further suggestion to move forward with theories of dialogical self, and experiential methods, such as psychodrama, is to inform and informed by a new promising paradigm, namely predictive processing, a promising paradigm that could provide an answer to the human cognitive architecture. Predictive processing combines top-down knowledge (beliefs always drive behaviors) and incoming sensory information. If our prior knowledge (or beliefs) match our sensory input, then no surprise is generated. Otherwise, a surprise,

what so-called a ‘prediction error’ or ‘Free energy’, is generated. The goal of cognizing, according to this theory, is for the Prediction error to be minimized. Predictive processing works in the following way, we first extract patterns or statistical regularities and use them to generate predictions or hypotheses. Hypotheses are organized in a hierarchical order, with higher-level hypotheses going to lower levels. Now, we got incoming information from the world through our senses. We compare them with the lowest-level hypotheses, which result in two possibilities either a match or prediction error is generated. Prediction errors cause the revision of the hypothesis at the lowest level. If not minimized, then prediction error pushed up higher in the system. Perception happens when prediction error is minimized. Most of the literature with this new paradigm are tackling perception. Nevertheless, Predictive processing could be applied to different cognitive/neural systems. Let us take a preliminary look at our phenomenon of interest through this scope. One alternative perspective to language is that the linguistics input directly affects mental states in ways similar to the other perceptual inputs (Elman, 2009). Viewed from the perspective of predictive processing, language directed at others and at oneself, i.e., self-talk, becomes a powerful tool for manipulating thought and reasoning. The process of predictive processing explained above for perception can be applied to the process of contemplating Inner (or private) speech. Reduction of surprise of any sense has an epistemic implication about our knowledge of the world (minimizing uncertainty). This will lead to better predictions in the future. Also, it has pragmatic ones as an agent will always choose their actions to avoid prediction error, i.e., having values, purpose, and goals.

6 Conclusion

The phenomenon of inner speech is difficult to investigate. This holds true because of the private nature and quality of inner speech. The researcher has no direct access to the “Inner” realm of thoughts. Therefore, I present with this research a window to the inner speech by the mean of a self-dialogue through psychodramatic interventional action. The intervention evokes a dialogue within a self without any input on the topic from a 2nd person perspective. Through the intervention, the participants assessed their opinions, beliefs, feelings, and values through the lens of different perspectives. According to DST, the different perspectives are the multiplicity of positions that have a dialogical relationship in the self. The intervention is a form of role-plays of those different perspectives using techniques of the psychodramatic method. The role-play method engages the whole person as an embodied, embedded, enacted, and situated agent. The role-play psychodramatic-inspired intervention is placed within the realm of serious play or as a prototype for a serious game.

Whether the private speech in childhood or the later developed inner speech, self-directed speech has a primary role in regulating thought and behavior. This guides my hypothesis that having an intrapersonal dialogue among different positions can lead to learning and meaning-making in a broad sense. More specifically, the study aims to test and evaluate whether a change in attitude or perspective can be detected towards the subject or topic entrained by a dialogic in a self. The topic or the case study used to operationalize the research is technological advancement.

The study follows a mix-method study design. Therefore, the collected data and their analysis follow two sources: quantitative and qualitative. This entails two competing worldviews. The results from the two forms of existence and knowledge can be compared and combined, which leads to an increase in the credibility and value of the study findings. The results of the quantitative and qualitative analysis show a divergence in the findings. The quantitative result shows no significant P-values. On the other hand, the qualitative result shows shift in perspectives in the main thematic categories and a change in the sub-thematic categories.

The divergence of the quantitative and qualitative findings calls for further investigations. Moreover, the phenomenon of dialogical self and the intervention used in this study should further inform, and informed by, cognitive science paradigms. Finally, the dialogical role-play can be investigated empirically using phenomenological methods.

Polarization is witnessed immediately by watching the daily news around the globe. Reasons can be confirmation bias, desirability bias, or binary bias, people experiences within their social environment, including the cyber one. Living in a social bubble and experiences similar beliefs, attitudes, and values can have adverse effects. Being in the other shoes can help to have empathy, understanding, and a possible shift in perspectives. The others can be found within us, as a self which extended to encompass a multiplicity of positions. A conversation within a self can reveal new output whether it supports or contradicts what we believe to be our viewpoint on a subject, just as conversations with others. Dominant position(s) probably are guiding our thoughts and behaviors. The proposed method is encouraged to be used as formal or informal educational role-playing and a serious play or game for social change. Just as children enact roles when play 'house' or 'school' to understand their environment and their place in it, Adults can also engage in this kind of role-play.

