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SIMPLY4EMOTIONS PROJECT

Report on literature review on emotional self-regulation, resilience, and game development for creating a game for health and social care professionals.

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BACKGROUND

Health and social care professionals (HSCPs) generally work in stressful working environments and are frequently confronted with emotional challenges in their professional life. Due to the many challenges, such as caring for terminally ill patients, bearing responsibility for difficult decisions or dealing with aggressive behaviour in the workplace and other emotionally challenging situations, health and social care workers can often feel physically, emotionally and psychologically drained (Maslach *et al*., 2001). This can have longer-term consequences, especially in relation to burnout, which for example occurs twice as often among nurses compared to all other occupational groups (Techniker Krankenkasse, 2021). Indeed, overall, health and social care professionals globally experience above-average levels of burnout (Jackson-Koku & Grime, 2019) and there is generally a higher level of workplace-related stress, which is itself a risk factor for burnout (Cheristanidis *et al*., 2021). The impacts of chronic interpersonal stressors on the job have long been known and can include physical outcomes, such as frequent headaches, sleeplessness, gastrointestinal disturbances, shortness of breath, etc, and behavioural outcomes, such as frustration, irritation, finding it difficult to hold in feelings, disengagement and cynicism (Freudenberger, 1974). These impacts obviously have implications for decreased quality of care, high rates of absenteeism and turnover among health and social care professionals, all of which have negative consequences for the healthcare sector (Eishaer *et al*., 2018; Embiaco *et al*., 2007; 13).

Health and social care professionals (HSCPs) often adopt different ways of coping to overcome these challenges and demands of their everyday work. Winter (2019) for example, identified cynicism and turning to administrative activities as a ‘strategy’ to cope with demands of the job. In a similar fashion, Kersting (2013) outlined a comparable process of “cool-out” when nursing students lose their

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motivation to be a "good nurse" after being in a hospital setting for more than a year. This was sometimes a precursor to resignation. Of concern, what these 'strategies' have in common is a general absence of supportive emotional self-regulation. Kadović *et al*. (2022) for example, found that health professionals commonly have weakly developed emotional regulation skills and that the level of stress experienced was significantly higher where the capacity for emotional regulation and control was low. As such, there is clearly a connection between the level of emotional self-regulation skills and the probability of burnout among health and social care professionals (Jackson-Koku & Grime, 2019; Khouri *et al*., 2022). Thus, the development of emotional self-regulation skills can act as protective factors against stress, burnout and ultimately exiting the profession.

However, there is generally a lack of health programmes to promote emotional intelligence of HSCPs and lack of support from the supporting systems (El-Sayed *et al*., 2014; Nooryan *et al*., 2012), although several studies have shown that training on emotion regulation and emotional intelligence is significantly effective in enhancing mental health (Esmaeeli *et al*., 2007; Jackson-Koku & Grime, 2019; Nooryan *et al*., 2012). In light of global shortages of health and social care professionals, enhancing emotional self-regulation skills and capacities has become an even more pressing priority, to support health and social care professionals, health and social care systems, and the patients and services users who engage with these systems.

The Simply4Emotions project is an attempt to help address this need to support health and social care professionals through the development of training opportunities. In recognition of the challenges and time demands that health and social care professionals face, the Simply4Emotions project team was cognisant that such training must use a low-threshold approach, be free from economic and resource constraints, and is suitably sensitive to the challenges of emotional self-regulation by providing a safe and fun space for learning. The development of a simulation game in both physical and digital formats that can fit into the daily lives of many health and social

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care professionals, offering them time-independent, asynchronous learning seems particularly appropriate to meet these challenges.

Game development – the theoretical foundation.

The development of a simulation game to support health and social care professionals enhance emotional self-regulation and support resilience clearly presents a number of challenges. Emotions and resilience are very much part of the internal world and can be shaped by a variety of individual factors, such as individual characteristics, age and level of experience. On the other hand, games are most often associated with the external world of interacting, playing and having fun with other people. In order to try to establish a blueprint to bring these elements together a structured phased approach was adopted. First, an initial review of the academic/scientific literature was conducted to establish suitable theoretical foundations. Second, further more specific reviews of the literature were undertaken with a focus on resilience among health and social care professionals and on game development.

The initial processes of development.

An initial desktop review of the academic/scientific literature around emotional self-regulation was completed to help establish the theoretical basis for the project's development. This review and consensus discussions among the project partners led to the selection of the Cognitive Appraisal Theory (Lazarus) and the Emotional Self-Regulation Model (Gross) as suitable theoretical underpinnings for the next phase of development. Subsequent to this phase, four parallel subgroups further interrogated the academic/scientific literature guided by specific questions that sought to bring the

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theory, resilience and target audience of health and social care professionals together, namely:

1) Cognitive Appraisal Theory (by Lazarus).

How can the cognitive appraisal theory approach support health and social care professionals to enhance their resilience?

2) Emotion Regulation Model (by Gross).

How can the emotional regulation model support health and social care professionals to enhance their resilience?

3) Resilience and self-care.

How can health and social care professionals' resilience be enhanced?

4) Game development.

How, if at all, have simulation games been developed to enhance resilience (or components of resilience)?

This report details the findings of these reviews. It is divided into four sections. The first two sections discuss the selected theoretical foundations, namely cognitive reappraisal theory and the emotional self-regulation model. The third section examines resilience and the fourth and final section looks at game development and the manner in which game design is shaped and implemented.

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COGNITIVE APPRAISAL THEORY

Cognitive appraisal is the subjective interpretation made by an individual to stimuli in the environment. It is a component in a variety of theories relating to stress, mental health, coping, and emotion. It is most notably used in the transactional model of stress and coping, introduced in a 1984 publication by Richard Lazarus and Susan Folkman (Lazarus & Folkman, 1984). In this theory, cognitive appraisal is viewed as the way in which an individual responds to stressors in life.

