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Parental perceptions of gamification and educational outcomes in public schools in Gauteng

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A research submitted to the Faculty of Commerce, Law and Management. University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration

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KEYWORDS: Gamification, Technology in education, student engagement, Quests & Missions, Rewards and Feedback, Wicked Problems, education outcomes, Parental perceptions

DECLARATION

I, Fulufhelo Miswe, hereby declare that this thesis is my original work, except where acknowledged, and has not been submitted for any other degree or examination. All references and sources have been duly cited and acknowledged. This work is submitted in partial fulfilment of the requirements for the Master of Business Administration Degree at the University of Witwatersrand, Johannesburg.

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1. CHAPTER ONE: INTRODUCTION

1.1 Purpose

This study will explore the perceptions of parents in using Gamification, game-like elements to enhance educational outcomes in public schools in Gauteng.

1.2 Background of the Study

South Africa's education system faces a complex and persistent challenge, often described as a "wicked problem". (Lönngren & Poeck, 2021) Unlike problems with clear solutions, these issues are deeply intertwined with historical inequalities, poverty, and social structures. (Niskanen et al., 2021) Efforts to improve one aspect, like teacher training, can be hampered by inadequate resources or a lack of community support. (Lönngren & Poeck, 2021) This interconnectedness makes achieving lasting change difficult. Addressing education in South Africa requires a multifaceted approach that considers the various factors impacting student success(Sabelo & Legg-Jack, 2022).

In the context of South Africa, where educational disparities and inequities persist as 'wicked problems,' leveraging technology offers a promising pathway towards addressing these multifaceted challenges (Sarker et al., 2019). Technology has the potential to democratize the availability of quality education, notwithstanding geographic location or socioeconomic status (Sarker et al., 2019). Through digital platforms, online programs, applications and interactive learning resources, students can engage with educational content in innovative ways, transcending traditional barriers to learning (Haleem et al., 2022). Additionally, technology allows for each individual child to be taught at their own pace from a learning and adaptability perspective for content, fostering inclusivity, and catering to diverse learning styles. By harnessing the power of technology, educators are enabled to create dynamic content and interactive material that empower students to become active participants in their own educational journey, ultimately contributing to the collective efforts to tackle the wicked problem of education in South Africa (Haleem et al., 2022).

Education is critical in shaping the future of individuals and societies, serving as a cornerstone for socioeconomic development and progress (Spiel et al., 2018).

The traditional classroom is facing a challenge: keeping students engaged and maximizing learning. One innovative solution gaining traction is gamification which allows for the classroom to incorporate game design into educational content (Dichev & Dicheva, 2017).

(Botha-Ravyse et al., 2018) state leveraging gamification principles holds significant promise for motivating students and improving their learning experience. By understanding parental perspectives on how extensively their children interact with gamification at home and school, we can gain valuable insights into the actual implementation of this approach within educational settings. Gamification, which entails use of elements that resemble games in classrooms is increasingly being adopted in South Africa (Caponetto et al., 2014a; Baroud, 2022). Gamification is being used to improve learning and training experiences in the workplace environment, as well as to enrich employee engagement and motivation (Adukaite et al., 2017). For example, companies are using gamified learning platforms to train employees in new skills and competencies (Baroud, 2022). These platforms often incorporate game elements such as points, levels, and leaderboards to make learning more enjoyable and immersive competencies (Baroud, 2022; Oliver, 2017). However, while gamification has the potential to be a powerful tool, it is not a one-size (Baroud, 2022)

The provision of gamification equipment and knowledge in schools requires investments in educational infrastructure, educational technology, and investments in teachers and educators who have the skills and knowledge to deliver effective strategies (Dicheva et al., 2015). However, South Africa's adoption of 4IR in education is limited due to its 3rd world status and the need for massive financial investments to improve infrastructure and teacher distribution (Baroud, 2022). There is some emerging evidence that implementing gamification in primary schools in South Africa may encounter several challenges, e.g., infrastructure and access, training and support and cultural and language context in different provinces (Akoodie, 2020); Caponetto et al, 2014). Addressing these challenges may require collaboration between education stakeholders, government support, and investment in technology infrastructure and professional development for teachers.

Amidst these current challenges, there is a scarcity of research on the extent to which gamification has impacted the learning process for public schools and its effects on

educational outcomes (Heraclides, 2019). Against this background, this study will assess the parental perceptions of gamification in how it can assist improve learning outcomes within public schools by improving student engagement. The results will inform recommendations on the readiness of learners to use gamification in education as perceived by parents.

1.3 Problem Statement

Gamification is injecting excitement and engagement into the learning process, This innovative approach, which incorporates game elements into learning experiences, is showing promise as a tool to boost student motivation and improve learning outcomes (Dichev & Dicheva, 2017), leveraging game design principles to enhance engagement, and learning outcomes among students. (Dicheva et al., 2015)There is a gap in understanding how parents perceive gamified educational approaches and their influence on their children's academic performance, particularly in South Africa.

Despite the growing implementation of gamified learning strategies in educational settings, there is limited research examining parental attitudes, beliefs, and concerns regarding the integration of gamification into their children's schooling (Alsawaier, 2018). Understanding parental perceptions is crucial as parents play a significant role in shaping students' educational experiences and can influence the adoption and effectiveness of gamified approaches.

This study aims to address this gap by investigating parental perceptions of gamification in public schools in Gauteng and its impact on educational outcomes. By exploring parental perspectives, this research seeks to identify the current gamification utilization amongst school kids. Additionally, the study aims to understand parental attitudes towards gamification and their views on gamification elements in how they impact their children.

Through a comprehensive examination of parental perceptions, this research aims to provide valuable insights that can inform policymakers, educators, and stakeholders in designing and implementing gamification strategies that effectively engage both students and parents, ultimately contributing to improved educational outcomes in public schools in Gauteng, South Africa.

1.4 Study Objectives

1. To assess the perception of parents on the extent of use of gamification among primary school learners in Gauteng schools.
2. To assess parental perception on whether utilizing gamification can increase student engagement in class and improve educational outcomes in the intermediate and long term.
3. To understand any potential barriers on gamification in the learning process to ensure continuous learning as perceived by parents.

1.5 Research Questions

1. What are the prevailing attitudes and perceptions of parents in Gauteng towards the use of gamification as an educational tool in public schools?
2. How do parents perceive the effectiveness of gamified educational interventions in improving their children's learning outcomes?
3. What concerns do parents in Gauteng schools have regarding potential drawbacks of gamified learning environments?
4. How do parents in Gauteng public schools perceive the potential benefits of gamified learning on their children's engagement in schoolwork?

1.6 Significance of Research

This research on parental perceptions of gamification in Gauteng public schools holds significance for several reasons:

1.6.1 Informing Policy and Practice:

By understanding parental perspectives on gamification's potential benefits and drawbacks, this research can inform educators and policymakers on how to effectively implement gamified learning strategies in Gauteng schools. Aligning practices with parental expectations can increase support and potentially lead to better outcomes.

1.6.2 Addresses Parental Concerns

The research can identify specific concerns parents have regarding gamification. This allows schools to address those concerns proactively through improved

communication and collaboration with parents. This fosters trust and creates a more supportive learning environment for students.

1.6.3 Contributes to Educational Research

This research adds to the growing body of knowledge surrounding gamification in education. By understanding parental perceptions in a specific context (Gauteng public schools), the research contributes valuable insights that can be compared to studies in other regions or educational settings.

1.6.4 Promoting Equity and Inclusivity

By examining parental perceptions across diverse socio-economic and demographic backgrounds in Gauteng, the research can contribute to efforts aimed at promoting equity and inclusivity in education. Understanding how different groups of parents perceive gamification can help ensure that educational innovations are accessible and beneficial to all students, regardless of their backgrounds.

The research will first involve a literature review of existing studies related to education and the issues encountered in the public education system, it will extend to gamification in education and its adoption in primary schools in South Africa with a contrast of what is happening as trends internationally, and the barriers that are faced by the schools and teachers. The data collected from these will then be analyzed to provide evidence on the challenges and possibilities of gamification adoption in these schools. Additionally, recommendations will be made to facilitate an effective implementation process of gamification in public schools.

