Game Designers' Experiences with Educational Game Design Elements: From Practice to Conception!

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Abstract: Educational game (EG) designing processes have adopted various processes and approaches over the last decades. While many articles report EG design elements that can potentially assist in effective EG design, not much research exists on whether game designers use/agree with those elements. In considering the aforementioned, the questions arise with game designers' practices: *how do they approach EG design elements in their process? Are there any core elements they include in their EG designing practices? Are there any other aspects that influence their EG designing process?* Therefore, this paper reports on the above-addressed questions and how game designers and their experiences in designing EGs can present insightful gaming elements associated with EGs. Based in Australia, a phenomenological approach was adopted to conduct semi-structured interviews to gather the *essence* of their experiences. Seventeen game designer participants attended two-hour interview sessions. Interpretive thematic analysis was used to identify emerging themes until saturation was achieved (Braun and Clarke 2012). The analysis was concurrently grounded through the concepts of the *theory of experience*, including *continuity*, *interaction*, *situation*, *freedom*, and *desire* which drives the purpose to apply and contextualize the *growth* of experience (Dewey 1938). In conclusion, an "Essential" Educational Game Elements (EGEs) framework is proposed with design elements collating all relevant elements/factors, necessary theories, and mechanics suggested by game designers for consideration in the design process as they have practiced. Lastly, researchers in educational/serious games are encouraged to consider the application of the proposed framework in designing EGs to further expand its limitations.

Keywords: Educational Games Design, Design Process, Game Elements, Framework, Experience, Serious Games

1. Introduction and Relevant Literature

The game design process varies in complexity across different genres, and the creative abilities of game designers in approaching such complexity are intriguing. Australian Game Development report demands for highly skilled employees have sufficiently increased, including programmers, artists, and game designers (Williams, 2021, Curry, 2021). Previously published research indicated that the Australian video game field has relied purely on economic and industrial metrics, often overlooking the interrelation of lived experiences of those within the field or the prior experiences of experts (Keogh, 2021, Sotamaa and Svelch, 2021). The emphasis on game designers (GDs) is to ensure that the *balance* is maintained in the system between the realistic and imaginative context of design (Kalmpourtzis, 2018, Schell, 2008). The need to conduct more empirical research that involves GDs' lived experiences, practices, and reflective thought-processes is essential for a growing industry. Still, there is niche research on GDs' thought-processes for designing games and educational games.

GDs are the artists, who direct and conceive game-making processes across various fields as discussed above (Koster, 2013, Darchen, 2017). GD roles, their skills, and the education that is needed to 'design the designer' suggested that there is an expectation and a particular skill level that is required within the gaming industry (Potanin and Davies, 2011). GDs take on multiple personalities to visualize what a game design should have and strive to create interactive narratives with meaningful experiences as they are play-testing to address the boundaries between imagination and reality (Garner, 2013, Kalmpourtzis, 2018, Schell, 2008). As Kalmpourtzis (2018, p.44) states, "*They challenge our way of thinking and help us grow. In this aspect, games are only limited to their designers' imagination*". GDs also experience a continuous play experience across various genres to adapt to a new and playable game with meaningful play (Ahmad, 2022, Ahmad, 2024).

The next section lists and discusses existing EG design elements, principles, factors, and also quality factors that have been prominently considered by other gaming researchers in the field over the past decade.

1.1 Existing EG Design Elements Review

Educational games designed for learning take both play and fun into account. Definitions by (Ogar et al., 2014) in (Ibrahim et al., 2010) defined game design as a learning system, that realizes some or all components of the learning process (learning theory, gaining skills and experience, and estimation of knowledge level) in a game context. EGs have been specifically designed to teach people about certain subjects, expand concepts, reinforce development, understand historical events or cultures, or assist them in learning a skill as they play (Singh et

al., 2008). Generally, EG is a game that combines both game design principles and learning theories with the integration of learning content of specific subjects or learning outcomes purposely to enrich learning for intended audiences.

