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PLAYING GAMES IN A MASTERS CLASS: EXPERIENCES OF STUDENT EDUCATIONAL PSYCHOLOGISTS

ABSTRACT

Playing authentic educational games can support learners of all ages and abilities, particularly those with special educational or remedial needs. Playing games in cooperative groups allows learners to relate socially, motivate each other competitively and rehearse schoolwork. Literature mostly covers computer games rather than real-life educational games.

This study explored student educational psychologists' experiences in creating and playing authentic educational games to facilitate learning for children with special educational needs. In pairs, the students constructed educational games from everyday recyclable material with the purpose of reinforcing concepts related to phonics, spelling, reading and mathematics. The games required small groups of learners to play together with minimal teacher facilitation. Working with a generic, qualitative, interpretive research design, the experiences of this cohort (n=29) of Master's students were gleaned from their reflective writings and the researcher's journal. Thematic content analysis was used to analyse the data and identify the emergent themes within the theoretical framework of game-based learning.

The findings indicated that authentic self-made educational games exhibited all the required features conceptualised in the theory of gameplay. Learning through play created experiences that are fun, motivating and have learners requesting more. Authentic educational games provided emotional and educational support. Playing educational games is a supportive adjunct to remedial interventions in the therapeutic context.

Keywords: *Authentic educational games, Educational Psychology students, gaming principles, learning support, qualitative methodology.*

1. INTRODUCTION

The learning support curriculum, which is part of the Master's in Educational Psychology degree (Fourie & van der Merwe, 2019), entails training in skills to support learners with special educational needs in inclusive mainstream, full-service, remedial, and special needs

schools. A core component of the curriculum requires the students to design and create an authentic educational game (AEG) that can be played with learners in the classroom who exhibit diverse learning challenges and difficulties with schoolwork. The game was assembled with every day, easily accessible, recycled materials and needed to address areas of literacy or numeracy difficulties. The Master's students played their games with each other and with a group of learners during their learning support classes to determine its effectiveness.

Based on the researcher's experiences, it appears that there is limited research available on AEG for learners attending schools – be they private, public, inclusive mainstream, full-service, remedial, or special schools, and irrespective of culture, gender and age. The few available studies do not provide the successful design features of effective educational games and learning. Other literature relates to computer games only (Breuer & Bente, 2010; Hamari, Koivisto, & Sarsa, 2014). This study, therefore, aimed to address the gap in literature related to AEG. Although some educators incorporate games as part of the school day, some are concerned that the games they use are not a worthwhile replacement for academic tasks. Managing to incorporate games into their class routine is challenging for some educators who find games disruptive and counterproductive (Marklund & Taylor, 2016), and this may be exacerbated in larger inclusive classrooms. Some games also disregard the importance of social groups in learning (Avory, 2010). Educational games can be beneficial for learning support and can play an important part in the social development of children (Piaget, 1965).

This study described the experiences of Master's student educational psychologists in developing and implementing AEG that facilitates learning support for learners who have special educational needs.

2. AUTHENTIC EDUCATIONAL GAMES

An AEG recognises every person's intrinsic need for learning, developing a sense of autonomy and a recognition of the person's competence (Amory, 2010). Competence leads to improved self-esteem or an improved sense of achievement, something that children who require learning support often do not have (Kriel & Livingston, 2019). The key elements of an AEG are discussed in terms of seven principles: engagement, flow, creativity, innovative thinking, immersion, enjoyment and challenge, as conceptualised by Takatalo *et al.* (2012).

The first principle of engagement involves a collection of mindfully goal-directed behaviours that indicate involvement in an activity (Amory, 2010). An engaged learner, when given the opportunity, will initiate, persist and concentrate on mastering and applying new knowledge or skills. They will also demonstrate positive attitudes towards the learning process (Ke, Xie & Xie, 2015). Engagement is beneficial provided there is sufficient social interaction and constructive discussion (Amory, 2010).

The second principle, game flow, gives the player a motive for playing. It describes a psychological state of complete absorption and intense concentration regarding the task at hand, typically resulting in a lost sense of time (Csikszentmihalyi, 2014).

The third principle, creativity, is multifaceted and is described as a process involving creative thought to solve challenging problems (Shabalina *et al.*, 2016) and the seemingly simple act of play fosters creativity (Holmes *et al.*, 2014).

Principle four is innovative thinking, where the AEG offers an exciting environment to foster intellectually stimulating thought. The gaming interaction must be relevant to the educational

context to avoid frustration and capture the learner's interest so that action is taken, and objectives are reached (Smeureanu & Isaila, 2017).

Principle five relates to immersion, which is critical to game playing. Immersion relates specifically to focused attention and concentration while playing the game to learn its rules and how to win the game rewards. Gaining positive accomplishments experienced while playing, is also highlighted by immersion. Immersion is less extreme than flow and is therefore seen as a separate principle (Michailidis *et al.*, 2018).

Principle six focuses on enjoyment and fun, a crucial component of a successful authentic game. Learners should play a game by choice because it is entertaining (Miller, 2013). If the game is fun and exciting the player will stay focused and engaged (Koster, 2013). The element of fun may distract learners from engaging actively in some learning content if the cognitive load is beyond the learners' reach (Iten & Petko, 2016) which could apply to learners with special educational needs.