REFERENCES

- Aboulafia, M. (2020). George Herbert Mead. In *Stanford Encyclopedia of Philosophy*. Metaphysics Research Lab, Stanford University. <https://plato.stanford.edu/archives/spr2020/entries/mead>
- Bakhtin, M. (1981). *The dialogic imagination: Four essays*.
- Bakhtin, M. (1984). *Problems of Dostoevsky's poetics* (C. Emerson, Ed.). University of Minnesota Press.
- Batson, C. D., Early, S., & Salvarani, G. (1997). Perspective Taking: Imagining How Another Feels Versus Imaging How You Would Feel. *Personality and Social Psychology Bulletin*, 23(7), 751–758. <https://doi.org/10.1177/0146167297237008>
- Blatner, A., & Blatner, A. (1988). *The art of play: An adult's guide to reclaiming imagination and spontaneity*. Human Sciences Press.
- Blatner, A. (2000). *Foundations of psychodrama: History, theory, and practice* (4th ed). Springer Pub. Co.
- Boser, R. A., & Michael, K. D. (1998). *Students' attitudes toward technology in selected technology education programs*. 10(1).
- Carter, P. D. (2010). *Using Action Methods in Post-graduate Supervision*. 17.
- Chesner, A. (2019). Framing creativity. In *One-to-One Psychodrama Psychotherapy: Applications and Technique*.
- Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and Conducting Mixed Methods Research* (2nd Edition). Sage Publications.
- Di Paolo, E., Buhrmann, T., & Barandiaran, X. (2017). *Sensorimotor Life: An enactive proposal*. Oxford University Press.
- Di Paolo, E., Cuffari, E., & De Jaegher, H. (2018). *Linguistic Bodies: The Continuity between Life and Language*.
- Elman, J. L. (2009). On the Meaning of Words and Dinosaur Bones: Lexical Knowledge Without a Lexicon. *Cognitive Science*, 33(4), 547–582. <https://doi.org/10.1111/j.1551-6709.2009.01023.x>
- Feinstein, A. H., & Cannon, H. M. (2002). Constructs of Simulation Evaluation. *Simulation & Gaming*, 33(4), 425–440. <https://doi.org/10.1177/1046878102238606>
- Fernández Castro, V. (2019). Inner Speech and Metacognition: A Defense of the Commitment-Based Approach. *Logos & Episteme*, 10(3), 245–261. <https://doi.org/10.5840/logos-episteme201910324>
- Fernyhough, C. (2016). *The voices within: The history and science of how we talk to ourselves*. Basic Books.
- Fernyhough, C. (1996). The dialogic mind: A dialogic approach to the higher mental functions. *New Ideas in Psychology*, 14(1), 47–62. [https://doi.org/10.1016/0732-118X\(95\)00024-B](https://doi.org/10.1016/0732-118X(95)00024-B)
- Fernyhough, C. (2001). Dialogic Thinking. In A. Winsler, C. Fernyhough, & I. Montero (Eds.), *Private Speech, Executive Functioning, and the Development of Verbal Self-Regulation* (pp. 42–52). Cambridge University Press. <https://doi.org/10.1017/CBO9780511581533.004>
- Fernyhough, C. (2009). Dialogic Thinking. In A. Winsler, C. Fernyhough, & I. Montero (Eds.), *Private Speech, Executive Functioning, and the Development of Verbal Self-Regulation* (pp. 42–52). Cambridge University Press. <https://doi.org/10.1017/CBO9780511581533.004>