The idea that people respond with different emotions to the same situation depending on how they interpret, or appraise, the situation is one of the core assumptions of cognitive appraisal theories of emotions. In this view, it is the appraisal of a situation, rather than the situation *per se*, that determines the quality and intensity of an emotional response. Specifically, appraisal theories of emotion assume that the

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emotions elicited by an event are determined by how the event is interpreted along a number of appraisal dimensions. These dimensions include the importance of the event, its un/expectedness, perceptions of the responsible agent, and the degree to which it is possible to control the event (Siemer *et al*., 2007).

As such, cognitive appraisal includes the personal significance of an event, an evaluation of its implications for one's well-being, and determining the available coping resources, and the extent to which they are (in)adequate to the response. This appraisal process influences the intensity and quality of emotional experiences, and Cognitive Appraisal Theory highlights the role of cognitive processes in shaping emotions through emphasises the subjective nature of emotional responses. These cognitive processes are spread across two phases, primary and secondary appraisal. During primary appraisal, an event is interpreted as dangerous to the individual or threatening to their personal goals. During the secondary appraisal, the individual evaluates their ability or resources to be able to cope with a specific situation.

Primary appraisal

Three components are distinguished within primary appraisal.

Goal relevance is the extent to which the encounter refers to issues about which the person cares, or that are relevant to the individual's well-being. If the person believes that there is no goal at stake, then no emotion will be elicited.

Goal congruence defines the extent to which the event is aligned with personal goals. This implies that if the person appraises the situation or event as being congruent with personal goals and helps to increase well-being then positive emotions are elicited. If the situation is appraised as being incongruent (hinders) then negative emotions are elicited.

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Type of ***ego involvement*** includes aspects of personal commitment such as self-esteem, moral values, ego-ideal or ego-identity. These ego-involvements refer to goals that center on the self and will determine the emotions felt.

Secondary appraisal refers to the individual's estimation of their ability to cope. It is the assessment of skills, resources and knowledge that the individual possesses to deal with the encounter. Evaluation is based on:

- *What coping strategies are available to me?*
- *Will the option I choose be effective in this situation?*
- *Do I have the ability to use this strategy in an effective manner?*

The adaptation response is determined by the primary appraisal of the event and the secondary appraisal of available coping strategies.

Three components of secondary appraisal have been identified, namely:

Accountability (credit or blame) determines who or what (oneself or someone/something else) is responsible for the event, that is who is to receive the credit (if the encounter is motivationally congruent) or the blame (if it is motivationally incongruent) for the outcome of the encounter, and therefore who or what should be the target of any subsequent coping efforts. For example, a client may be physically violent towards the health or social care professional. The HSCP may construe this as a reaction to something they (HSCP) said or did, or the HSCP may assign blame to the client for the behaviour.

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Coping potential - the two components of coping potential correspond to two main means of reducing discrepancies between one's circumstances and one's desires and motivations**:** ***problem-focused coping potential*** reflects evaluations of the person's ability to act directly upon the situation to bring or keep it in accord with the person's desires, while ***emotion-focused coping potential*** refers to the perceived prospects of adjusting psychologically to the encounter by altering one's interpretations, desires, and/or beliefs.

Future expectancy refers to how the future of the event is aligned with respect to goal congruence or incongruence, or to the possibilities, for any reason, of there being changes in the actual or psychological situation that could make the encounter seem more or less motivationally congruent (Lazarus & Folkman, 1984).

Scherer's component process model

The component process model proposed by Klaus Scherer (2009) utilises cognitive appraisal to explain an individual's psychological and physiological response to situations. Scherer's model makes additions to the Lazarus' transactional model regarding how many appraisals occur (see Figure 1). Rather than just two levels of appraisal in response to an event (primary and secondary), Scherer's model suggests four distinct appraisals occur: (a) the direct effects or relevance that an individual perceives an event to be to them (b) the consequences an event has both immediately and longer-term to an individual and their goals (c) the extent to which an individual perceives that they can cope with the consequences of the event (d) the ways in which the events are perceived to result from an individual's values. This model and additional work by Scherer notably highlight not only psychological responses, but many physiological responses according to how events are appraised by an individual.

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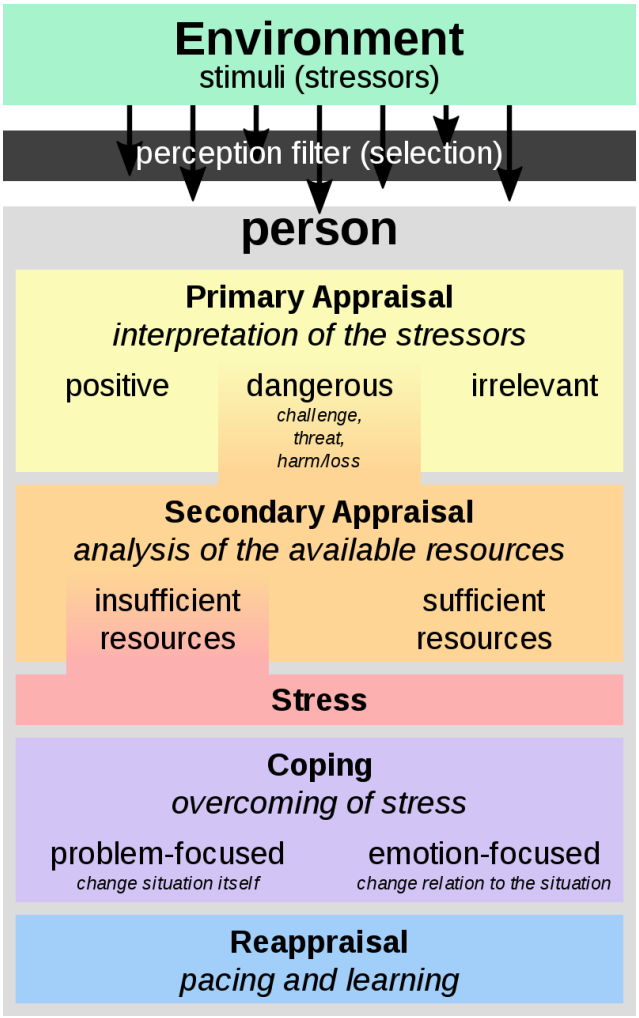

Figure 1. Visual representation of Lazarus' transactional model of stress by Guttmann (2023).