1.7 Delimitation and limitations of study

1.7.1 Access to Technology:

Some learners may not have the gadgets required to engage gamification which could yield null results for the research.

1.7.2 Sample Size

The research will focus on parents of primary school learners in Gauteng.

Sample representativeness:

Geographic Scope: Due to the vast area of Gauteng (18,176 km²) encompassing 15 districts and 2.7 million learners across various public schools (2,056), reaching parents in all districts through physical means is impractical. While online surveys

offer wider reach, the sample might not be geographically representative of the entire Gauteng province.

Social Media Sampling Bias: Distributing the survey through personal social media networks can introduce bias. People within these networks might share similar demographics or parenting styles, potentially limiting the generalizability of the findings to the broader Gauteng parent population.

1.7.3 Participant Recruitment:

Online Survey Reliance: Sole reliance on online surveys may exclude parents who lack internet access or prefer not to participate in online surveys due to privacy concerns. This could skew the sample towards more tech-savvy parents.

Trust and Survey Completion: Distributing the survey via links and QR codes might raise concerns about legitimacy due to cybersecurity risks. This could lead to lower participation rates, impacting the overall sample size.

1.7.4 Response Rate:

Low response Rate: Online surveys often have lower response rates compared to in-person surveys. A lower response rate can reduce the representativeness of the sample.

1.8 Definition of terms

Gamification: The use of game-like elements (e.g., points, badges, leaderboards) in non-game contexts, such as education, to motivate participation, engagement, and learning (Deterding et al., 2011).

Gamified learning environment: A learning environment that incorporates game-like elements to enhance the educational experience (Al-Hafdi & Alhalafawy, 2024).

Parental perceptions: Beliefs, opinions, and attitudes that parents hold regarding gamification in their children's education (Xie et al., 2021).

Student engagement: The degree to which students are actively involved in learning activities and focused on achieving educational goals (Schindler et al., 2017).

Motivation: The internal drive or willingness to learn and achieve (Filgona et al., 2020).

Feedback: Feedback serves to support student learning, engagement, and motivation by providing timely, personalized, and constructive guidance throughout the learning process. It transforms the learning experience into a dynamic and interactive journey where students receive continuous support and recognition for their efforts and achievements (Fawzi & Mohamad, 2020).

Equity: Fairness, justice, or equality of opportunity in access to resources, opportunities, and outcomes, such as efforts to promote equity in education by ensuring that gamified learning approaches are accessible to all students (Tierney, 2016).

Inclusivity: The practice of ensuring that all individuals, regardless of their backgrounds or characteristics, are actively engaged and included in decision-making processes, activities, and experiences, such as promoting inclusivity in education by addressing the diverse needs and perspectives of students and parents (FutureLearn, 2021).

Stakeholders: Individuals, groups, or organizations that have a vested interest or stake in a particular issue, process, or outcome, such as parents, educators, policymakers, researchers, and community members involved in the implementation of gamification in public schools (McGrath & Whitty, 2017).

1.9 Assumptions

Gamification can improve educational outcomes: This is the core assumption underlying the research. The study investigates parental perspectives on this idea, but it assumes there's potential for gamification to be beneficial.

Parents have some understanding of education: The research focuses on parental perceptions, so it assumes parents have a basic understanding of their children's education and the learning process.

Parental perceptions matter: The research assumes that parental views on gamification can influence its success in schools. Supportive parents can contribute to a more positive learning environment.

Effective communication is possible: The research assumes that schools can improve communication with parents regarding gamification strategies. This is crucial for addressing concerns and fostering collaboration.

Gamification is definable: The research uses the term "gamification" and assumes there's a common understanding of its core elements (points, badges, etc.) However, you might want to acknowledge that there can be variations in how gamification is implemented.

Influence on Academic Performance: There's an assumption that parental attitudes towards gamification may have an impact on their children's academic performance, although the nature and extent of this influence are open to investigation.

Openness to Change: It's assumed that parents may have varying degrees of openness to new educational approaches, with some being more receptive to gamification.

Cultural Factors: It's assumed that the perceptions and attitudes of parents towards gamification may be influenced by cultural norms, values, and expectations prevalent in Gauteng and South Africa more broadly.

1.10 Chapter Outline

The study is presented in five main chapters:

Chapter One: Introduction

This chapter outlines the rationale behind this study, offering background on the topic, stating the problem, clarifying the research aim, providing the research objectives and questions, emphasizing the significance of the study, and outlining the structure of the study.

Chapter 2: Literature review

In this chapter, the previously published scholarly work related to the topic and main ideas of the research are outlined and analyzed, as well as applicable theoretical frameworks or models that underpin the study. The literature was evaluated to identify the gaps in gamification components in primary schools-the purpose of which is addressed by this study.

Chapter 3: Research Methodology

The chapter outlines the research design, plan and methodology. Further elaborations are made concerning why certain decisions were taken regarding the selection of the research philosophy, methodology, sampling strategy, sampling size, data collection instrument and pretest. Furthermore, the reliability and validity of the instruments and results are discussed, and any ethical considerations and bias-reducing steps taken by the researcher are outlined.

Chapter Four: Data Analysis, Presentation, and Interpretation

The chapter discusses the analysis approach of the qualitative and quantitative data. Quantitative data from the surveys will be analysed in SPSS, a statistical software. The themes extracted from the analysis will be presented and triangulated

Chapter Five: Conclusions and Recommendations

This final section will interpret results considering the literature overviewed in Chapter two and discuss the implications of the findings. Based on this, suggestions will be presented to the Department of Basic Education on how to best facilitate implementing the gamification techniques in specific schools gradually. Potential future research topics will be identified as well.

2. CHAPTER TWO: LITERATURE REVIEW

This study aims to investigate parental perceptions of gamification in Gauteng public schools, it will look at the challenges in the educational system in South Africa and how technology is used internationally to give a background of where gamification fits in South Africa. The research will explore how parents in Gauteng view the potential benefits and drawbacks of gamification in education, and how these perceptions align with their expectations for their children's learning outcomes. This study will take into consideration existing studies and research to provide information on the pros and cons of gamification in schools.

2.1 Challenges in the education system in South Africa

South Africa invests heavily in education, however, the learning outcomes do not reflect the large investment made by the government (Spaull, 2013). In a follow up article, (Spaull, 2019) recognizes that there is a crisis in the South African education system when looking at investment versus return (Spaull, 2019). This was observed by (Spaull, 2019) over a period of twenty years. The South African education system lacks progress in learning outcomes, learners reading and writing for meaning in the early learning grades through to the matric level and poor subject choices as some of the contributing factors to poor results in the education sector (Spaull, 2019).

(Spaull, 2019) reviews the National Development Plan (NDP) which was commissioned by the National Planning Committee (NPC), the notable recommendations identified in the document address the systematic challenges, the support to principals, improving the management of the education system and improving the teacher performance and accountability. (Spaull, 2019) recommends that the education improvement journey should not be looked at in isolation from the learners, as such the education improvement plan should look at, how can learners be encouraged to concentrate, how can the education system support learning for meaning and improving understanding to improve learning outcomes.

(Berg et al., 2011) argue that amongst all its issues, South Africa doesn’t have an issue with access to education, it is seemingly doing well across all levels when assessing access, the main issue is the quality of education. This is further supported by (Spaull & Kotze, 2015) by saying the low quality in education is reflected in the low

throughput of learners with only 14 out of 100 that start school making it to university. (Spaull, 2019) continues to observe that about 45% of primary schools in South Africa are cognitive wastelands which means that they cannot read for meaning. (Spaull, 2019) extends the assertion by stating that the number is higher at high schools at 47% of students failing to reach the international benchmark for Math, when compared to neighboring countries, Botswana is at 2% over the same benchmark.