- Fernyhough, C. & Fradley, E. (2005). Private speech on an executive task: Relations with task difficulty and task performance. *Cognitive Development*, 20(1), 103–120. <https://doi.org/10.1016/j.cogdev.2004.11.002>
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Sage.
- Flavell, J. H. (1976). Metacognitive Aspects of Problem Solving. *The Nature of Intelligence*.
- Galinsky, A. D., Maddux, W. W., Gilin, D., & White, J. B. (2008). *Why It Pays to Get Inside the Head of Your Opponent*. 19(4), 7.
- Gallagher, S. (2013). The socially extended mind. *Cognitive Systems Research*, 4–12.
- Gallagher, S. (2017). *Enactivist interventions: Rethinking the mind*. Oxford University Press.
- Gieser, T., & Hermans, H. J. M. (2012). *Handbook of Dialogical Self Theory*.
- Gillin, J. L., & Huizinga, J. (1951). Homo Ludens: A Study of the Play-Element in Culture. *American Sociological Review*, 16(2), 274. <https://doi.org/10.2307/2087716>
- Gregory, D. (2019). *Is Inner Speech Dialogic?* 27.
- Heavey, C. L., & Hurlburt, R. T. (2008). The phenomena of inner experience. *Consciousness and Cognition*, 17(3), 798–810. <https://doi.org/10.1016/j.concog.2007.12.006>
- Hermans, H. J. M., & Dimaggio, G. (Eds.). (2004). *The dialogical self in psychotherapy*. Brunner-Routledge.
- Hermans, H. J. M., & Hermans-Konopka, A. (2010). *Dialogical self theory: Positioning and counter-positioning in a globalizing society*. Cambridge University Press.
- Hermans, H. J. M. (2003). THE CONSTRUCTION AND RECONSTRUCTION OF A DIALOGICAL SELF. *Journal of Constructivist Psychology*, 16(2), 89–130. <https://doi.org/10.1080/10720530390117902>
- Hermans, H. J. M. (2008). How to Perform Research on the Basis of Dialogical Self Theory? Introduction to the Special Issue. *Journal of Constructivist Psychology*, 21(3), 185–199. <https://doi.org/10.1080/10720530802070684>
- Hermans, H. J. M., & Dimaggio, G. (2007). Self, Identity, and Globalization in Times of Uncertainty: A Dialogical Analysis. *Review of General Psychology*, 11(1), 31–61. <https://doi.org/10.1037/1089-2680.11.1.31>
- Hermans, H. J. M., Rijks, T. I., & Kempen, H. J. G. (1993). Imaginal Dialogues in the Self: Theory and Method. *Journal of Personality*, 61(2), 207–236. <https://doi.org/10.1111/j.1467-6494.1993.tb01032.x>
- Hermans, H. J.M. (1999). Dialogical Thinking and Self-Innovation. *Culture & Psychology*, 5(1), 67–87. <https://doi.org/10.1177/1354067X9951004>
- Hermans, H. J.M. (2001). The Dialogical Self: Toward a Theory of Personal and Cultural Positioning. *Culture & Psychology*, 7(3), 243–281. <https://doi.org/10.1177/1354067X0173001>
- Honeycutt, J. M. (2010). Imagined interactions. *American Psychologist*, 65(2), 129–130. <https://doi.org/10.1037/a0018052>
- Honeycutt, J. M. (2019). Imagined Interactions and Inner Speech. *Imagination, Cognition and Personality*, 027623661986916. <https://doi.org/10.1177/0276236619869163>
- Hurlburt, R. T., & Akhter, S. A. (2006). The Descriptive Experience Sampling method. *Phenomenology and the Cognitive Sciences*, 5(3–4), 271–301. <https://doi.org/10.1007/s11097-006-9024-0>
- Hurlburt, R. T., Heavey, C. L., & Kelsey, J. M. (2013). Toward a phenomenology of inner speaking. *Consciousness and Cognition*, 22(4), 1477–1494. <https://doi.org/10.1016/j.concog.2013.10.003>