Stress

Stress is the term used to describe the heavy strain placed on an organism by internal or external stimuli. Lazarus and Folkman (1984) described stress as a relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being. Stress is cited as the main trigger for situations in which resilient behaviour is necessary. A distinction is made between two different types of stress. The first is

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"positive stress", also known as eustress. Here, the perceived stress is seen as a challenge and has a motivating effect. There is also "negative stress", commonly known as distress. Distress is seen as a burden and causes anxiety and a feeling of helplessness. It is a state in which the person affected is unable to cope fully with the situation (Ernst *et al*., 2022).

Coping

Appraisal of stressors (e.g., threat, harm/loss, or challenge) is accompanied by evaluation of possible *coping responses*. Coping entails efforts to manage the perceived situation and its subjective impact, referred to as problem-focused (changing the situation/event) and emotion-focused (changing the emotional response to a situation/event) coping, respectively. It takes the form of cognitive and/or behavioural activity and has numerous different manifestations depending on the nature of the stressor (Folkman *et al*., 1986).

Reappraisal

Cognitive reappraisal, or cognitive reframing is a strategy that can be used to improve self-regulation abilities. Specifically, cognitive reappraisal involves reinterpreting a situation in order to change the emotional response to it. In a study examining the link between self-regulation strategies (i.e., mindfulness, cognitive reappraisal, and emotion suppression) and emotional well-being, researchers found cognitive reappraisal to be associated with daily positive emotions, including feelings of enthusiasm, happiness, satisfaction, and excitement (Brockman *et al*., 2017).

EMOTION REGULATION MODEL

Self-regulation is the ability to control one's behaviour, emotions, and thoughts in the pursuit of long-term goals (Gillebaart, 2018). More specifically, emotional self-

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regulation refers to the ability to manage disruptive emotions and impulses - in other words, to think before acting. Self-regulation also involves the ability to rebound from disappointment and to act in a way consistent with personal values. It is one of the key components of emotional intelligence. Self-regulation involves taking a pause between a feeling and an action, taking the time to think things through, making a plan, and waiting patiently. Researchers have found that self-regulation skills are tied to a range of positive health outcomes, including better resilience to stress, increased happiness, and better overall well-being (Hofmann *et al*., 2014).

Emotions are important and basic in human experience, and are comprised of different components, such as subjective feelings, cognitive appraisal, physiological responses, and action tendencies (Kleinginna & Kleinginna,1981). Emotions become dysfunctional when they interfere with an individual's ability to behave adaptively, and therefore successful emotion regulation, when necessary, is crucial for psychological health. Emotion regulation is characterised as a process of observing, evaluating, and changing emotional reactions, their intensity and their duration to increase well-being (Aldao *et al.*, 2010; Thompson, 1994). Emotion regulation can be achieved through an automatic (implicit) process, or an effortful (explicit) process (controlled by learnt strategies to initiate, display, maintain or modify it) (Gross *et al*., 2011). It has been widely assumed that the absence of adequate emotional strategies puts a person at an increased risk for psychopathology (Aldao *et al*., 2010).

Emotion regulation model by Gross

The Emotion regulation model developed by James Gross (1998), is a widely recognised framework that explains how individuals manage and regulate their emotions. It suggests that people use various strategies to modify their emotional experiences, expressions, and physiological responses. These strategies can be categorised into five major types: situation selection, situation modification,

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attentional deployment, cognitive change, and response modulation. The model emphasises the importance of understanding and effectively managing emotions for overall well-being and adaptive functioning.

The following skills can be learned for adaptive emotional self-regulation:

- **Situation selection** – engage/avoid situations that illicit positive/negative emotions.
- **Situation modification** – individual attempts to alter specifics of the situation.
- **Attention deployment** – focus on particular aspects of a situation, such as concentrating on positive elements to improve emotions or directing attention away from negative elements.
- **Cognitive change** – reinterpreting the meaning of events.
- **Response modulation** – managing the physical or psychological responses from emotions, such as suppressing facial expressions to appear calm when frustrated.

A study by Kharatzadeh *et al*. (2020) evaluated the effectiveness of emotional regulation training on depression, anxiety and stress, and professional quality of life for intensive and critical care nurses. The 60 nurse participants were randomly assigned to treatment and control groups. The treatment group received six sessions of emotional regulation training, while the control group received no intervention. After the intervention the treatment group demonstrated improvements in burnout and compassion satisfaction compared to the control group, though no significant reduction in compassion fatigue was found compared to controls. Some cognitive coping strategies improved in the treatment group compared to controls, with greater reductions in depression, anxiety, and stress.

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Personal resources can support HSCPs in bearing up against stressful and demanding work situations. Emotion regulation skills can be conceptualised as crucial individual resources in this context. HSCPs should have a repertoire of strategies helping to deal with negative emotions, which allows application of adaptive emotional skills and enhances emotional coping abilities in the occupational context.