Finally, principle seven requires that games should be sufficiently challenging as they help learners to acquire new knowledge in their zone of proximal development as described by Lev Vygotsky (Kuusisaari, 2014). Sufficiently challenging games have a positive effect on learning by increasing engagement and are a predictor of learning (Haman *et al.*, 2016).

Game based learning is the theoretical underpinning of this study. It refers to the borrowing of game play principles with defined learning outcomes (Pho & Dinscore, 2015). Psychologists and educators have discussed the benefits of play in learning. Amory (2010) stated that AEG will support learning and mediate learning outcomes if they are designed according to specific game designs. Games are effective learning environments as they motivate learners to stay engaged over long periods (Plass, Homer & Kinzer, 2015). Game designers decide on the specific game that reflects the specific learning goal, learner attributes, learning settings and different learning commitments that can be achieved. Ideally, these would be cognitive, social, affective, behavioural, and socio-cultural, depending on the game (Plass *et al.*, 2015).

Authentic games that enable the achievement of cognitive engagement will also allow for learning goals to be achieved by developing the learner's cognitive abilities and focusing on the learner's potential (Plass *et al.*, 2015). When game-based learning is viewed from a cognitive perspective, the goal of learners' engagement with a game is the construction of mental models (Mayor, 2014). Learners first select what is presented in the game, organise this information as visual and verbal presentations in working memory, and then integrate these representations with one another and with prior knowledge (Mayor, 2014).

Games are powerful ways of developing social learning in children and younger adults. During game play, skills such as regulation of emotions, turn taking, playing fair and being respectful to fellow game players, are learnt (Hromeck & Roffey, 2009). Therapeutic board games are also available to assist learners who have difficulty socialising and may need emotional support (Hromeck & Roffey, 2009). The educational psychologist then uses these games during therapy sessions with learners who have difficulties expressing their feelings, regulating emotions or making social connections.

The current generation of AEG largely ignores the emotional role of learning, hence new game development is striving towards more affective game play (Wilkinson, 2013). Three key aspects of affective game design are identification of senses and how they impact on one's body, identification of emotions and expressing and modelling of emotions (Wilkinson, 2013).

Discussions amongst the learners during game play will lead to increased self-awareness and self-esteem.

Children playing AEG with children from different cultural groups benefit from the knowledge construction and mediation of learning that takes place through the game (Amory, 2010). Children's social learning could also be promoted through discussions stimulated during the board game sessions (Marjanen, Monkkonen, & Vanhala, 2011). However, socio-cultural rules, prizes and forfeitures may not mean the same for everyone playing the game. Educators and educational psychologists who give learning support should be aware of cultural differences and the implications for different age groups.

The elements of game design are determined by the content and skills that the game is designed to teach (Plass & Homer, 2012). The content and skills are the subject matter, which has a profound effect on the game mechanics, visual aesthetics design and the incentive system (Plass *et al.*, 2015).

The mechanics of the game involves the methods, rules and procedures that guide the player and the speed with which the player responds to the demands or responses of the game. Through the mechanics of the game, definitions or rules are created regarding how the game is going to work for the people who play it (Plass *et al.*, 2015).

The visual aesthetics give the player an overall impression, and the look and feel of the game. Visual aesthetics relate to the way the elements of the game are visualised and how the cues are represented. Guidelines, key aspects, and feedback are displayed either on the screen, the board, or the game insert (Plass *et al.*, 2015). Feedback could be corrective (right or wrong answer), can include sound effects, points scored, or visuals of the damage done to the victims. At times these can be motivating and engaging to the player (Plass *et al.*, 2015). Aesthetics are exceptionally important as these correlate directly and positively to the players' experience (Ahmad, 2019).

Incentives include the different motivational elements that aim to encourage players to continue their efforts and the feedback from the adult who oversees the game. The incentive system can use tokens, stars or badges, going up a level, increasing one's time or speed (Plass *et al.*, 2015). Some learners play to win, for the excitement, entertainment or just fun, for improving their previous scores or levels, or for the reward of learning.

The Health Professions Council of South Africa (HPCSA) is a statutory body established in terms of the Health Professions Act that is committed to protecting the public and guiding professionals such as the educational psychologists (HPCSA, 2017). Educational Psychology is a category within professional psychology that focuses on alleviating emotional, learning, academic, intellectual, behavioural, social, and developmental difficulties in children and young people within the systems in which they function (HPCSA, 2017). These include families, schools and peer groups. Educational psychologists provide extensive support and psychological services to support clients' optimal functioning. This may include family-based interventions, teacher support and learning support. In addition, educational psychologists enhance the vocational development of children and adults (HPCSA, 2017).

In the last thirty years the educational support of learners by educational psychologists has grown. In addition, contextual demands require a shift from the traditional child-deficit, medical model towards a bio-ecological and eco-systemic paradigm (Pretorius, 2012). The HPCSA prescribes the role of the educational psychologist in supporting learners. Principle two (p.

vi) states that educational psychologists must provide services to learners of all ages who have learning disabilities, learning difficulties, multiple disabilities, and intellectual disabilities, and to their families, systems and agencies that serve them (HPCSA, 2017). The educational psychologist would also be required to draw up an individual support plan (ISP) in conjunction with the SIAS document for the learner if they required one, or if they needed assistance with alternative school placement. They also have a role to play in the training and supporting of educators in inclusive schools (DoE, 2014). These roles can be enhanced through AEG played in therapy rooms and in schools to provide fun experiences for supporting learners.