- Hurlburt, R. T., & Heavy, C. L. (2006). *Exploring inner experience: The descriptive experience sampling method*. John Benjamins Pub.
- Hutchins, E. (2010). Enaction, Imagination, and Insight. In *Enaction*.
- Jefferies, J. (2019). Role theory and role analysis. In *One-to-One Psychodrama Psychotherapy*. Routledge. Vancouver.
- Kolb, D. A. (1984). The process of experiential learning. *Experiential learning: Experience as the source of learning and development*. Prentice-Hall, Inc.
- Kolb, D. A. (2015). *Experiential learning: Experience as the source of learning and development* (Second edition). Pearson Education, Inc.
- Kolb, D. A., & Fry, R. (1974). Toward an applied theory of experiential learning. *M.I.T. Alfred P. Sloan School of Management*, 78.
- Krauss, R. M., & Fussell, S. R. (1996). Social Psychological models Of Interpersonal Communication. 183.
- Kyselo, M. (2014). *Kyselo, M. (2014). The Body Social: An Enactive Approach to the Self. Frontiers in Cognitive Science 5:1017 doi: 10.3389/fpsyg.2014.00986. https://www.academia.edu/8306707/Kyselo_M._2014_.The_Body_Social_An_Enactive_Approach_to_the_Self.Frontiers_in_Cognitive_Science_5_1017_doi_10.3389_fpsyg.2014.00986*
- Ligorio, M. B. (2011). The dialogical self and educational research: A fruitful relationship. In Hubert J. M. Hermans & T. Gieser (Eds.), *Handbook of Dialogical Self Theory* (pp. 439–453). Cambridge University Press. <https://doi.org/10.1017/CBO9781139030434.030>
- Mahoney, M. J., & Granvold, D. K. (2005). Constructivism and psychotherapy. *World Psychiatry*, 4(2), 74–77.
- Martin, J. J., & Kulinna, P. H. (2005). A Social Cognitive Perspective of Physical Activity Related Behavior in Physical Education. *JOURNAL OF TEACHING IN PHYSICAL EDUCATION*, 24, 265–281.
- McCarthy-Jones, S., & Fernyhough, C. (2011). The varieties of inner speech: Links between quality of inner speech and psychopathological variables in a sample of young adults. *Consciousness and Cognition*, 20(4), 1586–1593. <https://doi.org/10.1016/j.con-cog.2011.08.005>
- Mead, G. H. (1913). The Social Self. *The Journal of Philosophy, Psychology and Scientific Methods*, 10(14), 374–380.
- Meijers, F., & Hermans, H. (2018a). Dialogical Self Theory in Education: An Introduction. In F. Meijers & H. Hermans (Eds.), *The Dialogical Self Theory in Education* (Vol. 5, pp. 1–17). Springer International Publishing. https://doi.org/10.1007/978-3-319-62861-5_1
- Meijers, F., & Hermans, H. (2018b). Dialogical Self Theory in Education: An Introduction. In F. Meijers & H. Hermans (Eds.), *The Dialogical Self Theory in Education* (Vol. 5, pp. 1–17). Springer International Publishing. https://doi.org/10.1007/978-3-319-62861-5_1
- Mezirow, J. (1978). Perspective Transformation. *Adult Education*, 28(2), 100–110. <https://doi.org/10.1177/074171367802800202>
- Mezirow, J. (1991). *Transformative Dimensions of Adult Learning*. Wiley.
- Mezirow, J. (1994). Understanding Transformation Theory. *Adult Education Quarterly*, 44(4), 222–232. <https://doi.org/10.1177/074171369404400403>
- Mezirow, J. (1997). Transformative Learning: Theory to Practice. *New Directions for Adult and Continuing Education*, 1997(74), 5–12. <https://doi.org/10.1002/ace.7401>
- Mezirow, J. (2003). Transformative Learning as Discourse. *Journal of Transformative Education*, 1(1), 58–63. <https://doi.org/10.1177/1541344603252172>

- Moreno, J. L. (1933). Psychological and social organization of groups in the community. *Proceedings & Addresses. American Association on Mental Deficiency*.
- Moreno, J. L. (1946). *Psychodrama* (Vol. 1). Beacon House.
- Moreno, J. L. (1941). Foundations of sociometry. *Sociometry*, 15–35.
- Morin, A. (2019). When Inner Speech and Imagined Interactions Meet. *Imagination, Cognition and Personality*, 027623661986427. <https://doi.org/10.1177/0276236619864276>
- Nolte, J. (2018). Psychodrama and Creativity in Education. In S. Burgoyne (Ed.), *Creativity in Theatre* (Vol. 2, pp. 191–207). Springer International Publishing. https://doi.org/10.1007/978-3-319-78928-6_12
- Peirce, C. S. (1974). *Collected papers of charles sanders peirce*. (Vol. 2). Harvard University Press.
- Petitmengin, C. (2006). Describing one's subjective experience in the second person: An interview method for the science of consciousness. *Phenomenology and the Cognitive Sciences*, 5(3–4), 229–269. <https://doi.org/10.1007/s11097-006-9022-2>
- Piaget, J. (2002). *The language and thought of the child* (Vol. 10). Psychology Press.
- Pitkänen, J. (2019). *Forms of change: How do psychodrama, sociodrama, Playback Theatre and educational live action roleplay (edularp) contribute to change?*
- Raggatt, P. T. F. (2011). Positioning in the dialogical self: Recent advances in theory construction. In Hubert J. M. Hermans & T. Gieser (Eds.), *Handbook of Dialogical Self Theory* (pp. 29–45). Cambridge University Press. <https://doi.org/10.1017/CBO9781139030434.004>
- Ramin, F. (2020). The role of egocentric bias in undergraduate Agile software development teams. *IEEE*, 122–124.
- Saunders, M. N., & Rojon, C. (2012). Formulating a convincing rationale for a research study. *Coaching: An International Journal of Theory, Research and Practice*, 5(1), 55–61.
- Schön, D. A. (1992). The theory of inquiry: Dewey's legacy to education. *Curriculum inquiry*. *Curriculum Inquiry*, 119–139.
- Sheskin, D. J. (2020). *Handbook of Parametric and Nonparametric Statistical Procedures*. crc Press.
- Stewart, T. T. (2018). Dialogue, Inquiry, Changing Roles, and the Dialogical Self. In F. Meijers & H. Hermans (Eds.), *The Dialogical Self Theory in Education* (Vol. 5, pp. 35–47). Springer International Publishing. https://doi.org/10.1007/978-3-319-62861-5_3
- Varela, F. G., Maturana, H. R., & Uribe, R. (1974). Autopoiesis: The organization of living systems, its characterization and a model. *Biosystems*, 5(4), 187–196. [https://doi.org/10.1016/0303-2647\(74\)90031-8](https://doi.org/10.1016/0303-2647(74)90031-8)
- Vygotsky, L. (1929). The problem of the cultural development of the child. *The Journal of Genetic Psychology*, 36–413.
- Vygotsky, L. (1980). The Role of Play in Development. In *Mind in society: The development of higher psychological processes* (pp. 92–105). Harvard university press.
- Vygotsky, L. (1987). Thinking and Speech. In R. W. Rieber & S. C. Aaron (Eds.), *The collected works of LS Vygotsky* (pp. 325–339).
- Vygotsky, L. (1986). *Thought and Language*. Cambridge.
- Wiley, N. (2014). Chomsky's Anomaly: Inner Speech. 12.