The following adaptive **emotional regulation approaches** can be used:

- **Identification** – identifying emotions, naming and labelling emotions, distinguishing different emotions and identifying normal and troublesome emotions.
- **Understanding** – comprehending causes and implications of emotions.
- **Cognitive reappraisal** – learning to reappraise emotional responses.
- **Emotional suppression awareness** – understanding the impact of emotional suppression (may be necessary in the short-term but can lead to long term issues). Identifying the extent to which the suppression strategy is used and its emotional consequences, acceptance and tolerance of emotional responses**.**
- **Social support** – seeking and receiving social support.
- **Self-care** – exercising, yoga, breathing, mindfulness and other relaxation techniques.

RESILIENCE

Resilience is an ability to manage and recover quickly from negative/stressful situations and to maintain positive mental health. According to Connor and Davidson (2003), resilience is the ability to thrive when faced with adversity. Resilience varies by individual and is shaped by biological, psychological and social factors. Resilience

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may vary with age, gender, constitution, cultural origin, and context (Connor & Davidson, 2003). It is often characterised by an individual's ability to view a stressful or adverse experience in a positive light (Kobasa, 1979) and whether the situation is approached actively and with optimism or passively endured (Scharnhorst, 2010); tolerate negative affect (Lyons, 1991); strive toward personal goals (Rutter, 1985); and generate optimism (Connor & Davidson, 2003). Accordingly, in more recent times, resilience has tended to be used as a collective term for a number of concepts, mutually influencing factors, circumstances and personality traits that make individuals more or less resistant to adverse conditions (Masten & Obradovic 2006).

Characteristics of resilient people (Connor & Davidson, 2003)

Characteristic	Reference
View change or stress as a challenge/opportunity	Kobasa, 1979
Commitment	Kobasa, 1979
Recognition of limits to control	Kobasa, 1979
Engaging the support of others	Rutter, 1985
Close, secure attachment to others	Rutter, 1985
Personal or collective goals	Rutter, 1985
Self-efficacy	Rutter, 1985
Strengthening effect of stress	Rutter, 1985
Past successes	Rutter, 1985
Realistic sense of control/having choices	Rutter, 1985
Sense of humour	Rutter, 1985

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Action oriented approach	Rutter, 1985
Patience	Lyons, 1991
Tolerance of negative affect	Lyons, 1991
Adaptability to change	Rutter, 1985
Optimism	Connor & Davidson, 2003
Faith	Connor & Davidson, 2003

Cross-sectional studies have generally indicated that problem-solving, positive refocusing, refocusing on planning, and adaptive perspective-taking are positively related to psychological resilience, whereas catastrophising, blaming others, and self-blame are negatively associated with resilience (Min *et al*., 2013; van der Werff *et al*., 2017). Kim and Lee's (2018) longitudinal study indicated that individuals with increased resilience were more likely to implement refocus on planning and positive refocusing (i.e., thinking about positive events and emotions rather than negative ones) compared to less resilient individuals.

Resilience approaches

Experiential learning - experiential learning can enhance many of the competencies associated with emotional resilience. Case studies, role plays and simulated practice, reflection on a story, and creating safe spaces for reflective learning, for example, can be used to improve emotion regulation, reflective ability, emotional intelligence and empathy (Cunningham, 2004; Gair, 2011; Foster & McKenzie, 2012). Work-based

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learning opportunities, or placements undertaken as part of training, can provide opportunities to help employees develop the competencies that underpin resilience. An experiential approach to enhancing emotional literacy has been developed by Grant *et al*. (2014) where social work students listen to experienced social workers from different backgrounds and disciplines describing their personal emotional reactions to practice situations and the ways in which they have processed them to protect their personal well-being and to ensure their practice was not adversely affected. This was followed by a group discussion. Preliminary findings indicate that this experiential approach improves aspects of emotional intelligence, reflective ability and empathy accuracy.

Mindfulness - mindfulness involves "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (Kabat-Zinn, 2004, p.4). Studies of helping professionals also provide evidence that mindfulness can relieve compassion fatigue, burnout and vicarious trauma (Cunningham, 2004; Thomas & Otis, 2010; Hülsheger *et al*., 2013) and can help employees manage work-related stress (Foureur *et al*., 2013). Mindfulness Based Stress Reduction (MBSR) is a technique developed by Kabat-Zinn (2003) that incorporates meditation, yoga and relaxation training. MBSR has been associated with enhanced levels of empathic self-awareness, self-compassion and emotional resilience in professions such as medicine, nursing and social work (Shapiro *et al*., 2007; Krasner *et al*., 2009; Pipe *et al*., 2009; Napoli & Bonifas, 2011).

Reflective practice – reflective ability can play a key role is supporting resilience to enable professionals to explore the dynamics of their emotional reactions and their doubts, assumptions and beliefs, together with the ways in which they can impact their well-being and practice. There are several techniques that can be utilised to enhance this key competency. Narrative writing has particular potential to facilitate reflection

and enhance self-awareness, empathic reflection and reflective communication in helping professionals (Hodges *et al*., 2008; Bolton, 2010). In particular, asking participants to write a narrative from the client or patient's perspective, and sharing these reflections in small groups of peers, can increase communication skills, help engender appropriate empathy and improve professional practice (DasGupta & Charon, 2004; Hurley & Linsley, 2012).

Peer coaching - peer coaching refers to a collaborative relationship that aims to enhance personal development by helping people identify personal strengths, promote self-awareness and develop reflective techniques (Goleman & Cherniss, 2001; Gyllensten & Palmer, 2005). There is also evidence that a brief peer coaching intervention can help trainees protect their psychological well-being during stressful periods (Short *et al*., 2010). Educators of helping professionals can use peer coaching techniques for personal development planning. Its strengths-focused philosophy has the potential to foster optimism and a positive outlook amongst HSCPs and help them develop action-orientated solutions to difficult situations, as well as develop strategies for self-care.