It has been highly discussed over the past few years that educational games are designed for learning. Stenros (2017) discusses ten (10) principles that are required for an efficient instructional design, which include theory classification, learning out classification, the assessments of serious games, and four different types of learners. Pedagogically designed games are based on learning outcomes as stated in the course syllabus to match with the authentic syllabus as suggested (Fisch, 2005, Lepper and Cordova, 1992). As educational value through games has been systematically researched, it has been suggested that the cognitive consequences and learning outcomes reflect the player's prior actions to further progress in the assessments towards goals (Mayer, 2014). The learning outcomes should be based on the first three levels of Bloom's taxonomy (Forehand, 2010): knowledge, comprehension, and application. Another concept is scaffolding which requires feedback to be provided in the form of learning material to enhance students' learning process (Fisch, 2005, Graci, 1992). Finally, EG designed for self-learning purposes is used by students to enhance their understanding and assess their learning performance. These concepts were integrated into the game model proposed in (Garris et al., 2002). Theorists other than Prensky also identify key elements. Van Staalduinen and de Freitas (2010) listed 12 game elements from the literature and grouped them into four dimensions of their proposed 4-Dimensional framework. Some of the game elements appearing in the four dimensions are also mentioned in the core elements of a well-designed game and elements of an effective game (De Freitas and Jarvis, 2009, De Freitas and Oliver, 2006). This framework is used to choose an appropriate EG and learn to earn knowledge correctly (De Freitas and Jarvis, 2009, De Freitas and Oliver, 2006). The list of elements of learning specifics, pedagogy, representation, and context can be grouped with game elements as elaborated in (van Staalduinen and de Freitas, 2010).

Games motivate learners to take responsibility for their learning, which leads to intrinsic motivation contained by the method itself (Rieber, 1996). Four characteristics of games that contribute to an increase in motivation and eagerness to learn new knowledge are, namely, challenge, fantasy, curiosity, and control (Malone, 1980, Malone and Lepper, 1987, Snow et al., 1980). Challenges in a game tend to fight students' boredom and keep them engaged with the activity by utilizing adjusted levels of difficulty. Fantasy in a game increases enthusiasm by providing an appealing imaginary context, whereas curiosity offers interesting, surprising, and novel contexts that stimulate students' needs to explore the unknown. Finally, the control characteristic gives learners the feeling of self-determination. The requirements/guidelines for effective EG design. Due to various researchers proposing game design elements, this study combined four different game design elements into one Figure 1 to have a more visual representation of the game design elements proposed.

Games deliberately designed for education require some degree of effectiveness in order to be accepted by stakeholders. Researchers suggested that effective games should combine good game design and good pedagogy (Amory and Seagram, 2003, Klopfer et al., 2009b). Games design has similar concepts applied in entertainment games that should be adapted into EGs so they can offer certain degrees of engagement as it is in entertainment games. Game design with a fun aspect includes challenges, goals, feedback, and game stories. These elements derive the concepts of the game as described by various authors(Garzotto, 2007, Novak, 2011). These elements are said to be crucial in a game to really behave as a game (Grassioulet, 2002, Klopfer et al., 2009b, Owen, 2005, Prensky, 2003, Sauvé et al., 2007). Without those elements, games cannot be claimed as a games, but rather similar to edutainment concepts as suggested by (Klopfer et al., 2009a). See Figure 2 for a summarized list of existing EG elements.