Learning support incorporates the resources, strategies and practices that provide physical, social, emotional, and intellectual support intended to enable all learners to have an equal opportunity for success at school by addressing barriers to learning and teaching (Landsberg, Kruger & Nel, 2019). Using AEG in learning support sessions could assist with reducing barriers to learning. Learning support acknowledges that each learner has the potential to learn at their own pace by using their choice of strategies and learning styles, which is provided in a variety of educational game experiences. Learning support relies on collaboration with various people from the learners' system who will participate in the process of their learning (Fourie, 2018). Learning support is a way to provide equal educational opportunities for diverse learners who may have a multitude of difficulties and to respond to their needs. Learning support should consider the ongoing educational demands placed on the learner despite the presence of a barrier to learning. Educational Psychologists could collaborate with the learners' educators to assist them with knowledge and strategies to use AEG in their classrooms to decrease learning difficulties in a fun way.

According to the DoE (2001; 2014), educators are responsible for administering the first level of support to the learners in their care who may have barriers to learning. As educators are often too busy to assist learners with learning disabilities, the educational psychologist is best placed to assist the educator and the learner (Berger, 2013; DoE, 2014; Landsberg *et al.*, 2019: 48).

A learner needing learning support often feels insecure and anxious about schoolwork. The use of play and games is beneficial for those learners who need support and consolidation of skills already learnt. These learners can be assisted to learn new skills, have fun and obtain individualised attention from the educational psychologist. Play-based interventions lead to better understanding of concepts, as the learning process is relaxing, accessible and more effective.

3. RESEARCH DESIGN AND METHODOLOGY

An interpretive paradigm was used to describe the personal experiences of the participants in their unique contexts (Alase, 2017; Creswell, 2013). Qualitative, interpretive research requires a highly active, yet creative engagement from researchers with dynamic skills (Mason, 2017). The researcher engaged actively with the class during the game playing sessions and meticulously recorded observations in a researcher's journal (RJ). The researcher assumed that knowledge is subjective, and the researcher learns from the participants to understand the meaning of their lives and experiences (Creswell & Poth, 2018). A generic qualitative research design was used which is a method that draws on multiple participants voices while remaining flexible regarding the guidelines (Kahlke, 2014).

The study took place at a university and the participants were the Master's in Educational Psychology student group (n=29). To maintain anonymity each participant was given a number (1 through 29). Working in pairs the students were tasked to plan, design and create an AEG out of recyclable material. The student group played their game during the learning support classes. They then played their game with groups of school learners (n=26) requiring learning support who attended inclusive mainstream, full service, remedial or special schools, depending on where the student worked. The student educational psychologists (SEP) observed the learners' play and recorded their observations as reflections in notebooks which they handed in to the lecturers at the end of the course. The SEP are trained to observe, record strengths and challenges in learners and have all worked in classrooms. While playing their game with the selected group of learners they noticed the learners' ability to focus, their anxiety about playing the game, the benefits in language development, and active indications of motivation and fun (Sattler, 2014). Observing student's behaviours is part of the SEP training (Sattler, 2014). The researcher analysed the SEP assignment reflections to extract data to establish thematic commonalities.

Lastly, the students submitted a reflective written assignment in which they recorded their observations, experiences, successes and challenges. Their reflective assignments provided meaningful data, and rich descriptions, which is in keeping with the generic qualitative design (Kennedy, 2016).

Data were analysed using thematic content data analysis using an inductive and deductive approach. An inductive approach allows the data to determine the themes, whereas the deductive approach involves the researcher coming to the data with some preconceived themes (Roberts, Dowell & Nie, 2019). Thematic content analysis was used to identify common patterns of meaning within the data that were repeated (Nowell, Norris & White, 2017). The researcher defined coding units or units of text such as individual words, phrases, symbols, sentences or paragraphs in the data that related to the research question. Coding was done manually by using highlighters and making notes next to the relevant text being analysed (Nowell *et al.*, 2017). Meaningful sections or data of interest were also noted. Four themes emerged from the grouping of identified categories for consistency.

Thematic data analysis produces trustworthy and insightful findings (Braun & Clarke, 2006). To ensure trustworthiness, this study followed Lincoln and Guba's (1985) guidelines of credibility, transferability, and confirmability (Korstjens & Moser, 2018).

As ethical concerns are an integral part of the planning and implementation of the research to protect the welfare and rights of research participants (Terreblanche, Durrheim, & Painter, 2014), the researcher adhered to all ethical requirements and obtained ethical clearance from the university.

4. PRESENTATION AND DISCUSSION OF THEMES

4.1 Conceptualisation of authentic educational games

Motivation and focus

The SEP designed games that were engaging, motivating and aesthetically colourful. They chose pertinent topics for the games that could be interesting for the learners and would keep them focused. Some of the games had competitive elements such as collecting coloured tokens to keep the learners motivated.