2.2 Digital technology in the education system

(Dicheva et al., 2015) found that the traditional classroom is undergoing a metamorphosis, Digital technology is no longer on the periphery; it's become a central element, driving a transformation in both teaching and learning approaches. This is supported by (Mpungose, 2020) who identifies that digital revolution offers a multitude of benefits for students, educators, and parents alike

The World Economic Forum (2020) indicate that education has become increasingly out-of-sync with the changing global economy and society due to the shifts brought by worldwide integration and rapid technological progress. Primary and secondary schools have a crucial responsibility in equipping global citizens and workers for the coming job disruption and rising political division (World Economic Forum, 2020; (Grinshkun & Osipovskaya, 2020). In South Africa, educational frameworks must be altered to accommodate technology, to boost the educational standard in public institutions and give the students the necessary abilities to improve in their pass rates, so that they complete and graduate (Berg et al., 2011).

Digital technology has the potential to revolutionize education by making learning more engaging, personalized, and effective (Forum, 2020). (Dicheva et al., 2015) states that it is crucial to implement technology strategically and thoughtfully, addressing potential challenges and ensuring equitable access for all students. In their argument, (Ally et al, 2017) observed that there has been increasing interest in the use of gamification in education (SDGs).This study puts forward the hypothesis that the use of gamification in education will improve the student engagement with learning content, hence improving their academic outcomes and consequently resulting in higher chances of employability.

2.2.1 International perspective on digital technology in the education system

(Putz & Treiblmaier, 2017) found that to keep learners interested in education and learning, the teachers had to find interesting ways that were appealing to learners. (Putz & Treiblmaier, 2019) argue that the attention span of a learner is impacted by the method and mode of delivery which brings a challenge to try and align the education system with familiar tools to learners and achieve the desired educational outcomes.

Due to the interactivity and alignment with the devices the learners already possess and use at home, (Otesayu et.al, 2018) found that learners in first world countries have adapted to digital education as a form of teaching and learning which they have found to work better than traditional classroom teacher delivery. They have highlighted a further need to look at gamification as a potential to improve the learning outcomes of education (Otesayu et.al, 2018).

2.3 Parent involvement in education

Teaching in k-12 (Kindergarten to 12th grade) is taking a transformative approach as the world advances where there is a requirement for it to integrate technology into the pedagogy (Ozolnieks, 2019). Governments have worked to streamline the education process to train teachers and implement technology in the education system (Ozolnieks, 2019). The education system has three key stakeholder, the learner, the teacher and the parent/guardian, often when looking at assessment of education systems, the opinion of parents and guardians is overlooked (Jin & Schmidt-Crawford, 2017).

The perception of parents and guardians is critical to assess in the education system as they provide the support and spend equal active time with the learners, furthermore it is in the best interest of the parent for the learner to succeed in their education journey (Ozolnieks, 2019). (Xie et al., 2021) argues that some parents view gamified learning positively, appreciating its potential to enhance engagement and motivation, others express concerns about its effectiveness or potential distractions.

Parents and Guardians as the main custodians of the learner dictate the education direction of a learner, education is seen as an investment therefore parents take their children to schools where they believe they will get the best quality of education. This

further highlights the importance of the perception of parents in the education system (Amzalag, 2021).

2.4 Gamification is the Education sector in South Africa

Gamification is being used to make learning more interactive and enjoyable for students. The aim is to create an immersive and personalized classroom engagement that motivates students to actively participate and learn. Gamification in education has also been found to improve student performance, increase retention rates, and foster a positive learning environment (Cavus et al., 2023).

(Adukaite et al, 2017; Caponetto et al, 2014) stated that schools and universities are experimenting with gamified learning platforms and applications that encourage students to complete assignments and quizzes and earn rewards for their achievements (Adukaite et al, 2017; Caponetto et al, 2014). (Martin & Deakin, 2020; Salima, 2020) found that most public schools are working to make use of what tools and resources they have available to create 4IR educational programs. (Martin and Deakin, 2020) state that there is a variety of options which could include a range of 4IR-based curricula or student support services such as coding clubs and robotics clubs. In addition, public schools may seek out partnerships with organizations that can help provide access to 4IR-related materials and resources (Martin and Deakin, 2020). In a nutshell, the use of 4IR-focused activities such as the use of tablets or gamification are becoming increasingly popular in public schools as observed by(Salima, 2020).

The effectiveness of gamification educational outcomes is highly dependent on the level of engagement and interaction between the teachers, students, and the resources available (Salima, 2020). Researching gamification educational outcomes in public school systems is an important topic as it provides insight on how students are utilizing and benefitting from the advances in technology and automation that characterize the Fourth Industrial Revolution (4IR) (Rugani, 2019).

2.5 Parental Perceptions of Gamification

(Piller et al., 2016) found that parental attitudes towards gamification in education are multifaceted and influenced by various factors, including cultural beliefs, socio-economic status, educational background, and personal experiences. The view was initially led by (Caponetto et al., 2014b) who found that while some parents may

embrace gamified learning as a novel and engaging method to motivate their children, others may harbor reservations or skepticism regarding its efficacy. (Wang & Kartika Sari, 2023) caution that understanding the spectrum of parental attitudes is crucial for gauging the acceptance and potential challenges associated with integrating gamification into public school curricula.

2.5.1 Parental Perceptions of Gamification benefits

(Wang & Kartika Sari, 2023) believe that parents who view gamification positively often highlight its potential benefits in enhancing student engagement, motivation, and enjoyment of learning. (Xie et al., 2021) support the view that gamified activities can be accepted as conducive to developing critical thinking skills, fostering collaboration, and promoting perseverance in the face of challenges. (Wang & Kartika Sari, 2023) Furthermore, parents may appreciate gamification's ability to cater to diverse learning styles and provide personalized learning experiences tailored to their children's needs and interests.

(Piller et al., 2016) found that parents appreciate the role of gamification in promoting positive behavior and skill development. (Hidayat, 2022) asserts that parents who support gamified applications believe they can improve health and wellness, (Hidayat, 2022) further states that gamification can encourage children to adopt healthy habits, such as physical activity or nutrition, through incentives and feedback mechanisms. (Xie et al., 2021) agrees that parents view gamification as a supportive tool for reinforcing desired behaviors and instilling valuable life skills, such as problem-solving, collaboration, and resilience, in their children.

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2.5.2 Parental Perceptions of Gamification drawbacks

(Amzalag, 2021) presents that some parents express concerns or reservations regarding the integration of gamification in public school education. (Wang & Kartika Sari, 2023) found that common apprehensions include fears of excessive screen time, potential distractions, and the displacement of traditional educational practices. Additionally,(Xie et al., 2021) observed that parents question the effectiveness of gamification in promoting deep learning and academic rigor, particularly in subjects that require conceptual understanding and mastery of complex topics.

(Xie et al., 2021) found that a significant consideration for parents is the equitable implementation of gamified learning experiences across schools. (Mpungose, 2020) supports the concerns regarding access to digital resources, internet connectivity, and disparities in socio-economic status may exacerbate existing educational inequalities.

(Wang & Kartika Sari, 2023) caution that parents often raise concerns about the content and appropriateness of gamified activities. (Wang & Kartika Sari, 2023) state that while gamification can enhance motivation and engagement, there is a risk of exposing children to inappropriate themes, violence, or gambling elements disguised within game mechanics. In their observation (Wang & Kartika Sari, 2023), state that this raises questions about the ethical implications of gamified interventions and the need for vigilant monitoring by parents to ensure content suitability.

2.6 Conceptual Diagram: Parental Perceptions of Gamification in Education

In this study, a conceptual diagram serves as a visual representation of the theoretical framework guiding the investigation into parental perceptions of gamification and its impact on educational outcomes in public schools in Gauteng. The conceptual diagram provides a structured overview of the key constructs, relationships, and variables under investigation, facilitating a deeper understanding of the research framework.