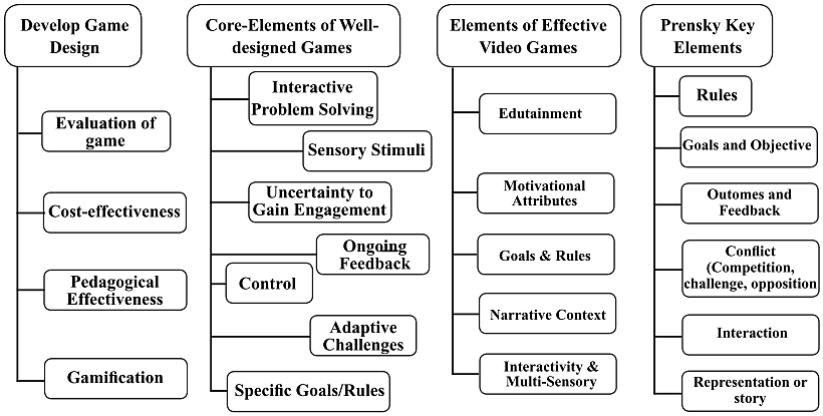

Figure 1: Adapted from various studies: Elements of developing a game design (Moreno-Ger et al., 2008, Holland et al., 2003, Whitton, 2007, Whitton, 2012), Core-elements of well-designed games (Shute and Ke, 2012), Elements of effective video game (Dondlinger, 2007), and Key elements of game (Prensky, 2003)

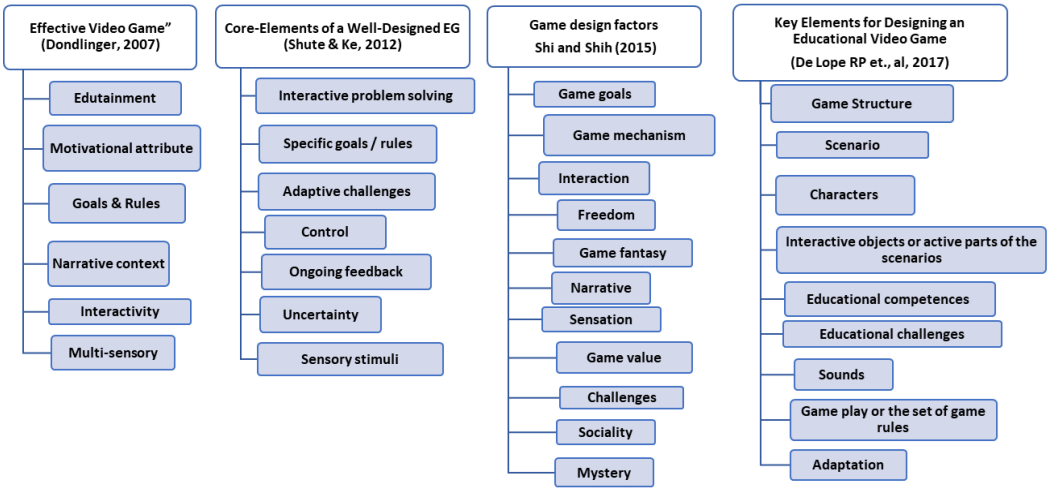

Figure 2: Adopted from Elements of an effective video game (Dondlinger, 2007), Core-elements of well-designed games (Shute and Ke, 2012), Game design Factors (Shi and Shih, 2015), and Key Elements for Designing an Educational Video Game (De Lope et al., 2017).

When the quality of EG is discussed, the quality characteristics must be also highlighted. Calderon & Ruize (2015) proposed 18 quality characteristics of EG for assisting in evaluating the process. A study analyzed primary studies (102) assessing learning outcomes through the application domains in which the assessments took place, the categories of serious games assessed, and the main features considered to assess the educational effectiveness of serious games (Calderón and Ruiz, 2015). Consequently, the procedures followed for assessing the learning outcomes of serious games and show that a key quality to be assessed is the effectiveness of EGs in terms of knowledge acquisition (Calderón and Ruiz, 2015). Usability and experience are also frequently assessed. Among the published research being reviewed, the methods for assessment being used are limited to testing the games after the games are fully developed. Other reviews on EGs for providing educational aspects do not analyze in detail how these EGs are evaluated. A non-systematic literature review presenting 41 games used for teaching different computing knowledge areas (Gibson and Bell, 2013). Besides characterizing the games, the authors also present some guidelines on how to determine if the use of a game is promising for computing education. Moreover, the Elemental Tetrad (Schellm 2008) was evolved by Kalmpourtzis (2018) as Elemental Pentad which includes Pedagogy in the center for educational purposes in the games. This was further used to develop categorization on sub-elements within the EGs design (Ahmad, 2022, Ahmad, 2023), which shed light on more clarity on aesthetics, mechanics, the storyline of the game, and technology. Petri & von Wangenheim (2017) reported that they have observed a diversity of quality factors evaluated but they did not identify a clear pattern. Frameworks such as MEEGA (Savi et al., 2011), use quality factors (e.g. Attention, relevance, competence, satisfaction) and the ARC model by (Keller, 1987); that decomposes the motivation concept. According to Keller