P22: Our board game was bright and interesting to catch their attention. It included obstacles which would see learners moving forward and backward on the game board. The learners focused on tasks at hand. They are motivated to take part.

P16: The learners were motivated by collecting the pictures on the ice-cream sticks.

P15: The learners wanted to play so they could get the tokens, they were so competitive.

P 6: When the learners became immersed in the game a sense of competition and camaraderie started to build in order to win the game.

Using AEG is learner-centred and according to the SEP's reflections, as the learners played their games, the students noticed the following about the learners' focus:

P16: The activities encouraged attentive listening skills in the group.

P21: The learners had to pay close attention to the questions and really listened.

P3: The learners were attentive and it was apparent when they quietened down whilst grabbing objects in the box, and that their team-mates were also attentive as they were actively listening to the clues.

Learners will be engaged and stay focused in an AEG if their interest is captured (Amory, 2010). The learners' interest was piqued by the design of the game, which assisted with focus and by some of the activities which required attentive listening to hear the clues read by their peers.

In short regarding the first theme, the games designed by the SEP were engaging. The learners listened attentively when required to, were adequately motivated, focused and gave attention when required.

Fun

Learners love playing games (Piaget, 1965) and the SEP stated how much fun the learners had. The learners found different aspects of the game they played enjoyable. For example, it may have been the appearance of the game.

P16: The learners loved the pictures at the back of the cards.

P23: The game offered greater enjoyment to the learners, greater motivation to learn, strive to finish so that they could be part of the winning team.

The learners wanted to play the game because they experienced real fun when playing it.

P5: They requested to play the game again on more than one occasion.

P15: They wanted to continue playing after break as they were having so much fun.

P19 and 2: The learners who played the game loved it.

P28: The boys started calling the game "our game" and wanted to take it out to break to play.

The element of fun is a core aspect of any good, authentic, educational game (Koster, 2013), and we know that learners who enjoy an activity are motivated, which means that they will want to keep playing the game. A feeling of enjoyment and fun in an activity makes you more prone to learning (Miller, 2013; Plaas *et al.*, 2015).

Creation of new knowledge

The SEP observed that during the game, the learners carried on discussions amongst themselves, exchanged ideas, contributed their experiences and this allowed the groups to create new knowledge, as for example, the mathematics multiplication game (Figure 1).

P21: You can observe that the learners built on from what they knew. There were opportunities to learn from each other, chances to exchange ideas, express their own thoughts. By exchanging their thoughts and understanding of the word they were able to write a sentence.

P22: Learners learned better when they were actively encouraged to explore and practise the use of their knowledge. There was active participation, constructing and reconstructing of their knowledge and understanding.

RJ: They [The] learners learned new information that they did not know before, such as differentiation of middle vowels, adjectives associated with sensory evaluation, building of sentences and increased speed with timetables.

During the game there was social interaction amongst the learners, which improved their language skills.

P1: The use of language became very evident whilst the learners were playing the game.

P3: Noticeable improvement in the learners' oral language stimulated vocabulary development and created further meaning and understanding.

Creating new knowledge, which includes the building of language skills, is a key element of learning (Amory, 2010). Creating new knowledge is best achieved in everyday situations where children can interact socially with their peers through play, games, exploration and social discourse (Amory, 2010). The AEG designed and created by the SEP enabled learners to create new knowledge through social interaction and improvement of language skills.

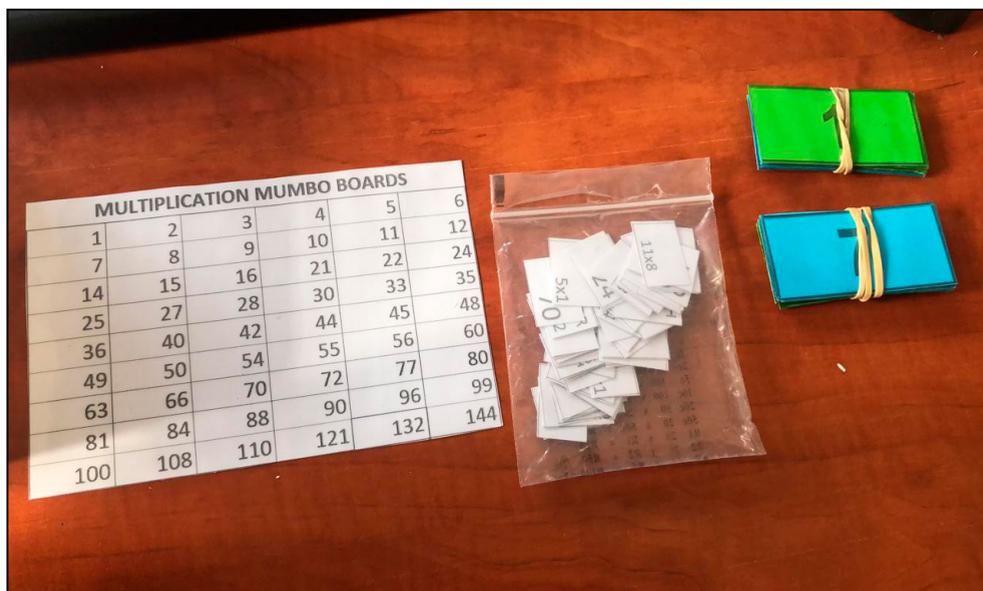


Figure 1: Mathematics game designed by participants 4 and 19

Critical thinking and problem solving

The learners worked together, made mistakes, learnt from their mistakes, discussed the problems and found suitable solutions to subject related questions and maths operations, such as addition, subtraction and fractions.