Mentoring - a mentor may impart knowledge about their own work path to a mentee, as well as offering direction, inspiration, emotional support, and role modelling and providing assistance with career exploration, goal setting, networking, and resource identification. Mentoring has strong potential to support the development of emotional resilience and develop structures to support a mentee in their professional practice (Hodges *et al*., 2008; Sergeant & Laws-Chapman, 2012).

Supervision - many health and social care professionals develop their reflective learning through the process of supervision. According to Edward and Hercelinskyj (2007), supervision provides a safe environment in which professionals can reflect on

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their practice and disclose and discuss their emotional reactions. Reflective supervision can play an important role in helping HSCPs to develop a flexible repertoire of problem-solving and coping styles that are a foundation for resilience.

Work-load management and autonomy - workplace-related aspects such as autonomy and empowerment, have been highlighted in a literature review on resilience in nurses (Jackson *et al*., 2007).

Self-care – the benefits of relaxation and contemplative practices such as mindfulness, yoga, meditation, and breathing are shown to enhance social and emotional well-being and build resilience (Brown & Gerbarg, 2009; Loizzo, 2018, Reeves *et al*., 2009). The results of a randomised clinical trial show that a six-week programme of yoga had substantial positive effects on the emotional well-being and resilience to stress among employees (Hartfiel *et al*., 2011).

General assumptions

The concepts of emotional regulation and resilience embrace the knowledge, personal qualities and skills required for a sustained and successful career in health and social care work, as well as other helping professions. Developing emotional resilience is a key skill that can enhance well-being, job satisfaction and retention in the helping professions, with positive implications for care. There is growing evidence that resilience is not an innate, fixed characteristic, but rather that it can be developed through training, carefully targeted workplace interventions, social support and self-care. Emotional resilience is a particularly important quality for health and social care professionals, as it can help them adapt positively to stressful working conditions, manage emotional demands, foster effective coping strategies, improve well-being and enhance professional growth. Coping strategies they can use may be either

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problem-focused (changing situation/event) or emotion-focused (changing emotional response to situation/event) or a combination of both.

GAME DEVELOPMENT

Game definitions

The word 'game,' derives from the Latin word 'ludus,' which encompasses both learning and entertainment (de Carvalho & Coelho, 2022). There are numerous definitions of games, however, they all generally characterise games as structured and goal-oriented activities, embodying an element of competition and/or challenge **(**Salen & Zimmerman, 2004; Merriam-Webster Dictionary, 2024). Sicart (2008) defined games as a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome, within a fictional context. In addition, games are playful and engaging activities characterised by encouraging intrinsic (personal enjoyment) and extrinsic (external rewards) motivation (Rieber, 1996). Games can be used as a skills exercise done consciously or unconsciously and they allow exploration and experimentation via role-playing in various contexts, allowing players to be immersed in real or fictional settings. Last but not least, games also entail an element of chance and uncertainty (Hunicke *et al*., 2004).

There are other types of games depending on their purpose, for example, serious games and simulation games. Serious games are games with a serious purpose that use game mechanics to engage players in learning, training, or problem-solving (Gee, 2003). Simulation games are often "computer programs that simulate real-world processes or environments" (Prensky, 2001, p. 5). These types of games are

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"immersive and engaging experiences that allow players to explore and learn about complex systems" (Dede, 2009, p. 4) and they can operate as "educative tools that can be used to teach a variety of subjects, including science, history, and social studies" (Klopfer *et al.*, 2009, p. 1).

Drawing from Frederik Barth's concepts, Klabbers (2018) characterises games as ephemeral social frameworks comprised of three interconnected components: actors, rules, and resources (p. 219). By embracing designated roles within defined rules, games manifest genuine temporary social structures. These structures are symbolically represented by available resources, ranging from linguistic cues to tangible items like coins or cards. The amalgamation of roles, rule adherence, and resource utilisation cultivates an authentic cultural dynamic within the game, sustaining itself in a circular fashion: Players operate within their role parameters, utilising resources in accordance to established rules. When all participants grasp their roles and access resources within the rule framework, a sense of purpose ensues, perpetuated by collective actions (termed "circular organisation"). Klabbers (2018) underscores the gravity of gaming, where participants immerse themselves in these temporary social constructs, fostering an intrinsic significance solely relevant within the game: whether competing for points, upholding rule compliance, or valuing certain tokens over others.

While games alone do not constitute simulation games, they serve as their foundation. Refining the notion of "games," Kriz (2009) defines simulation games as models that closely mirror reality, wherein players make decisions whose repercussions on reality are scrutinised (p. 560). Kriz identifies two pivotal aspects of simulation games: their proximity to reality through modeling and the subsequent evaluation of decision outcomes on reality. Simulation games excel in simulating and experiencing reality-like scenarios, varying in abstraction levels (Kriz & Manahl, 2016, p. 74). Moreover, they prompt reflection on decision impacts through

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debriefing, a hallmark feature absent in other playful learning formats like serious or educational games. Hence, simulation games entail:

- A game integrating actors, rules, and resources to construct a transient social structure (Klabbers, 2018).
- Utilisation of models to approximate reality, with varying levels of abstraction (Kriz, 2009).
- Deliberation on the game's real-world impacts through debriefing (Kriz & Manahl, 2016).

Game elements

According to Hinske *et al*. (2007) games have six elements: rules, competition, the goal, the outcome, decisions, and emotional attachment.

Rules are the very backbone of any game. They define the parameters within which players can act (do's and don'ts), to ensure that the game is fair and enjoyable for all players. Rules can be enforced through various methods, such as rewards, punishments, or even the mere threat of being excluded.