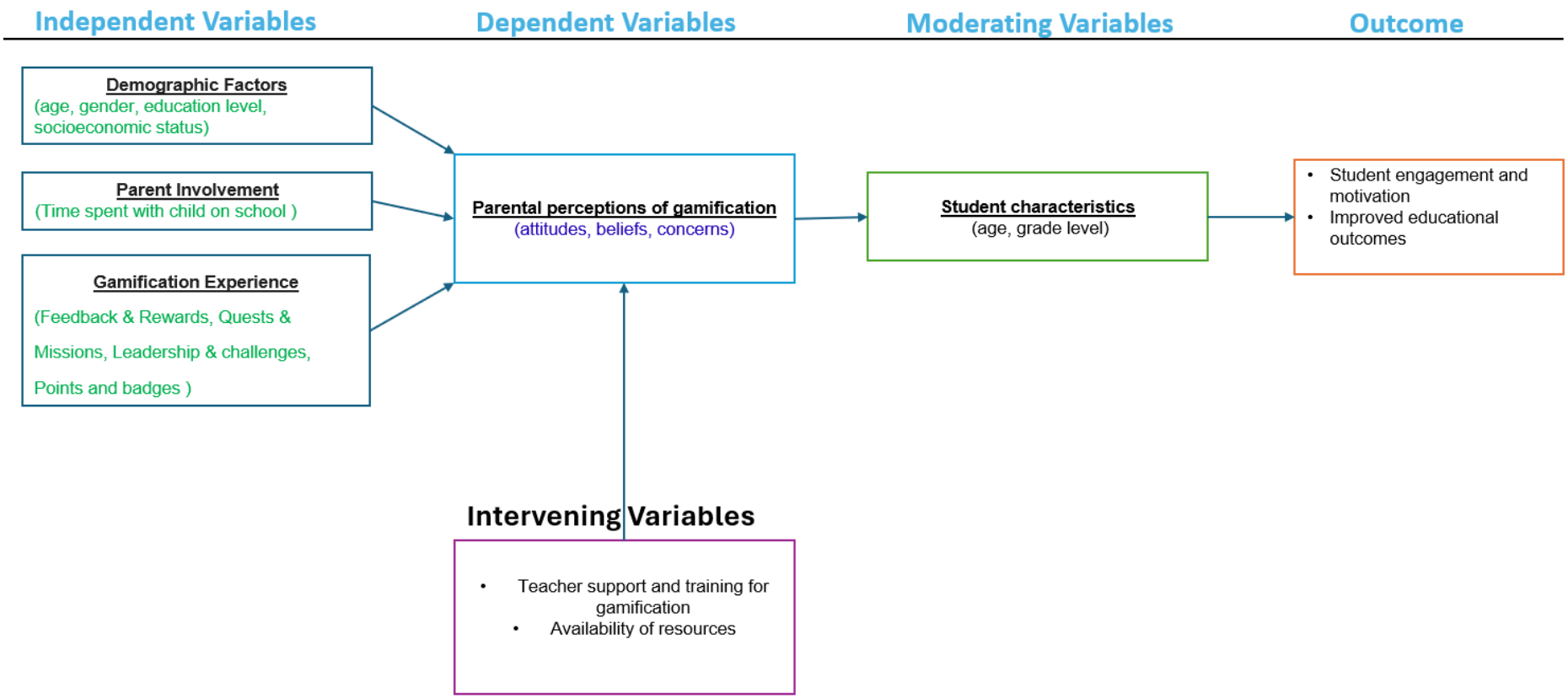
At its core, the conceptual diagram is grounded in theories of gamification, parental involvement in education, and educational outcomes. These theories inform the conceptualization of parental perceptions as a central determinant in the adoption and effectiveness of gamified learning approaches within the educational context. By visualizing these theoretical concepts and their interconnections, the conceptual diagram offers a roadmap for exploring the complexities of parental attitudes towards gamification and their implications for student learning.

The conceptual diagram comprises interconnected components representing parental perceptions, gamification strategies, educational outcomes, and mediating factors. Each component is characterized by specific variables and relationships that shape the overall research framework. Through the conceptual diagram, researchers and

stakeholders gain insight into the multifaceted nature of parental perceptions and their potential influence on the integration and outcomes of gamified educational interventions.

As the study progresses, the conceptual diagram serves as a guiding framework for data collection, analysis, and interpretation. By aligning empirical findings with theoretical constructs depicted in the conceptual diagram, researchers can elucidate the mechanisms through which parental perceptions impact educational practices and student outcomes. Ultimately, the conceptual diagram provides a holistic perspective on the complex interplay between parental attitudes, gamification strategies, and educational achievements, contributing to a deeper understanding of effective educational interventions in public schools in Gauteng.

Research Framework



2.7 Gamification Implementation pathways

The following section provides the broader processes depicted in the conceptual framework, that can predict adoption of gamification.

2.7.1 Demographic Factors

(Koivisto & Hamari, 2014) Demographic factors play a significant role in shaping parental perceptions, this will be true of gamification and its associated benefits and drawbacks. (Koivisto & Hamari, 2014) These factors, including age, gender, education level, and socioeconomic status, influence how parents perceive and interact with gamified interventions aimed at children.

2.7.1.1 Age

Parental perceptions of gamification may vary according to age demographics. Older parents may exhibit more traditional views regarding education and technology, potentially expressing skepticism or concerns about the efficacy and appropriateness of gamified approaches. In contrast, younger parents, who are more digitally fluent and accustomed to interactive technologies, may be more receptive to gamification and its potential benefits.

2.7.1.2 Gender

Gender can also influence parental perceptions of gamification, albeit to a lesser extent. Research suggests that gender stereotypes and societal expectations may shape how parents perceive the suitability of gamified interventions for their children. For example, stereotypical beliefs about gaming being more suitable for boys than girls may influence parental attitudes and preferences regarding the adoption of gamified educational or recreational activities.

2.7.1.3 Education Level

The level of parental education is an influential factor in shaping perceptions of gamification. Parents with higher levels of education may possess greater awareness of educational theories and pedagogical approaches, enabling them to critically evaluate the efficacy and alignment of gamified interventions with learning objectives. Conversely,

parents with lower levels of education may rely more on anecdotal evidence or societal norms in forming their perceptions of gamification.

2.7.1.4 Socioeconomic Status

Socioeconomic status can significantly impact parental perceptions of gamification due to its association with access to resources and cultural capital. Parents from higher socioeconomic backgrounds may have greater access to educational resources, including technology and extracurricular activities, allowing them to make informed decisions about the adoption of gamified interventions. In contrast, parents from lower socioeconomic backgrounds may face barriers to accessing and utilizing gamified resources, influencing their perceptions of its relevance and value.

2.7.2 Parent Involvement

2.7.2.1 Parent involvement

(Koivisto & Hamari, 2014) The time spent with the child on school-related activities, plays a crucial role in shaping parental perceptions of gamification and its efficacy in supporting children's learning and development. The extent of parent involvement can influence how parents perceive and engage with gamified interventions aimed at enhancing educational outcomes.

2.7.2.2 Time Spent with Child on School Activities

The amount of time parents dedicate to engaging with their child on school-related activities, including homework assistance, educational discussions, and extracurricular involvement, can significantly impact their perceptions of gamification. Parents who actively participate in their child's educational journey by providing academic support and guidance may have a deeper understanding of their child's learning needs and preferences. As a result, they may be more receptive to gamified interventions that complement and enhance traditional learning methods.

2.7.3 Gamification Experience

(Smiderle et al., 2020)Gamification experiences encompass a variety of elements, including feedback and rewards, quests and missions, leadership and challenges, as well

as points and badges, all of which can influence parental perceptions of gamified interventions aimed at children. Understanding how these gamification features interact with parental perceptions is essential for designing effective and engaging educational and recreational experiences.

2.7.3.1 Feedback and Rewards

(Smiderle et al., 2020) The provision of timely and meaningful feedback, coupled with rewards or incentives, is a key component of gamification that can shape parental perceptions. Parents value gamified interventions that offer constructive feedback on their child's progress and achievements, reinforcing positive behaviors and learning outcomes. (Caponetto et al., 2014b)The perceived effectiveness of feedback and rewards in motivating children and promoting engagement influences parental attitudes towards gamification, with well-designed feedback mechanisms garnering greater parental support and acceptance.

2.7.3.2 Quests and Missions:

(Christopoulos & Mystakidis, 2023) Gamification often involves the use of quests, missions, or challenges to structure learning experiences and promote goal-oriented behavior. Parents perceive gamified interventions that offer clear objectives and progression paths as beneficial for fostering their child's sense of achievement and mastery. (Smiderle et al., 2020)The alignment of quests and missions with educational objectives enhances parental perceptions of gamification as a meaningful tool for promoting skill development and knowledge acquisition.