P7: Learners could participate actively the entire time, work together in teams to solve problems. They learnt from their mistakes.

P5: It soon became evident that they were learning from each other and through collaboration, they were able to remember more of what I had taught them in the term, such a punctuation and parts of speech.

RJ: Some games were tools to be used for revision and consolidation of schoolwork prior to writing of exams. (Figure 2).

P22: She specifically formulated activities for her game from the curriculum statements to be line with the subject content the learners are currently working with. The SEP also used the curriculum textbooks to ensure the game content was suitable.

P21: It incorporated reasoning; they had to visualise what the others were doing. The learners were allowed to discuss the possible answers amongst themselves.

P14: The learners internalised the problem-solving technique that they used.

P22: Working in cooperative groups allows the learners to have the opportunity to learn from each other, give opinions and debate the processes they used to complete the questions.

Critical discussions taking place amongst the players, pointed to active problem-solving skills. AEG is an effective platform to teach problem-solving and critical thinking in social groups. (Plaas *et al.*, 2015). Some critical thinking, internalising of problem solving and learning from each other was observed by the SEP as the learners played their games in cooperative groups as posited by Amory (2010).



Figure 2: Game designed by participants 6 and 18: reinforcing of subject matter

4.2 Playful elements of the games

The games were described by the participants as having a strong element of play.

P25: The best way to teach a child is by letting them play. They have fun and learn while playing.

P7: Play is a successful tool that can be used to support learning.

P11: Play is the initial step to learning.

P23: Through play, learners get a chance to learn in a fun way, they are playing and learning at the same time.

P19: Educational games are fun and interactive.

P3: Educational games have a positive impact on learners generally.

P20: Games meet children at their stage of personal development and promote individual learning.

RJ: Special Needs learners who have different learning needs find games beneficial as games can target them or their barrier specifically.

AEG can be played with children of all ages and cultural groups. In playing games that involve real world problems and mimic the world of adult work children learn valuable skills (Rule, 2006).

P15: AEG also teach learners other life skills such as anger management, coping with anxiety and grief.

The game designed by participants 1 and 3 was designed to teach social skills such as coping with anxiety and grief (*Figure 3*).

P7: Educational games should be much more part of an educator's pedagogy.

P11: Children learn how to adapt to the world and make sense of things around them by playing. Playing is the initial step to learning. Through these activities they can develop social, cognitive, and emotional skills.

P18: Learning through play empowers children to become creative engaged life-long learners. The games were captivating, motivating for higher levels of engagement.

Learning through play can create experiences that are fun, motivating and the use of AEG can assist learners to become creative and more engaged (Zosh *et al.*, 2017). The SEP captured the essence of AEG in their reflections stating that without play in general, learning, socialisation, and adaptation to the world around them becomes seriously compromised.



Figure 3: Game designed by participants 1 and 3 on social skills

4.3 Games assist with emotional regulation and remediation

The participants noted in their reflections that the games they had created were worthwhile aids to assist learners who needed learning support in an inclusive, mainstream, special or remedial classroom. Playing the AEG in a small group with a facilitator appeared to be an effective way to support learners with special needs.

P7: The games can be successfully utilised as a technique for learning support with children with special needs.

P6: Having the support of the educator or educational psychologist only for clarification while playing the game, but really leaving it up to them to sort out.

P5: I also observed how the learners would coach one another and tried to help each other to guess the correct answer to the questions, giving each other clues and reminders of the activities we had completed in class.

P22: The educator would play in smaller groups and support each learner on their own level. Learners will learn more effectively through participation and activity than passive instruction.

P14: I was able to see the learners' potential develop as they learnt with a competent and supporting mediator. With that they become more competent problem solvers themselves.

Learners with learning support needs may require specialised teaching individually, in smaller groups with a facilitator who may be an educational psychologist or educator. This would make using AEG beneficial (Landsberg *et al.*, 2019). Social interaction is crucial during learning support as it constructs knowledge (Avory, 2010).

The SEP reflected on the anxiety levels in many of the learners prior to playing their game. Learners who are anxious will frequently be nervous in new situations.

P18: Because the learners are so anxious, I believe that utilising games in learning support provides a safe place for learners to explore their ability to learn their curriculum content that is more challenging, without causing them distress associated with learning.

P15: The learners were anxious initially as they were not sure what the game entailed and what would be expected of them.

Maths anxiety is common in schools (Sarker Dowker, & Looi, 2016), so the SEP planned AEG to help reduce learners' anxiety. This is what they noted.

P19: Our game was meant to reduce mathematics anxiety by making it fun as it was an informal game for children with all different mathematics strength and confidence levels to take part in.

RJ: As part of the game each learner was provided a card with multiplication tables with answers that they could refer to initially as they played the game. The learners could refer to the answer cards until they no longer needed to use them.

This was an example of scaffolding where support is provided to a learner until a concept is grasped and thereafter the child is left to work independently (Kuusisaari, 2014).