Competition can take several forms whether it is players competing against each other, teams pitting their skills against one another, or one or more individuals competing against the game itself. No matter the form, competition adds a thrilling aspect to the game, providing excitement and a sense of challenge.

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In every game, players have a **goal** to reach. Goals can be simple or complex, short-term or long-term, and they can be individual or collective (team) contributing significantly to the engagement of the players.

Players' actions and decisions throughout the game form the **final outcome** that can be a win or loss, or even a state in between, but in any case it should be meaningful and leave an impactful footprint.

When it comes to playing games, **decision-making** is crucial. From seemingly small choices to more significant one, players' choices shape the game experience. The ability to make wise decisions is crucial for achieving success in many games.

Games can evoke a wide range of **emotions** in players, such as joy, excitement, frustration, and even anger, resulting from their engagement in the game experience. For instance, in chess rules are strict and well-defined. It is a two-player game with players competing to achieve a winning condition by checkmating the opponent's king. The outcome is a win or loss, decisions are crucial, and emotional attachment can be strong for serious players.

Typology of games

There are many ways to analyse the typology of games that have been developed, such as by their materiality and gameplay.

Materiality means the physicality of the objects that are used to play the game. Based on this criterion, four main categories can be distinguished: tabletop games, group games, digital games, and phygital games.

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Tabletop games are normally played on a flat surface (e.g., table). Such games have mainly tangible objects (pawns, cards, etc.) that a player can use according to the particular rules. Examples of tabletop games include board games, card games, dice games, miniature games, or tile-based games.

Participants in a **group game** can be divided into two or more groups that play as units during the game. Each playing unit competes with the other. When there is a group of people playing together, teamwork leads to victory. The most popular group games are sports like football, basketball, volleyball, etc. Other popular examples of group games are tug-of-war, musical chairs, hopscotch, and cat-and-mouse chase, etc. Escape rooms are a popular group game for people today. Within escape rooms a group of people are in a room and try to escape by solving a series of puzzles and riddles within a timeframe. Group games can take place in exterior places or interior spaces. Thus, they can be divided into outdoor and indoor games.

In general, a **digital game** is defined as a game that integrates digital technology such as computers, laptops, consoles like PlayStation, Xbox, or Wii, smartphones, and tablets. In existing literature, there are many definitions of digital games, mainly shaped by the continuing evolution of media for digital gaming. Synonyms of digital games can be computer games, electronic games, and video games.

Phygital is a term initially coined for the marketing industry and it is nowadays also applied to the gaming sphere. It describes any attempt to amalgamate the digital with the physical realm. This merging aims to provide a unique interactive experience for potential players/users. This expansion of physical space into the digital realm is achieved by using digital means such as smartphones, tablets, or desktop computers, and specialised software. Examples of phygital games are the well-known Guitar Hero or Wii. Similarly, Hunt Games that use QR codes or Quiz games are very well-known

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in the educational community. Creating a phygital game answers to the emerging need of game designers to offer a differentiated and more engaging and attractive gaming experience, facilitating at the same time physical (interpersonal) interactions.

Gameplay is a complex term that encompasses the way players interact with the game itself, its story, its mechanics, and with each other. Oxford Learner's Dictionary (2024) defines gameplay as "the features of a computer game, such as its story or the way it is played, rather than the images or sounds it uses." Technopedia links gameplay to the player's overall experience of the game, including its rules, plot, game objectives, and how to achieve them.

Cooperative or coalition games are a type of game in which players work together online or offline to achieve a common goal. In these games, individual competition is reduced, and team skills and socialisation are emphasised. In the business world or within an educational framework, cooperative games can be used as team-building exercises or educational tools.

A **semi-cooperative game** is a game in which players must both cooperate and compete with each other to achieve a common goal. In order for a game to be considered semi-cooperative, there must be a possibility that some or all players can win, or that no one wins.

Puzzle games are games in which players must solve a problem to advance to the next level or for the game to end. Puzzles typically require players to rearrange pieces of information together in a logical pattern to reach a solution. Escape rooms, mystery games, and deduction games are all types of puzzle games.

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Deduction games are board games that require players to apply their deductive reasoning skills to identify the culprit, such as in a murder mystery or other crime. Mystery games similarly typically feature a storyline with a mystery or puzzle that players must solve, e.g. Who Done It games.

Managerial and resource management games involve managing a certain entity by collecting, monitoring, and leveraging resources. Players often have incomplete information about the game world and must make decisions based on limited knowledge. Examples of managerial and resource management games include city-building games and business simulations.

In storytelling games multiple players collaborate to create a story spontaneously. Each player typically controls one or more characters and describes their actions in detail.

Role playing games are a subgenre of storytelling games that typically involve character development, skill improvement, and a storyline.

Abstract strategy games are board games that do not have a specific theme or story. They rely on their rules and mechanics to provide an engaging and challenging gameplay experience. Chess is an example of an abstract strategy game. Although abstract strategy games tend to have simpler rules than theme-based games, they can be just as engaging and intellectually stimulating.

Game based learning

The context of gaming is like that of learning, involving cognitive, affective, motivational, and sociocultural aspects, coupled with enjoyable problem-solving

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activities guided by game rules (Plass *et al*., 2015; de Carvalho & Coelho, 2022). Traditional education methods often involve mainly passive learning methods, where learners simply listen to trainers without actively applying their knowledge or experimenting. Although effective in earlier educational models, research indicates that learners tend to lose focus in such environments. On the contrary, game-based learning (GBL) promotes active learning, allowing learners to construct knowledge independently (Foster & Shah, 2021) and apply it practically. The immersive narratives and challenges presented in games enhance the learning experience, fostering deep mental involvement (Agarwal *et al*., 2020; de Carvalho & Coelho, 2022).