2.7.3.3 Leadership and Challenges:

(Christopoulos & Mystakidis, 2023) Gamification experiences that incorporate elements of leadership and challenges can influence parental perceptions by promoting collaboration, critical thinking, and problem-solving skills in children. Parents value gamified interventions that provide opportunities for their child to take on leadership roles, collaborate with peers, and overcome challenges in a supportive environment. (Christopoulos & Mystakidis, 2023) The perceived value of leadership and challenges in promoting social and cognitive development shapes parental attitudes towards

gamification, with a focus on its potential to cultivate essential life skills beyond academic achievement.

2.7.3.4 Points and Badges:

(Christopoulos & Mystakidis, 2023) The use of points and badges as tangible markers of achievement and progress is a common feature of gamification that can impact parental perceptions. Parents view gamified interventions that utilize points and badges as effective tools for recognizing and rewarding their child's efforts and accomplishments. (Smiderle et al., 2020) The perceived value of points and badges in reinforcing positive behaviors and motivating continued engagement influences parental acceptance and support for gamification as a means of enhancing learning experiences.

2.7.4 Parent Perceptions

Parental perceptions of gamification, encompassing attitudes, beliefs, and concerns, serve as a crucial dependent variable influenced by various factors, including gamification experience, parent involvement, and demographics. Understanding how parental perceptions shape and are shaped by these factors is essential for comprehensively examining the impact of gamified interventions on student engagement, motivation, and academic achievement.

2.7.5 Student Characteristics

Student characteristics, such as age and grade level, moderate the relationship between parental perceptions of gamification and student outcomes by shaping students' receptiveness to gamified interventions and their ability to engage with them effectively. Younger students may rely more on parental guidance and support in navigating gamified experiences, while older students may have greater autonomy and independence in their learning preferences. Additionally, students at different grade levels may have varying levels of academic readiness and motivation, which can influence how they respond to gamified interventions and the extent to which parental perceptions impact their educational outcomes.

2.7.6 Teacher Support and Resources

(Hidayat, 2022)Teacher support and training for gamification encompass professional development programs, workshops, and ongoing support mechanisms designed to equip educators with the knowledge, skills, and confidence to effectively integrate gamified strategies into their teaching practices.

(Hidayat, 2022)The availability of resources plays an intervening role in the relationship between teacher support/training for gamification and the effectiveness of gamified interventions in enhancing student outcomes. (Xie et al., 2021)Teachers who receive comprehensive support and training for gamification may encounter barriers to implementation if resources are lacking or inadequate. (Xie et al., 2021) Conversely, sufficient resources can facilitate the successful implementation of gamified strategies, enabling teachers to create engaging and interactive learning experiences that promote student engagement, motivation, and academic achievement.

2.7.7 Student engagement and improved educational outcomes

Student engagement and improved educational outcomes represent key objectives and desired outcomes of gamified interventions in educational settings. These outcomes are influenced by various factors, including parental perceptions, teacher support and training, as well as the availability of resources, and they serve as indicators of the effectiveness of gamification in enhancing the learning experiences of students.

As outcomes of gamified interventions, student engagement and improved educational outcomes reflect the effectiveness of gamification in enhancing the learning experiences and outcomes of students. These outcomes are influenced by various factors, including the perceptions and attitudes of parents, the support and training provided to teachers, as well as the availability of resources to support the implementation of gamified strategies in educational settings.

2.8 Examples Of Gamification Being Implemented in Gauteng Schools

There are several examples of gamification being implemented in Gauteng schools:

1. *ClassDojo:* ClassDojo is a popular gamified platform that enables teachers to track and reward students' behavior and achievements in real-time (Saeger, 2017). It uses a point-based system, allowing teachers to give positive or negative points to students based on their behavior (Chiarelli et al, 2015). Students can also customize their avatars and earn virtual rewards (Chiarelli et al, 2015).

2. *Kahoot*. This is where students can participate in these quizzes using their smartphones or mobile devices, competing against fellow learners, or working together in teams to answer questions (Mdlalose et al, 2022). The platform fosters engagement, competition, and learning in a fun and interactive manner (Mdlalose et al, 2022).

4. *Prodigy Math.* Students answer math questions to progress in the game, earning virtual rewards and leveling up their characters. The game adapts to students 's abilities, providing personalized learning experiences (Lyons ,2020).

5. *Edu Bits:* Edu Bits is a gamified assessment system that allows students to earn micro-credentials or digital badges for different skills and competencies (Sahami et al, 2016). Students can complete specific tasks or projects and earn badges, which can be showcased on their resumes or online portfolios (Sahami et al, 2016).

Gamified applications and platforms are constantly evolving, and educators are finding innovative ways to leverage them to enhance teaching and learning experiences (Wang and Kartika, 2023). These are examples of how gamification can be applied in Gauteng schools.

2.9 Challenges in implementing gamification

Implementing gamification in primary schools in Gauteng may encounter several challenges. Recent findings from South Africa stated in (Lubinga et al, 2023) cite the following:

1. *Infrastructure and Access:* The lack of access to technology in most SA primary schools can limit the implementation of gamified learning environments (Adukaite et al, 2017; Lubinga et al, 2023).

2. *Training and Support**:*** *Teachers* may not have sufficient training or support in integrating gamification into their teaching practices. They may need guidance on how to effectively design and implement gamified activities that align with the curriculum objectives (Akoodie, 2020).

3. *Limited Resources:* Primary schools in South Africa often face resource constraints, which may limit their ability to invest in gamification tools and resources. Purchasing educational games or software platforms can be expensive, making it challenging to fully adopt gamification in the classroom (Botha-Ravyse et al, 2018).

4. *Cultural and Language Context**:*** South Africa is a diverse country with multiple cultural and linguistic contexts. Gamification strategies need to be designed to be inclusive ensuring they resonate with all students (Lubinga et al, 2023; Abdullahi, 2021).

5. Assessment and Evaluation**:** Traditional assessment methods may not adequately capture the learning outcomes of gamified activities. Developing appropriate assessment strategies that align with gamification can be a challenge for teachers, as well as ensuring that these methods align with the curriculum requirements and standards (Abdullahi, 2021; Lubinga et al, 2023).

6. *Resistance to Change:* Introducing gamification in primary schools may face resistance from teachers, administrators, and parents who are unfamiliar with the concept or skeptical of its effectiveness. Convincing stakeholders about the benefits of gamification and addressing concerns may require ongoing communication and advocacy efforts (Abdullahi, 2021; Lubinga et al, 2023).

Addressing these challenges may require collaboration between education stakeholders, government support, and investment in technology infrastructure and professional development for teachers (Abdullahi, 2021; Lubinga et al, 2023). Additionally, parents' perceptions of gamification by conducting research and sharing best practices on successful implementations of gamification in primary schools can contribute to

overcoming these challenges and promoting effective gamified learning experiences in South Africa (Abdullahi, 2021).

2.10 Elements Required for Gamification Implementation.

This study will focus on gamification as one way of applying 4IR in improving educational outcomes and parents perceptions of the adoption of gamification.

2.10.1 Gamification to help engaging the learners.

Gamification involves introducing game-like elements into learning activities, such as awarding badges or points for completing tasks, setting up leader boards, creating virtual rewards, and providing challenges that learners can compete in (Welbers et al, 2019). Gamification can help to motivate learners, boost engagement, and foster a sense of competition and collaboration between learners. However, some studies have showed that there is little development of educational games to drive more interaction and engagement, this could be that gaming development is expensive which requires a lot of funding (Brull and Finlayson, 2016; Renata et al, 2022).

2.10.2 Gamification and improved student engagement

Gamification incorporates game elements into the learning process and can help to make the learning process more engaging and enjoyable for students (Kumar er al., 2021). It is the assumption of this conceptual framework that the more the students are engaged the more they enjoy schooling and the less there is a likelihood of dropping out.

Automated grading systems can provide students with immediate feedback on their progress and help them better understand the material being taught (Korkmaz and Correia, 2019). This can help to foster a more engaging learning environment.