P22: Tackling maths anxiety was an important focus area for this game. By playing games negative attitudes towards mathematics can be changed. Children enjoy playing games and are motivated to take part. Learners will learn better when they are active; that is why we decided on a board game, where they can work together in a group to find the correct answer to the maths operation. (Figure 4).

P7: We created a very comfortable atmosphere with very little performance pressure to reduce the kid's maths anxiety.

P19: Learning support should be less structured and informal in order to relieve anxiety and the associated emotional stress of schoolwork.

Maths anxiety can be defined as feelings such as worry, fear and apprehension about mathematics linked to tests and performance anxiety, especially in front of peers. As mathematics anxiety increases, so performance decreases. Playing the mathematics games with small groups gave the learners some self-confidence and reduced some of the anxiety (Landsberg *et al.*, 2019; Sarker *et al.*, 2016).

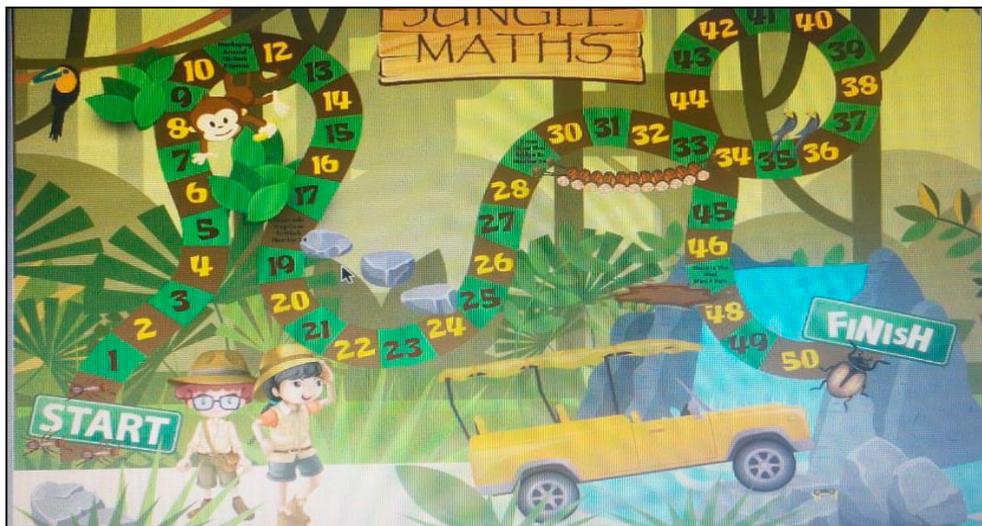


Figure 4: Mathematics game designed by participants 22 and 5

Making games from recycled material

In terms of their careers as future educational psychologists the participants were excited that they had learnt to make educational games from easily obtained recycled materials which is an essential skill needed when providing therapeutic interventions in under-resourced communities.

RJ: The authentic educational games created by the SEP were made out of laminated board, paper boxes, egg cartons, bottle tops, sucker sticks, little stones, different counters and a wide variety of other recyclable materials. This is useful when working in poor school communities.

P10: From working on this game with my classmate, I came to realise and appreciate that it does not need expensive resources to support learning. We were able to create a game from easily accessible materials for educational psychologists and teachers.



Figure 5: Game created by participants 11 and 29: Learning of middle vowel sound and spelling.

4.4 Games in the therapy room

The participants saw the value of the games for use in learning support to screen for struggling learners while conducting diagnostic scholastic assessments.

P7: Designing educational games to facilitate support in the classroom is not the only role as educational psychologist. Educational games can successfully be used by the educational psychologist for learning support or as a screening aid in a one on one session.

P3: The diverse and flexible nature of our educational game has many implications for practising educational psychologists. They may be adapted for assessment and diagnosing purposes, however, its main function would be for intervention purposes.

The participants reflected on the benefits of playing AEG with children needing learning support for learning problems. They noted that working in small groups in a relaxed non-threatening environment was beneficial to the learners.

P23: I learnt how educators can use games to get learners more interested and excited about their studies. Educators can play a game that will focus on a skill they want learners to acquire.

P7: I learnt that a well-designed educational game can make learning fun, relevant and even change learners' attitudes towards subjects. I have realised that play should be a much more integral part of an educator's pedagogy.

The SEP reflected on how their roles have transformed to a more collaborative whole school approach. They noted that key psychological interventions focus on enhancing, promoting, and facilitating optimal learning of learners, which includes providing learning support and working with the educators in the classroom (HPCSA, 2011). They reflected on the value of using well-designed AEG in their own therapeutic practice as educational psychologists.

5. CONCLUSION

Extensive literature abounds regarding online computer games that share the same principles with AEG such as focus, flow, motivation, competitiveness, fun, gaining new understandings, problem solving and critical thinking. The games designed by the participants contained all these elements and had the advantage of teaching learners school concepts, particularly for learners with learning difficulties. Playing AEG teaches social skills of sharing, winning, and losing gracefully, and interacting with peers. The games can assist with emotional response regulation and play a crucial role in support and remediation of school concepts. The participants' reflections expressed how much they had learnt by creating an AEG from recyclable material that could allow them to practise in under-resourced schools and communities. A comparative study between computer and AEG would be beneficial.