APPENDIX

The questionnaire of the study

Participant No. _____

Please answer each question as accurately as possible by crossing the correct answer or filling in the space provided.

How old are you? : _____

Do you identify as (check all that apply):

- ☐ Male
- ☐ Female
- ☐ Transgender
- ☐ Different Gender Identity: _____

What is the highest level of education you have? :

- ☐ Did not finish High School
- ☐ High School Diploma
- ☐ Vocational Degree
- ☐ Some College
- ☐ Bachelor's Degree
- ☐ Graduate Degree (Masters, Ph.D, etc)
- ☐ Other (Please specify) : _____

What is your country of birth?: _____

What are the languages you are most comfortable speaking?:

1st Language (Mother tongue): _____

2nd Language: _____

3rd Language: _____

4th Language: _____

5th Language: _____

More: _____

Questions	Never	Rarely	Sometimes	Often	Always
How often you talk innerly to yourself?					

Participant No. _____

Now there will be **two** parts to the survey: we will collect information on your opinion about the **consequences of the advancement of technology** before and after an exercise. Some questions simply require you to choose an answer from a list of options. Other questions are open ended, where we ask you to fill with text. The answer is simply your point of view on the **consequences of the advancement of technology**.

REMEMBER THERE IS NO RIGHT OR WRONG ANSWER

What do you think the consequences of technological advancement?

Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Technology is good for the future of humanity					
Technology makes everything work better					
Technology is very important in life					
Technology has brought more good things than bad					

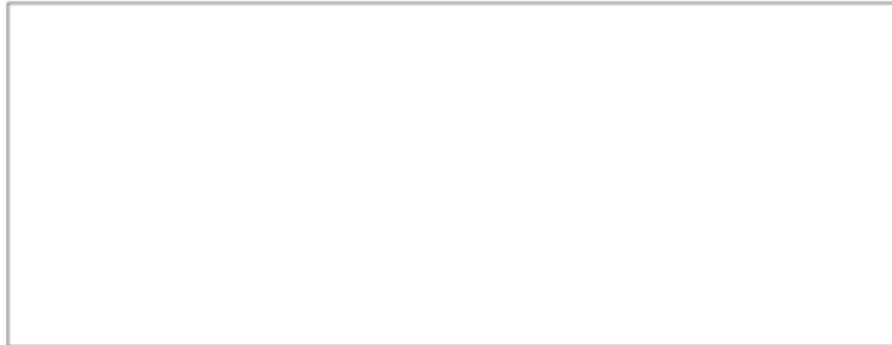
Participant No. _____

What do you think the consequences of technological advancement?

Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Technology is good for the future of humanity					
Technology makes everything work better					
Technology is very important in life					
Technology has brought more good things than bad					

Participant No. _____

How you compare your viewpoint/answer to the question "*What do you think the consequences of technological advancement?*" before and after the exercise?



Any comments about your experience of the exercise?