Games support multiple aspects of the learning process (Pivec, 2017):

- Encouraging the integration of knowledge from diverse fields.
- Requiring decision-making and problem-solving skills.
- Evaluating outcomes based on decisions and actions.
- Promoting collaboration and negotiation, enhancing social and soft skills.

Furthermore, games provide a sense of freedom for both learners and trainers (Osterweil & Klopfer, 2011), including the freedom to fail, embody different identities, experiment, and exert effort. Consequently, significant improvements are observed in learners' engagement, understanding, and long-term retention.

Graceful Failure

Game-based learning allows for graceful failure; rather than describing it as an undesirable outcome, failure is by design an expected and sometimes even necessary step in the learning process (Kapur, 2008; Kapur & Bielaczyc, 2012; Plass *et al*.,

2010). This characteristic of game-based learning could be a useful feature in a game that addresses such sensitive topics as emotional self-regulation and resilience. The lowered consequences of failure in games encourages risk taking, trying new things, and exploration (Hoffman & Nadelson, 2010). They also provide opportunities for self-regulated learning during play, where a player executes strategies of goal setting, monitoring of goal achievement, and assessment of the effectiveness of the strategies used to achieve the intended goal (Barab *et al*., 2009; Kim *et al*., 2009).

Gamification or GBL?

It is crucial to distinguish gamification from game based learning (GBL) since they are currently widely used. More specifically:

- Gamification involves integrating game elements into non-game contexts/systems to motivate and engage learners (Deterding *et al*., 2011; Hamari *et al*., 2014). In other words, it could be the use of game-like mechanics, aesthetics, and rewards to engage people, motivate action, and solve problems (McGonigal, 2011). By using gamification, educators can enhance user/learner engagement and motivation (Zichermann & Cunningham, 2011).

- Game-based learning (GBL) represents an innovative educational paradigm that employs games to transfer learning, where the game itself serves as the lesson (Tan *et al*., 2007).

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Below, is a table with differences and commonalities of GBL and gamification.

Feature	Game-Based Learning	Gamification
Purpose	To enhance learning and improve engagement in a structured and goal-oriented environment (Tan, et al., 2007).	To increase motivation and engagement in non-game contexts (Zichermann & Cunningham, 2011).
Core	Games designed primarily for learning (Foster & Shah, 2021).	Game elements embedded into non-game contexts (Deterding, *et al*., 2011).
Learning Approach	Immersive, interactive, and experiential (Salen & Zimmerman, 2004).	Incorporates game mechanics, such as points, badges, and leaderboards (McGonigal, 2011).
Learning Outcomes	Conceptual understanding, problem-solving skills, and knowledge retention (Plass, *et al*., 2015).	Improved engagement, motivation, and task completion (Hamari, *et al*., 2014).
Applications	Education, training, healthcare, and personal development (de Carvalho & Coelho, 2022).	Marketing, productivity, and customer loyalty (Nicholson, 2014).

What is game design? Definitions and basic terms

Game design is the art of creating games. It is a complex and multifaceted discipline that draws upon a wide range of skills and knowledge, including creativity, problem-solving, mathematics, psychology, and technology. It involves a series of steps that are typically iterative, meaning that they may be repeated as the game is developed before resulting in its final form.

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1. Concept Development

To start designing a game, the first step is to create a clear and concise concept (Clark & Mayer, 2013). This involves determining the game's genre, theme, target audience, and core gameplay mechanics. The concept sets the foundation for the rest of the design process (Prensky, 2001).

2. Game Design Document

After establishing the concept, a Game Design Document (GDD) is created (Deterding *et al*., 2011). This comprehensive document outlines the game's entire design, including its concept, mechanics, story, characters, narrative arc, art style, and audio. The GDD serves as a blueprint for the development team, ensuring everyone is aligned (Gee, 2003).

3. Prototyping

Creating small, playable versions of the game to test and refine the design is a crucial aspect of the game design process, known as prototyping (Clark & Mayer, 2013). By prototyping, the design team can detect and solve problems at an early stage, which can save them a lot of time and resources in the long run (Prensky, 2001).

4. Development

After finalising the design, the game is developed into a complete product (Deterding *et al*., 2011). This process includes coding the game, creating the art and audio assets, and thorough testing to ensure it is free of bugs and enjoyable to play.

5. Testing and Iteration

It is important to conduct testing and iteration at every stage throughout the game development process. The development team and potential players regularly test the

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game to detect and fix bugs that arise to refine the gameplay mechanics and improve the overall experience (Gee, 2003).

6. Deployment

After completing the game development process, the next step is to deploy the game to the targeted platform(s) as mentioned by Clark and Mayer (2013), the deployment process includes publishing the game to digital stores, packaging it for physical release, and promoting it to the public (Prensky, 2001).

7. Post-Release Support

Games may continue to receive updates and improvements even after their release (Deterding *et al*., 2011). Developers often do this to fix bugs, include new features, or make gameplay more balanced.

Duke and Geurts' 21-step game design methodology

Duke and Geurts (2004) developed a 21-step sequence for the development and implementation of policy exercises: a special type of gaming simulation designed together with the stakeholders. According to Duke and Geurts (2004), a gaming simulation is a special type of model that uses gaming techniques to model and simulate a system. A gaming simulation is an operating model of a real-life system in which actors engage in roles that partially recreate the behaviour of the system. Players engage in a series of actions to achieve objectives within a restrictive and sometimes abstract theoretical setting that contains numerous challenges.