REFERENCES

- Ahmad, M. 2019. Categorizing Game Design Elements into Educational game design fundamentals. *Game design and Intelligent Interaction*. IntechOpen. <https://doi.org/10.5772/intechopen.89971>
- Alase, A. 2017. The interpretative Phenomenological Analysis: A guide to a good Qualitative Research Approach. *International Journal of Education and Literacy Studies*, 5(2): 9–19. <http://dx.doi.org/10.7575/aiac.ijels.v.5n.2p.9>
- Amory, A. 2010. Learning to play games or playing games to learn? A health education case study with Soweto Teenagers. *Australasian Journal of Educational Technology*, 26(6): 810-829. <https://doi.org/10.14742/ajet.1044>
- Berger, M. 2013. The role of the educational psychologist in supporting inclusion at school level. M Ed dissertation. University of Pretoria.
- Braun, V. & Clarke, V. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2): 77–101. DOI: 10.1191/1478088706qp063oa
- Breuer, J. & Bente, G. 2010. Why so serious? On the relation of serious games and learning. *Journal for Computer Game Culture*, 4(1): 7–24. <https://hal.archives-ouvertes.fr/hal-00692052>
- Creswell, J.W. 2013. *Research Design: Qualitative, quantitative and mixed methods approaches*. Thousand Oaks: Sage Publications.
- Creswell, J.W. & Poth, C.N. 2018. *Qualitative inquiry and research design*, fourth edition. Thousand Oaks: Sage Publications.
- Csikszentmihalyi, M. 2014. *Flow and the foundations of Positive Psychology: The collected works of Mihaly Csikszentmihalyi*. New York/London: Springer. <https://doi.org/10.1007/978-94-017-9088-8>
- Denzin, N.K. & Lincoln, Y.S. 2018. *The Sage handbook of qualitative research*, fifth edition. Thousand Oaks: Sage Publications.
- Department of Education. 2001. *Education White Paper Six: Special needs education. Building an Inclusive Education and Training system*. Pretoria: Government printers.
- Department of Education. 2014. *Policy on Screening, Identification, Assessment and Support*. Department of Basic Education. Pretoria: Government Printers.

- Fourie, J. 2018. Teacher Collaboration and working with school-based support teams. In I. Eloff & E. Swart (eds.). *Understanding Educational Psychology*. South Africa: Juta Publishers
- Fourie, J. & Van der Merwe, M. 2019. *Educational Psychological specialist Areas: Learning Guide*. University of Johannesburg: University Printers.
- Health Professions Council of South Africa. 2017. *Research and Publication*, Chapter 10. In: Professional Board of Psychology: Scope of Practice guidelines for Educational Psychologists. Pretoria: Heinemann Publishers.
- Holmes, R.M. Romeo, L. Ciraola, S. & Grushko, M. 2015. The relationship between creativity, social play, and children's language abilities. *Early Child Development and Care*, 85(7): 1180-1197. <https://doi.org/10.1080/03004430.2014.983916>
- Hromeck, R. & Roffey, S. 2009. Promoting Social and Emotional Learning with games: "It's fun and we learn things." *Simulation and Gaming*, 40(5): 624–644. <https://www.proquest.com/docview/2528506698> <https://doi.org/10.1177/1046878109333793>
- Haman, J. Shernoff, D.J. Rowe, E. Coller, B. Asbell-Clarke, J. & Edwards, T. 2016. Challenging games help students learn: An empirical study on engagement, flow, and immersion in game-based learning. *Computers in Human Behaviour*, 54: 170–179. <https://www.terc.edu/publications/challenging-games-help-students-learn-an-empirical-study-on-engagement-flow-and-immersion-in-game-based-learning/> <https://doi.org/10.1016/j.chb.2015.07.045>
- Hamari, J. Koivisto, J. & Sarsa, H. 2014. Does Gamification work? A Literature Review of Empirical Studies on Gamification. In *proceedings of the 47th Hawaii International Conference on System Sciences, Hawaii*. <https://doi.org/10.1109/HICSS.2014.377>
- Iten, N. & Petko, D. 2016. Learning with serious games: Is fun playing the game a predictor of learning success? *British Journal of Educational Technology*, 47(1): 151–163. <https://doi.org/10.1111/bjet.12226>
- Kahlke, R.M. 2014. Generic Qualitative Approaches: Pitfalls and benefits of Methodological Mixology. *International Journal of Qualitative Methods*, 13: 37–52. <https://doi.org/10.1177%2F160940691401300119>
- Ke, F. Xie, K. & Xie, Y. 2015. Game based learning engagement: A theory and data driven exploration. *British Journal of Educational Technology*, 47(6): 1183–1201. <https://doi.org/10.1111/bjet.12314>
- Kennedy, D. 2016. Is it any clearer? Generic Qualitative Inquiry and the VSAIEEDC model of data analysis. *The Qualitative Report*, 21(8): 1369–1379. DOI:10.46743/2160-3715/2016.2444
- Koster, R. 2013. *A theory of fun for game design*. Boston: Oreilly Media.
- Korstjens, I. & Moser, A. 2018. Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice*, 24(1): 120–24. <https://doi.org/10.1080/13814788.2017.1375092>
- Kriel, C. & Livingston, C. 2019. Foundation Phase learners' view of learning support and self-esteem. *South African Journal of Childhood Education*, 9(1): 1-8. <https://doi.org/10.4102/sajce.v9i1.679>
- Kuusisaari, H. 2014. Teachers at the zone of proximal development: Collaboration, promoting or hindering the development process. *Teaching and Teacher Education*, 43: 46–57. <https://doi.org/10.1016/j.tate.2014.06.001>