(1987), motivation is viewed as an unpredictable and changeable factor, and it can be influenced by teachers or a designer as they have no control over it. As a result, designers and teachers tend to ensure that their responsibility is to provide a good quality instruction, and they tend to assume that it is learner's responsibility to decide whether they take this opportunity to learn or not.

The explosion of EG design elements in research has clearly created duplication of some existing elements proposed previously, though some criteria changes in terms of the way type of game design, or using the terms effective, efficient, quality factors, and core elements. Not only does this lead to confusion but also leads to a misunderstanding of many other elements and their importance in EG. Therefore, there is a need to comprehend the reflective practices of game designers who have used and tested EG design elements in their design processes.

2. Theoretical, Conceptual, and Methodological Approach

The conceptual and theoretical frameworks adopted in this paper relate to Dewey's experience theory (1938): growth of experience, purpose, and continuity. Since these concepts are related to research epistemology and ontology, constructivism is used as a model for constructing new knowledge that welcomes the subjectiveness of individual experiences (Dewey, 1938b). The growth of experience is how a person develops in his or her career, experiences everyday activities to gain knowledge, learns to achieve his or her objectives, maintains his or her understanding of phenomena, and continues to develop in his or her experience. The aspects of "growth" are driven by the desire to formulate a "purpose" that returns to the growth of experience with the intelligence of the individual mind. In this context, adults who combine work and study, theoretical and practical exposure, are very well-known and productive in their expertise. The *purpose* is simple when a desirable quality *"…which identifies freedom with power to frame purposes and to execute or carry into effect purposes so framed. Such freedom is, in turn, identical with self-control; for the formation of purposes and the organization of means them are the work of intelligence"* (Dewey 1938, p.67). Dewey's description of an actual purpose is that it begins with an impulse. It is always equipped with *"end-view"* – *which is involving "the foresight of the consequences that may result from acting upon that impulse"* (p.67). Teachers create their meaning through their actions, and when games are played or tested, they reflect constantly through their actions, while game designers have similar ideals. Therefore, the creation of an enhanced experience shows the individualized aspect of learning by playing games, learning by doing, and adjusting the experience throughout the process.

The principle of *Continuity* is each experience taken from the past affects the future experience of the individual. In contrast, interaction refers to the situational and teacher's influence on student's experience. He believes that the elements of interaction and the situation in which they occur are *"inseparable from each other"* (1983, p. 41). Despite the importance of experience, some challenges may be encountered, such as *"that all experiences are genuinely or equally educative"* (1938, p.13). Thus, teachers must first understand the nature of human experience and explain how the value of this experience affects the person's present and future, and the ability to contribute to society. This is directly related to the way teachers in their classrooms interact with the needs of each person to support his or her cultural and social differences and enable them to learn equally and freely. Similarly, game designers help design EG design experiences by emphasizing and understanding players', designers', and game design processes. It is therefore crucial that teachers and game designers position the changing experiences in order to understand their perspectives, which may be enjoyable, but they cannot contribute to personal growth or experience without consistency, a situation that does not necessarily lead to a cumulative learning basis for future learning.

2.1 Participant Recruitment Criteria, Data Collection Method, and Analysis

Based in Australia, with criterion and snowballing recruitment procedures, semi-structured qualitative interviews with 17 game designers participated in this study. The criteria set for the recruitment process are shown in Table 1. Each interview session is approx. 2 hours and 30 minutes. This paper interprets one central theme (from six themes) emerging through the coding analysis. Consequently, the phenomenological approach is adopted to allow the researcher to uncover the *essence* of lived experiences described as the qualitative researcher pursues to identify the phenomenon of human experience and then derive a description representing the nature of experience (Kafle, 2011). The *essence* should not be viewed as a vague idea but rather the ability to identify the meaning embodied in the lived experience (Merleau-Ponty and Smith, 1962). Please note that all names are pseudonyms in the analysis.