2.10.3 Ethical consideration of gamification in line with learners

(Gkintoni et al., 2024) Gamification should prioritize the holistic development and well-being of children. (Gkintoni et al., 2024) Ethical concerns arise regarding whether gamified activities promote healthy psychological and social development or potentially exacerbate issues such as addiction, social isolation, or excessive screen time.

2.10.4 Training Educators in the 4IR Era

The role of teachers is crucial in the gamification context (Moloi & Mhlanga, 2021). Teachers will need to be knowledgeable and comfortable using the latest technology and apply it in their teaching practices (Ruminar & Gayatri, 2018). They need to be able to learn and adapt for them to be able to apply the skills effectively (Moloi & Mhlanga, 2021). However, a recent study in South Africa found out student teachers lacked knowledge on 4IR for them to adapt to gamification (Mpungose, 2020).

2.11 Chapter summary

This chapter establishes a comprehensive foundation for exploring parental perceptions of gamification to improve learning outcomes in Gauteng public schools. It looks into the existing literature on gamification in education within the specific context of South Africa's educational challenges and the role of digital technologies.

2.11.1 Key Themes Explored:

Challenges in South African Education: The chapter begins by examining the complexities facing the South African education system. Understanding these challenges is crucial for identifying how gamification might be leveraged as a potential solution.

Digital Technology Integration: The review explores the international and South African perspectives on integrating digital technologies into education. This includes discussions of opportunities and potential challenges associated with technology use in learning environments.

The Role of Parents: Parental involvement in their children's education is a critical factor for success. The chapter explores the existing research on parent involvement and its potential influence on how parents perceive innovative approaches like gamification.

Gamification in Education: A core focus of the review is understanding the current landscape of gamification in South African education. This includes exploring existing research on parental perceptions of gamification's benefits and drawbacks.

Conceptual Framework: The chapter presents a conceptual diagram outlining the factors that can influence parental perceptions of gamification. This framework considers

demographic factors, parent involvement, gamification experience, student characteristics, teacher support, and student engagement.

Implementation Considerations: The review examines key elements for successful gamification implementation, including strategies to enhance learner engagement, ethical considerations, and teacher training in the context of the Fourth Industrial Revolution (4IR).

Examples and Challenges: Finally, the chapter explores current examples of gamification use in Gauteng schools and acknowledges potential challenges that need to be addressed for successful implementation.

This comprehensive examination of the literature provides a rich context for the subsequent chapters. By drawing on insights from both international and South African research, the study will explore how parental perceptions of gamification influence their willingness to embrace this approach in their children's education within Gauteng public schools.

3. CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research Design

This is regarded as the blueprint for how the study will be conducted (Kumar, 2019). The study will be cross-sectional (Kesmodel, 2018; Wang & Cheng, 2020) and will provide results on gamification effects on educational outcomes in the current study period, as opposed to longitudinal studies that collect data over a long period.

This research utilizes a quantitative approach by employing a survey method to collect data from parents of students attending Gauteng public schools. Surveys are a valuable tool for gathering information from a large population on their attitudes and opinions (Flick, 2018).

3.2 Data Collection Instrument

A self-administered questionnaire will be the primary tool for data collection. The questionnaire will be designed to be clear, concise, and easy to understand for parents with varying levels of education. It will encompass the following elements:

Introductory Statement: A brief introduction will explain the purpose of the research and assure participants of anonymity and confidentiality.

Informed Consent: An informed consent statement will outline the research objectives, data collection procedures, and how the data will be used. Participants will be required to acknowledge their consent before proceeding with the questionnaire.

Demographic Information: A short section will gather basic demographic information such as participants' location within Gauteng (if comfortable disclosing) and the grade level(s) of their children in public schools.

Gamification Awareness: Questions will assess parents' understanding and awareness of gamification in educational settings. This might involve a brief definition followed by a multiple-choice question or a Likert scale question asking them to rate their familiarity with the concept.

Perceptions of Benefits: Questions will explore parental perceptions of the potential benefits of gamified learning environments for their children. This may involve Likert scale questions asking them to rate their agreement with statements regarding increased engagement, motivation, and knowledge retention.

Perceptions of Drawbacks: Questions will examine parental concerns regarding potential drawbacks of gamified learning. Like the benefits section, this might use Likert scale questions about concerns like excessive competition or a focus on points over learning.

3.3 Sampling Techniques

In research, population refers to all individuals from which the data will be collected (McCombes, 2023). A purposive sampling strategy will be employed to target parents of students attending Gauteng schools, they will form a base for reference and inference to the larger population of parents in Gauteng (Rahman, 2023). Online platforms frequented by parents in Gauteng, such as school or community Facebook groups, will be utilized for questionnaire distribution.

3.3.1 Sample size calculation for the quantitative research

According to the Gauteng Department of Education there are 1485238 learners in public schools in Gauteng (Gauteng Department of Education Statistics Report, 2022). The Cochran formula will be used to calculate the sample of parents of learners in public schools in Gauteng:

$$n = \frac{N \cdot Z^2 \cdot p \cdot (1-p)}{(N-1) \cdot e^2 + Z^2 \cdot p \cdot (1-p)}$$

- n = sample size
- N = population size (1485238)
- Z = Z-score (1.96 for a 95% confidence level)
- p = estimated proportion of the population with the attribute of interest (0.5 for maximum variability)

- e = margin of error (5%)

$$n = \frac{1485238 \cdot (1.96)^2 \cdot 0.5 \cdot (1-0.5)}{(1485238-1) \cdot (0.05)^2 + (1.96)^2 \cdot 0.5 \cdot (1-0.5)}$$

$$n \approx \frac{1485238 \cdot 3.8416 \cdot 0.25}{1485237 \cdot 0.0025 + 3.8416 \cdot 0.25}$$

$$n \approx \frac{568947.6}{3713.5942 + 0.9604}$$

$$n \approx \frac{568947.6}{3714.5546}$$

$$n \approx 153.07$$

The calculated sample size will be 153 parents.

3.4 Data collection

The questionnaire will be developed using an Google Forms which is an online survey tool. Google Forms will allow for easy access and completion from any device with internet connectivity, facilitating participation from parents across Gauteng.

3.4.1 Pretest

A pilot test with a small sample group of parents will be conducted before the main data collection phase. This pretest will assess the clarity, understandability, and response time of the questionnaire. Based on the pretest results, the questionnaire can be refined to ensure optimal effectiveness. If some questions will have low consistency Cronbach's alpha coefficient (<0.7) they will be tweaked.

3.4.2 Data Security

Confidentiality of participants will be ensured by anonymizing all responses. The online survey tool will be password-protected, and all collected data will be stored securely.

3.5 Data analysis

Quantitative data collected through the Likert scale questions will be analyzed using statistical software (SPSS). Descriptive statistics will be used to summarize parental perceptions on gamification, including measures of central tendency (mean, median) and dispersion (standard deviation). Additionally, inferential statistics may be employed to identify any significant relationships between variables, such as demographic factors and parental perceptions.

As standard in social sciences, it will be analysed at 95% confidence interval, meaning that the 5% significant level will be used to accept or reject the null hypothesis. Frequency tables with percentages and mean and standard deviations of the Likert scale will be computed. The mean scores will be computed to measure the central tendency (average) of the data points while the standard deviation will tell how the responses deviate from the mean.

3.6 Reliability and validity

Reliability and validity of the results are essential in determining its accuracy and reliability. Reliability analysis of the final dataset will measure the consistency of the perceptions on the effectiveness of gamification as well as perceptions of parents of learners. It will also measure validity or accuracy of the computed constructs of the gamification components in the questionnaire and education outcomes (Middleton, 2023).

3.6.1 Possible Limitations and Challenges

Selection Bias: Purposive sampling through online platforms might not reach the entire population of Gauteng parents. Parents with limited internet access or those not active on social media groups may be excluded.

Response Bias: Participants who are more interested in or have stronger opinions on gamification might be more likely to complete the survey, potentially skewing the results.

Social Desirability Bias: Participants might answer in a way they perceive to be socially desirable, potentially downplaying concerns about gamification.

Oversimplification of Opinions: Likert scale responses can limit the richness of data by offering predetermined answer choices. Parents may have nuanced views not captured by the scale.