Since Duke's first book in 1974, his work has been focused on the scientific approach to gaming simulation. Duke and Geurts (2004) have detailed the 21 steps in their book along with providing suggestions and recommendations for optimal

practices. Their approach emphasises the importance of utilising theories and modelling practices from social psychology and sociology when discussing their methodology. According to Duke and Geurts (2004), policy exercise is an abstraction of reality, and "It should serve as a valid and efficient model of a complex environment for communication purposes" (p. 255). It is essential to capture the central aspects of the problem in the exercise while keeping the presentation simple and concise. Too many details or a complicated presentation can cause confusion instead of providing clarity. The 21-step process, if faithfully followed, provides a clear, logical basis for capturing the essence of the problem environment and translating it into an appropriate exercise. This game design model is a replicable, disciplined process to guide the development and use of policy games (Duke & Geurts, 2004). The design team can proceed systematically through twenty-one distinct steps, allowing the client to track the work's progress throughout the design effort and determine if the product meets the initial specifications. The step-by-step process directs a sequence of activities that includes formulating the initial situation, providing background and problem statements and developing a schematic (visual presentation of a system), articulating a conceptual model, designing, constructing, running a gaming exercise, and capturing the insights that emerge.

21-step game design sequence by Duke & Geurts (2004)

Phase I. Setting the stage for the project - Complete the essential preliminaries

Step 1. Administrative setup - Organize the project.

Step 2. Define the macro-problem - What prompts this exercise?

Step 3. Define the goals of the project - What are the primary objectives?

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Step 4. Project objectives /methods employed matrix - Is a game appropriate?

Step 5. Specifications - Constraints and expectations.

Phase II. Clarifying the problem - Define both the focus and scope

Step 6. Defining the system - Content, boundaries, interrelationships.

Step 7. Displaying the system - Create a lucid cognitive map.

Step 8. Negotiating the focus/scope with the client - set a clear target.

Phase III. Designing the policy exercise - Create a blueprint for the exercise

Step 9. System components/gaming elements matrix - A model of a model.

Step 10. Definition of gaming elements - Describe each module.

Step 11. Repertoire of techniques - Don't reinvent the wheel.

Step 12. Select a format for the exercise - What style is appropriate for this client?

Step 13. Concept report - Document the working drawings.

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Phase IV. Developing the exercise- complete the rule of ten test runs

Step 14. Build, test and modify a prototype exercise - Put the pieces together.

Step 15. Technical evaluation - Ensure an efficient and effective tool.

Step 16. Graphic design and printing-develop a professional presentation.

Phase V. Implementation - Ensure proper use by the client.

Step 17. Integrate the exercise into the client's environment - Make it fit.

Step 18. Facilitating the exercise - Practical use by the client.

Step 19. Dissemination - Deliver the policy exercise to the client.

Step 20. Ethical and legal concerns - Protect the client and the designers.

Step 21. Final report to the client - Ensure proper closure.

Mechanics, Dynamics, Aesthetics (MDA) framework for game design

The MDA framework for game design is a conceptual model that was developed by Hunicke, LeBlanc and Ryan in 2004. It was first taught as part of the Game Design and Tuning Workshop during the Game Developers Conference, San Jose 2001-2004. It is a three-part framework that breaks down the elements of a game into three categories: Mechanics, Dynamics, and Aesthetics and attempts to bridge the gap between game design, development and game research.

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Mechanics refer to the hidden elements of games, such as algorithms and rules in data structures. In other words, mechanics could be considered the building blocks that enable players to interact with the game world and experience its challenges. Mechanics define the game's setup, the actions players can take, the winning conditions, the points system, possible interactions between players, etc. Mechanics, in combination with dynamics and aesthetics, can enhance or diminish the overall pleasure and engagement of the gaming experience.

Dynamics are one of the most important features of game design and are closely linked to the gameplay. It refers to the parts of the game that are comprehensible and viewable by the players and are associated with processes and behaviors that emerge during the actual game experience. In short, dynamics describe how mechanics are acting on players.

Aesthetics of a game can be defined as the emotional responses evoked in the player while playing. They are the things that make a game feel good to play, and they are what make players want to come back for more. Some examples of game aesthetics include the art style, sound design, storytelling and context, and challenge and feeling of accomplishment that the game engenders.

Summing up, the MDA framework is a path from the rules of the game (mechanics) to the system of activities that are realised (dynamics) while playing, concluding with the feelings of players (aesthetics). It is a useful framing tool for game designers because it provides a comprehensive way to think about the different elements of a game. By understanding the relationship between mechanics, dynamics, and aesthetics, designers can create games that are fun, engaging, and challenging.

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Reframed MDA framework (Silveira Duarte, 2015).

In 2018, Sebastian Deterding and colleagues proposed a reframed MDA framework in their paper "From Game Design Elements to Gamefulness: A Conceptual Framework for Describing and Designing Gamified Experiences". The reframed MDA framework is similar to the original MDA framework but with some key differences:

- **Gameplay:** The reframed MDA framework replaces the term "mechanics" with the term "gameplay". Gameplay is defined as "the experience of playing a game".

- **Implementation and Emergent Gameplay:** The reframed MDA framework separates "dynamics" into two categories: "implementation" and "emergent gameplay". Implementation refers to the specific ways in which the game mechanics are implemented, while emergent gameplay refers to the patterns and trends that emerge from the interactions between the player and the game mechanics.

- **Feedback:** The reframed MDA framework adds a new category called "feedback". Feedback is defined as "any information that the game provides to the player about their actions".

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Simulation games in healthcare

The use of simulation games in becoming increasingly common in health and social care education and training. This increasing use and growing popularity can be attributed to the range of contributions simulation games can make to learning and skills improvement through engaging learners in experiences. These can including areas such as decision-making, interpersonal skills and clinical skills, as well as contributing to active learning, providing feedback and developing stress management skills. In addition, simulation games can be more cost-effective than traditional teaching methods, as they can be used repeatedly with different groups of students/learners. As a result of these advantages, simulation games are becoming an increasingly popular tool in healthcare education and training.

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