Table 1: Participant recruitment criteria in this study

Criteria	Participants Details
Location	Within Australia (Victoria, New South Wales, Queensland, South Australia)
Years of Experience	Between 5 years – 15 years
Type of experience	Game designing and Developing (all types of genres).
Types of Players' Demographic	All Demographics. Primary school players' demographics are beneficial.
Participants in the study	17

2.2 Data Analysis and Interpretation Approach

The interviews were audio-recorded, transcribed, and time-stamped. An initial hand-coding approach was adopted before an in-depth thematic analysis using NVivo 10 software. This research adopted a six-step thematic analysis approach (Braun and Clarke, 2006). This analysis aims to allow game designers' perspectives discussed through reflective experience, their experience designing both types of gaming systems (its *growth* and *continuity*), and the way they criticize the conceptualization of games before they are designed (framing the purpose of designing games). Interpretive results are discussed through the interpretivism approach, where hermeneutic analysis is adopted to allow the subjectivity of game designers' experience. Interpretive thematic analysis was adopted to code emerging themes until saturation was achieved (Braun and Clarke, 2012). The analysis was concurrently interpreted through the concepts of the *theory of experience*, including *continuity*, *interaction*, *situation*, *freedom*, *intelligence*, and *desire* drives the purpose to apply and contextualize the *growth* of experience (Dewey, 1938a). Interpretive data analysis of GD's perspectives established six main themes and the *theory of experience,* and its concepts are deeply embedded within contexts where games are centered. Additionally, GDs demonstrated their preferences, attitudes, beliefs, desires, and purpose in using and designing games. By contextualizing the experiences of GDs, designing EGs corresponding to their beliefs shows potential towards what is essential, core, and what factors are considered in designing practices. Please note that all participants are addressed as pseudonyms to maintain anonymity(ethics approved).

3. Findings and Interpretive Results Discussion

Understanding how game designers approach the design of EGs is crucial to contextualize their experiences and practices that have transformed over time. Due to its generalization and adaptability of game designing processes, this theme explores a prompt question: *How do they consider designing elements for designing EGs, and based on your experience of designing EGs, what were the necessary factors to consider during designing processes?* While this question was open-ended, all game designers immediately acknowledged it as they reflected and (re) iterated their game designing approaches (Ahmad, 2023).

While all game designers indicated their preferences to begin designing EG with the way they approached 'games', two out of seventeen mentioned specific additions in the EG designing processes and altered their approach to accommodate EGs. As evidenced [**Raymond and Charlie**] justified how their designing processes were altered based on their previous experiences reflected with the ***bottom-up approach*** [Raymond] and using the ***Verbs*** in the curriculum to help guide the design process of EG [Charlie]. For instance, [Raymond] explained:

> *"..bottom-up approach works for me with educational games because the smallest interactions need to be considered in the beginning and defining all the necessary educational terms beforehand needed to be established…I know the biggest issue is that no other models have helped this process and this contains the essentials as I already know the game mechanics but I just need to define gameplay with a verb to complement with appropriate setting, content, and story relations to centre the core of the educational game…".*

As emphasized by a game designer their understanding of the designing process involves the relation of game designers' cognition to enable such designing processes that are institutively used and understood by themselves (Kuhnen, 2007). The *verb* layer consists of actions that players undertake during play and enforces the low-level micro-decisions to enable an immersive and memorable gaming experience. A good example presented and explained (Kuhnen, 2007) for the Grand Theft Auto game is that if "in-car" is a game state, then "accelerate" and "brake" might be good game verbs. In an EG like Minecraft, if "create" is a game state, then "build" and "break" might be a good game verb. This is then related to mechanics, the player's action, core features, and context.