Response Rate: Encouraging sufficient participation from parents across Gauteng can be challenging.

3.6.2 Mitigation

Clarity: The questionnaire will clearly state the importance of participation from all parents in the online survey.

Time: The survey will be released for 1months which will give enough time for completion by participants.

Explanatory Video: Record a video explaining the importance of the study so that parents can watch and understand intention.

3.6.3 Quality Assurance

The questionnaire will have questions that check against questions in the questionaire, and use of skip patterns will ensure that respondents are clear on what they need to ask. Second, data will be captured as it comes and checked for any inconsistencies. Feedback will be provided to the data collection team in case of inconsistences that may arise.

3.7 Ethical Considerations

The Researcher will apply ethical considerations that will be contextual to this study and target population, considering the study design. Clearance to conduct the study will be obtained from the University Ethics Committee during proposal development. This study is a cross sectional study that will not cause any harm to participants, it will focus on consenting adults who are guardians to the learners.

The questionnaire will have a section where the responded will consent to participation, and they will be informed of the confidentiality and anonymity of the results, as well as voluntary participation. The Researcher shall abide to all research ethics for the integrity of the study results. They will not tamper with the results and will disseminate the results in an honest manner without falsifying any information.

Equity and Access:

Ensure that gamified educational initiatives do not exacerbate existing inequalities in access to technology or resources. Ethical considerations include whether all students have equal access to the necessary devices and internet connectivity to participate fully in gamified learning experiences.

Data Privacy and Security:

Collecting data through gamified platforms raises concerns about the privacy and security of students' personal information. Ethical implementation requires strict adherence to data protection regulations, transparent consent processes, and robust security measures to safeguard sensitive data from breaches or misuse.

Inclusivity and Diversity:

Ethical gamification practices should consider the diverse needs, backgrounds, and learning styles of students. Avoid reinforcing stereotypes or biases within gamified content and ensure that the design is inclusive and accessible to students with varying abilities and cultural backgrounds.

Teacher Training and Support:

Ethical considerations extend to the preparation and support provided to teachers for implementing gamified approaches effectively. Teachers must receive adequate training to facilitate meaningful learning experiences, monitor student engagement, and address any ethical issues or concerns that may arise during gamified activities

Transparency and Accountability:

Ensure transparency in the objectives, mechanics, and outcomes of gamified interventions. Ethical implementation requires clear communication with stakeholders, including students, parents, teachers, and school administrators, about the purpose, rules, and potential impacts of gamification on learning outcomes.

Balancing Gamification with Traditional Pedagogy:

Ethical considerations involve striking a balance between incorporating gamified elements into the curriculum and preserving the integrity of traditional teaching methods. Gamification should complement rather than replace existing pedagogical approaches, ensuring that learning remains grounded in critical thinking, collaboration, and real-world application.

Long-term Effects and Sustainability:

Consider the long-term effects and sustainability of gamified interventions on student motivation, engagement, and academic performance. Ethical implementation requires ongoing evaluation and reflection to assess the efficacy, impact, and ethical implications of gamification practices over time.

3.8 Proposed Timelines

Table 1 - Proposed Timeline

		May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23
	Proposal submission								
	Proposal accepted, ethical clearance								
	Data collection								
	Data analysis								
	Results write up								
	Thesis submission								

4. CHAPTER FOUR: ANALYSIS

4.1 Introduction

This chapter explores parental perceptions of gamification and educational outcomes in public schools in Gauteng. To understand these viewpoints, the research employed a structured survey method. This method was chosen due to its effectiveness in reaching a large and diverse sample of parents within a reasonable timeframe. The survey was distributed online through social media platforms and email, targeting parents across Gauteng.

The survey consisted solely of closed-ended questions. These questions utilized formats like Likert scales, yes/no options, and multiple-choice formats to facilitate clear and quantifiable responses. A pretest with a small group ensured the clarity and accuracy of the survey instrument.

While the target sample size based on the Cochran formula was 153 participants, social science research can achieve statistical significance with smaller samples depending on the specific focus. Considering this chapter's focus on parental perceptions of gamification's impact on learning outcomes, we proceeded with a sample of 100 parents. The achieved response rate of 65% strengthens the validity of the data collected for this analysis which provides a robust base for statistical analysis and inference drawing.

To ensure the reliability and validity of the survey, the questionnaire was pretested with a small group of participants. Feedback from this pretest led to refinements in question wording and format to improve clarity and response accuracy.

The next section will present a summary of key demographic and response metrics from the survey data.

4.2 Demographic Data

4.2.1 Response Rate and Demographic Breakdown

Table 2 - Responding demographics

Description	Data
Total Surveys Distributed	150
Total Responses Received	100
Response Rate	66.7%
Male Respondents	39
Female Respondents	59
Prefer Not to Say	1
Not Provided	1

This spread provides a diverse perspective on parental perceptions across various elementary school stages.

4.2.2 Children's Grade Level Distribution

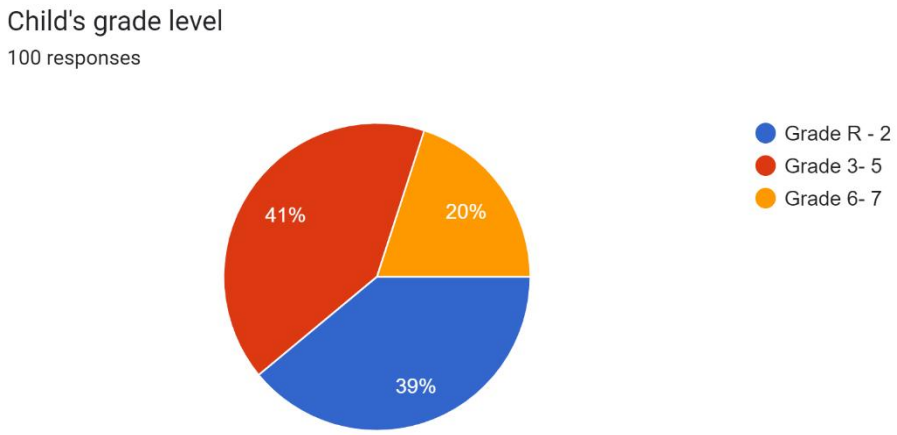


Figure 1 -Child's Grade

4.2.3 Children's access to electronic devices

Table 3 - Child Access to a device

Has Access	Number of Responses
Yes	94
No	6

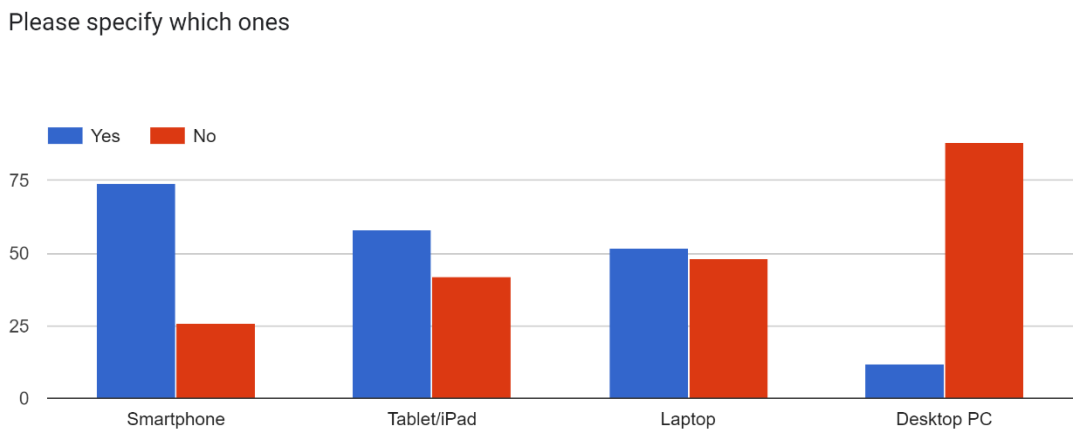


Figure 2 - Types of devices the learners have.