- Landsberg, E. Krüger, D. & Swart, E. 2019. *Addressing barriers to learning: A South African perspective*, fourth edition. Pretoria: Van Schaik Publishers.
- Lincoln, Y.S. & Guba, E. G. 1985. *Naturalistic inquiry*. Thousand Oaks: Sage Publications. [https://doi.org/10.1016/0147-1767\(85\)90062-8](https://doi.org/10.1016/0147-1767(85)90062-8)
- Mason, J. 2017. *Qualitative researching*. 2nd ed. Thousand Oaks: Sage Publications.
- Mayor, R. 2014. *Computer games for learning: An evidence-based approach*. University of Cambridge: MIT Press. <https://doi.org/10.7551/mitpress/9427.001.0001>
- Marjanen, P. Monkkonen, L. & Vanhala, M. 2011. Peer group learning during the board game sessions. *Proceedings of the European Conference on Game based Learning*, 388–394.
- Marklund, B.B. & Taylor, A.S. 2016. Educational games in Practice: The challenges involved in conducting a game-based curriculum. *The Electronic Journal of e-learning*, 14(2): 112–121. <https://eric.ed.gov/?id=EJ1101225>
- Michailidis, L. Balaguer-Ballester, E. & He, X. 2018. Flow and Immersion in Video Games. *Frontiers in Psychology*, 9: 1682. <https://doi.org/10.3389/fpsyg.2018.01682>
- Miller, G. 2013. The Gamification of Education. *Developments in Business Simulation and experiential Learning*, 40: 196–200. <https://journals.tdl.org/absel/index.php/absel/article/view/40>
- Nowell, L.S. Norris, J.M. & White, D.E. 2017. Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, 16(1): 1-13 <https://doi.org/10.1177%2F1609406917733847>
- Pho, A. & Dinscore, A. 2015. *Game based Learning*. Association of college and research. American Library Association.
- Piaget, J. 1965. *The moral development of the child*. Detroit: Free Press.
- Plass, J.H. & Homer, B.D. 2012. Popular game mechanics. Inspirations for learning mechanics and assessment mechanics. *Paper presented at the game developers conference*. San Francisco: CA.
- Plass, J.L. Homer, B.D. & Kinzer, C.K. 2015. Foundations of Game Based Learning. *Educational Psychologist*, 50(4): 258–283. DOI: 10.1080/00461520.2015.1122533
- Pretorius, G. 2012. Reflections on the scope of practice in the South African Profession of Psychology: A moral plea for relevance and a future vision. *South African Journal of Psychology*, 42 (4): 509-521. <https://doi.org/10.1177%2F008124631204200405>
- Roberts, K. Dowell, A. & Nie, J.B. 2019. Attempting rigour and replicability in thematic analysis of qualitative research data: A case study of codebook development. *BMC Medical Research Methodology*, 19(1): 1-8. <https://doi.org/10.1186/s12874-019-0707-y>
- Rule, A. 2006. The components of authentic learning. *Journal of Authentic Learning*, 3(1): 1–10.
- Sattler, J. 2014. *Foundations of behavioural, social and clinical assessment of children*, sixth edition. California: Sattler Publishing.
- Sarker, A. Dowker, A. & Looi, C. 2016. Mathematics anxiety: What have we learnt in 60 years? *Frontiers in Psychology*, 7(508): 1–16. doi: 10.3389/fpsyg.2016.00508

- Shabalina, O. Tomos, F. Malliarakis, C. & Mozelius, P. 2016. Game based learning as a catalyst for creative learning. *Conference paper presented in Scotland*.
- Smeureanu, I. & Isaila, N. 2017. Innovative Educational Scenarios in game-based teaching and learning. *Journal Amfiteatru Economic*, 19(46): 890–899.
- Takatalo, J. Ihanus, J. Kaistinen, J. & Nyman, G. 2012. Experiencing Digital Games. In J Gackenback (ed.). *Video Game Play and Consciousness*. New York: Nova Science Publishers.
- Terreblanche, M. Durrheim, K. & Painter, D. 2004. *Research in practice: Applied methods for the social sciences*. Cape Town: Juta
- Wilkinson, P. 2013. Affective educational games: Utilizing emotions in game-based learning. *5th International Conference on games and virtual worlds. For serious Applications, VS-GAMES 2013*. <https://doi.org/10.1109/VS-GAMES.2013.6624219>
- Zosh, J. M., Hopkins, E. J., Jensen, H., Liu, C., Neale, D., Hirsh-Pasek, K., Solis, S. L., & Whitebread, D. 2017. *Learning through play: A review of the evidence (white paper)*. The Lego Foundation, D.K. <https://www.legofoundation.com/en/learn-how/knowledge-base/learning-through-play-a-review-of-the-evidence/>