Similarly, [**Charlie**] emphasized on the use of '*verbs'* in the designing process but there were no specific models/processes that were mentioned. However, the description of designing EG in the extract presented shows similarities with the bottom-up approach to an extent. She acknowledges that the core of the game is organized around *doing,* which is agreed with (Squire, K 2006). As shown:

> "*Unfortunately, I don't think there is a specific designing process for educational games because I usually tend to use the idea from game designing, as they are about playing and learning and not necessarily about knowledge, but players get knowledge by doing/interacting with games. What worked for me was using terms of verbs, listening, and brainstorming what we needed the students to understand and do in the game with some mechanics or actions. This is sometimes the first process I begin with…verbs can also be relevant to curriculum or learning objectives*".

With that, other game designers' participants explained how they have designed EGs and what were the necessary features, elements, and processes, that were undertaken in their experiences. Therefore, there are four emerging themes: Core features/necessary considerations, for whom (player's psychology), Combining Leaning and Gaming elements, and Positioning Pedagogy and learning principles; discussed in the following sections.

3.1 Core Features and Necessary Consideration

As the game designers mentioned that their EG designing processes are transferred and adapted towards EG designing, I prompted a question*: In your opinion, what are the required game design elements/features you always consider in educational game design? Or the "Necessary" elements?* The core of the game (central role in the player's experience are the content and features) and the context that allows players to have a general impression of the game world and its *essence*. The concept occurs to ensure the content and gameplay are constructed simultaneously. The two sub-themes below are discussed in relevance with: Rules, and choices in play, and balancing player's experiences and expectations (classroom).

3.1.1 Rules and Choices in Play

The game designers believed that EGs require an explicit set of rules that allow the learners in the classroom context to 'feel' the serious setting, as [**Blaire**] mentioned, "*the set of rules for educational games are solid and refined, to match the seriousness of the setting*". Moreover, [**Ross**] added that "*rules also relate with player's experience and the reason why game's purpose is educational and how that is controlled appropriately within it*". This relates to the clearly formed *purpose* of designing a game for a specific *situation* as a classroom, where the *interactions* between players and the game system demonstrate its *continuous* form of learning (Dewey 1938). Another relevant point related to rules and their influence on a player's gameplay where boredom may occur, is evidenced below:

> [**Anne**]: "*But one thing I know is a big hurdle for using educational games in the classroom is the rules and learning rules, along with introducing the rules because rules are so boring. Yet, students don't want to listen!"*
>
> [**Paige**]: "R*ules are core and essential, but they are tedious to finalized because it is a constraint on educational use! making the rules understandable to ease the 'figuring out during play' while being in a classroom and to get some fun and engagement together is difficult…rules control them [players] which isn't true. Rules control gameplay for fairness*".

Here, the concept of *freedom* and *social control* was observed in their description which I agree as rules are designed within the game to enable various play/learning experiences in a 'standardized' manner, however, players/learners neglect. In addition, adaptable rules within the games may encourage more interactive gameplay, as [**Nora**] mentioned, "*Once I designed an educational game with rules that were relevant to certain game elements and changed according to their [players] actions and interactions, which was successful!"*

Another point relevant to rules was the demonstration of 'instructions or 'guidance' provided to players through the gameplay are interconnected. Game designers advocated that the instructions "*need to be precise and not like an essay!*" [**Max**], and "*the rules should be differently displayed and the instructions of how to finish a level or activity should be separately presented to players*" [**Warren**]. This suggests that the players/learners make their choices based on what they understand through the play, but teachers act as 'external guidance' to boost their confidence during play or accomplish a sense of mastery. Mastery is when playing a game where the player's choices and actions can lead to a successful outcome, hence, "feeling of mastery that helps remind you that you can succeed…have control" (Schell, 2008, p.442). Here, the *freedom* of choice provided to players allows their abilities, *social control* as rules and guidance, and *interactions* are ideally necessary within EG.

Dewey believes that *freedom* allows one's mind to freely explore the possibilities without being restricted to taking actions or assuming it as a careless act as the players evaluate their own choices without complete guidance (Dewey, 1929).

3.1.2 Balancing Player's Experience and Expectations (Classroom Situation)

This sub-theme expands on players as learners who play games within the classroom context. Game designers highlighted that there is a need to *balance* the play expectations and experiences to ensure that they are memorable. In terms of memorable experiences, game designers advocated that EGs fail due to the play experiences and memory of playing games in the classroom. For instance:

> [**Zack**]: "*if the game being played in the classroom isn't designed in considering the expectations of experiences that the players will have, then the game will fail, and players will hate educational games because that is what they played in the classroom!*".

> [**Cathy**]: *"…memorable experience is so crucial, and I usually design it alongside any fun element or animation in the design, so I don't miss it!".*

With the fun element, another feature associated with memorable experiences was integrating problem-solving tasks/activities that can trigger memorable experiences, emotions/feelings, and affirmation beliefs (winning /losing), as shown below:

> [**Raymond**]: "*You need to engage players with some problem-solving tricks where they get into the play and show their emotions like excitement or anger if they fail*"

> [**Betty**]: "*Usually I find that players remember how they solved a problem or challenge they faced during their play and I think that's a memorable experience shared! I think when they win or lose, it helps them understand what they did wrong and master their choices, redo, and win!*"

Another feature influencing a player's experience is the level of difficulty that reveals appropriate pace and instruction, [**Anne**] added, "*the division of difficulty levels is so crucial in players' experience because if they fail too much, they will get frustrated!*". GD participants believed that a gradual transformation between levels positively affects the progress of learning and forms a *continuous* pace that enables *freedom*, "*they need to feel that they are progressing with some challenges, of course! But the challenges should level with how they progress and make choices. You can't design a game with full freedom, but you need to show that through a progression*" **[Tia].** Here, they asserted that challenging tasks and difficulty levels can be designed separately and are sometimes highly complex (Arnab et al., 2015, Schell, 2008, Kalmpourtzis, 2018). For instance, [**Tia**] pointed out, "*the difficulty level can be controlled one task at a time, but the challenges could be mini ones that pop up during one of the levels… so that's slightly hard to balance because it needs to be universally understood by the players, otherwise I don't add in design*". On that note, [**James**] added that, *"…challenging tasks are highly required because it triggers their mind, and they make choices which they sometimes speak out as reactions especially when they win! So, it encourages memorable experiences*".

With game levels, challenges, and choices, game designers mentioned the need to allocate the appropriate amount of time, that is required to complete the task in the classroom.

> [**Timothy**]: "*I usually design the task and difficulty levels differently to ensure that it can be completed in a certain amount of time… the threshold is to avoid players getting irritated!*"

> [**Terry**]: "*I just don't know how much time a classroom session has these days…my experience didn't let me have the luxury of knowing or being in the classroom to observe but I design based on the challenges that one task can encompass and make them mini so they can feel they completed a challenge.*"

With challenging tasks, some participants emphasized the need to 'communicate concepts appropriately' through design and they encourage curiosity and surprising features, [**Raymond**] added, "*there's something about the experience of communicating concepts and making a way to develop surprising elements, which lets the design level to speak directly to the players*" and this was paired with the interactivity of the player with the game, as [**Ross**] added:

> "*The way in which we [game designers] think that levels and challenges may evoke curiosity or surprise them with a new character or rule, it can directly communicate with players through play, but it can't assure us that it worked… it's a complex thought to anticipate about*."

As Schell (2008) emphasized that "*it is the root of humor, strategy and problem-solving […] random sprays considered the experience much more pleasurable*" (p. 26-27). In relevance with memorable experiences and surprise elements, [**Anne**] expressed that:

> *"One of the most significant elements in game design is surprising. Basically, introduces randomness, or 'gotcha' mechanics, so that your friends figure out what you have in your hands. Then, they can steal a bunch of cards off you because they figured out exactly what you have. So, those are examples like surprises are memorable."*

With surprises and experiences, communication between players and the game world (game as a system) is crucial to address as, "*it's an art... communicating what I want to design as challenges and levels and how they[players] understand it…and then, if they play with their friends in the class, you can hear what they understand too!*" [**Timothy**]. Moreover, game designers also believed that achieving communication and competition within EG design is relevant to the game mechanics that may be selected at the beginning of the designing process. For instance, [**Nora**] added, "*the communication of game elements and learning in the design and how players understand that is also related to how well the mechanics delivered what I meant!*". In addition to that, [**Anne**] suggested that EGs need to accommodate player's experiences through experimentation or trial-and-error based tasks which are aided by communication between their peers, "*it is crucial to let them experiment continuously to achieve the goal, explore, and communicate what they have done to allow their creativity, and collaborative learning within the classroom*". Here, ***Anne*** also mentioned that the goal drives their experimentation, communication, and collaborative learning and creates memorable experiences. It indicates that Dewey's *interaction* and *situation* concepts advocate their intimacy by positioning experience that occurs in a setting(*situation*) and formation of the *purpose* of the EG design that relates to how game mechanics aid with communicating EG design.

4. Concluding Remarks and "Successful" EG Design Elements

To conclude, the game designers experienced in EG designing processes were able to discuss and reflect on their successful EG design elements that enabled a more effective EG. These suggestions were enlightening to some existing literature discussed while others were connected with other elements that represent a successful combination to deliver memorable gameplay. Therefore, Figure 3 proposes the summarised interconnectedness of EG design elements as "essential"; which are practiced by GDs in Australia.

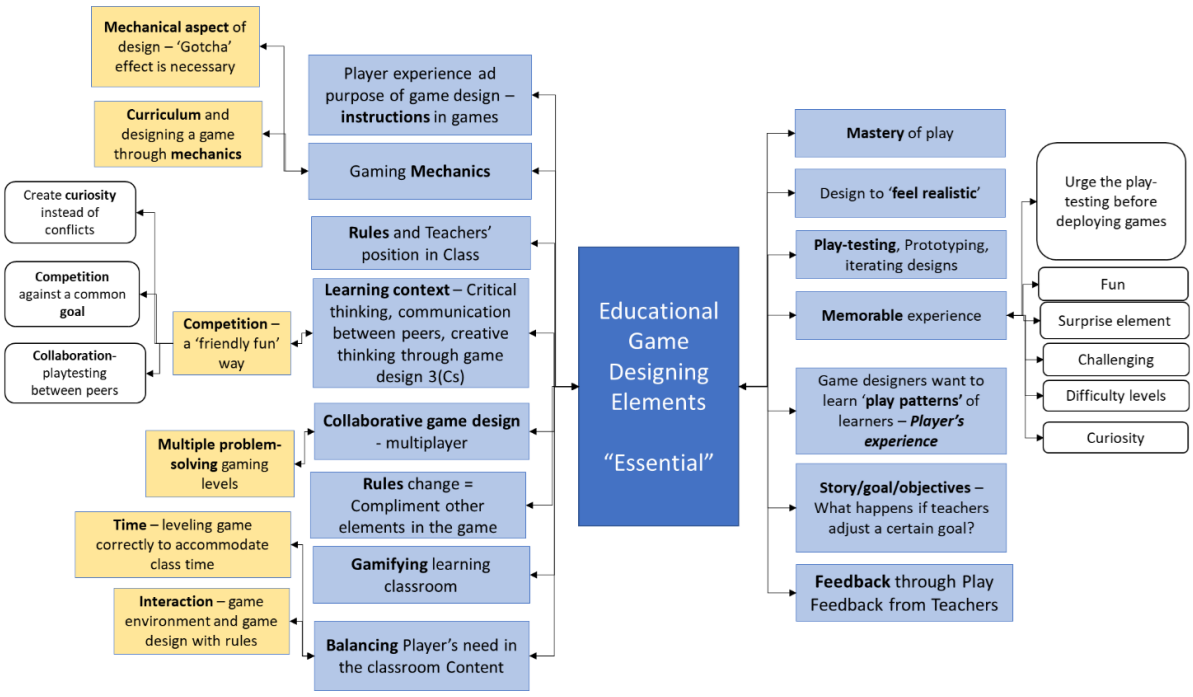

Figure 3: The "Essential" Educational Game Elements (EGEs) for designing EGs

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