The survey explored whether children in Gauteng public schools have consistent access to electronic mobile devices, including smartphones, tablets, iPads, laptops, and desktop PCs. The responses from 100 participants showed that 94% of the children have access to such devices, indicating a substantial penetration of technology in the households surveyed. Only 6% of the respondents indicated their children did not have access to these devices.

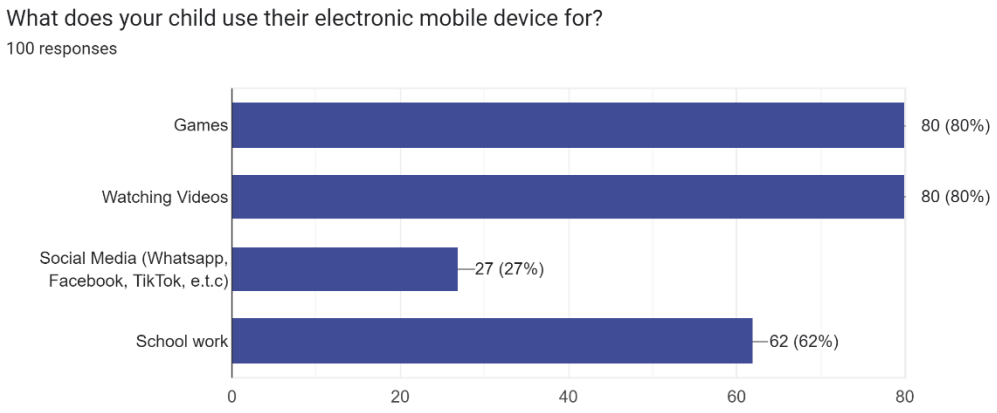


Figure 3 - Child device utilization.

While a significant portion (80%) use devices for entertainment, only 60% use them for school work. This suggests a potential opportunity for further integrating educational technology tools and gamified learning experiences into the school curriculum.

4.2.4 Parent Awareness of Gamification

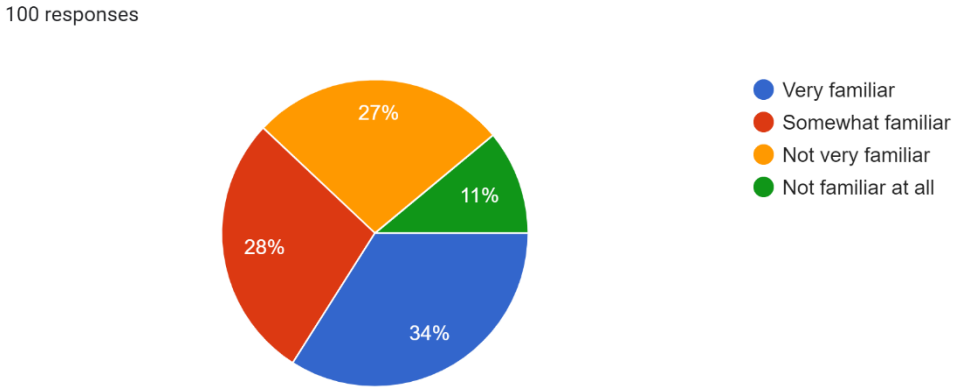


Figure 4 - Parents familiarity of gamification.

The survey results show that a significant portion of parents (55%) have at least some level of familiarity with gamification (Very familiar or Somewhat familiar). This suggests that parents may be open to the concept of gamified learning being implemented in their children's education.

However, a sizeable portion (45%) of parents indicated that they are either Not very familiar (34%) or Not familiar at all (11%) with gamification. This highlights a potential need for increased awareness and education about gamification among parents.

Table 4 - Opinions on Gamification Improving Learning Outcomes

Opinion	Number of Responses
Strongly Agree	23
Agree	54
Neutral	15
Disagree	5
Strongly Disagree	3

Most respondents (54%) agreed that gamification improves learning outcomes, while a significant portion (23%) strongly agreed. In contrast, only 8% of respondents disagreed or strongly disagreed. The average score for the Likert scale question on whether parents believe gamification improves learning outcomes is 3.89. This leans slightly towards agreement with the statement.

The data collected offers a comprehensive insight into the parental perceptions of gamification in public schools in Gauteng, with a good balance of responses across different demographic segments and a high engagement level on questions concerning technology and education. This response rate is considered excellent for an online survey, which typically faces challenges in engaging participants to complete questionnaires fully. The high level of engagement may reflect a strong interest or concern among parents regarding the integration of gamification into their children's education, suggesting that the topic is both relevant and timely.

4.3 Results of the Study

4.3.1 Electronic Device Access Among Children in Gauteng Public Schools

The survey explored whether children in Gauteng public schools have consistent access to electronic mobile devices, including smartphones, tablets, iPads, laptops, and desktop PCs. The responses from 100 participants showed that 94% of the children have access to such devices, indicating a substantial penetration of technology in the households surveyed. Only 6% of the respondents indicated their children did not have access to these devices.

Table 5 - Access to Electronic Devices

Access to Devices	Frequency	Percentage
Yes	94	94%
No	6	6%

A chi-square test was conducted to determine if there was a statistically significant association between the parent's gender and the child's access to electronic devices. The test results yielded a chi-square statistic of 1.51 with a p-value of 0.471, suggesting no significant difference in device access based on the gender of the parent. This indicates that both male and female parents reported similar levels of access to electronic devices for their children.

Table 6 -Device Access by Parent's Gender

Your Gender / Device Access	Female	Male	Prefer not to say
No	5	1	0
Yes	54	38	1

The findings from this study suggest that access to electronic devices among children in Gauteng public schools is quite high and not influenced by the gender of the parent. This widespread availability of technology is a positive indicator for the potential implementation of gamified educational strategies, which rely heavily on such technology. The absence of a gender disparity in device access underscores the equitable distribution of technology resources among the survey respondents, which can facilitate inclusive educational practices.

4.3.2 Internet Access

The survey explored whether children in Gauteng public schools have access to the internet, which is crucial for enabling technology-driven education, including gamified learning platforms. The responses from the survey indicate a high level of internet connectivity among the children:

Table 7 - Access to Internet

Internet Access	Frequency	Percentage
Yes	95	95%
No	5	5%

A vast majority, 95% of the respondents, reported that their children have internet access, demonstrating a robust digital infrastructure in the homes of surveyed families. This high connectivity rate is indicative of the potential to implement online educational tools and resources effectively.

The overwhelming availability of internet access supports the feasibility of using digital and gamified educational interventions, which rely on stable internet connections for functionality. Such widespread connectivity not only enables the use of online learning platforms but also opens opportunities for introducing innovative educational technologies that can enhance learning engagement and outcomes.

The presence of internet access in 95% of the households surveyed suggests that technological barriers to implementing online education may be lower than anticipated, facilitating a more inclusive approach to digital education initiatives in Gauteng public schools.

4.3.3 Types of Internet Connectivity in Households

The survey also investigated the types of internet connectivity available in the households of the children attending Gauteng public schools. This data provides insight into the infrastructure that supports digital learning environments, crucial for implementing online and gamified educational methods. Here's how the types of internet connections distribute among the surveyed households:

Table 8 -Types of Internet Connectivity

Type of Internet Connectivity	Frequency
Fibre/ADSL Uncapped	62
3G/4G/5G on the mobile device or hotspot	28
Other (e.g., satellite, dial-up)	5

The majority of respondents (62%) reported having high-speed fibre or ADSL uncapped connections, which are ideal for high-demand online activities, including streaming educational videos and participating in interactive learning platforms. A significant portion (28%) relies on mobile data connections like 3G, 4G, or 5G, which may offer varying levels of reliability and data constraints. A small fraction (5%) has access to other forms of internet connectivity, which might include less reliable options like satellite or dial-up services.

This distribution highlights that most children have access to robust internet services, potentially facilitating effective engagement with digital learning resources. However, the variability in type and quality of internet services could influence the consistency of online educational experiences across different households.

4.3.4 Daily Screen Time on Weekdays

The survey assessed the amount of time children spend using electronic mobile devices on a typical weekday (Monday to Friday). This measure helps understand the extent of device interaction, which is essential for gauging exposure to potential digital learning tools and the impact of screen time on children's daily routines.

Table 9 - Daily Screen Time on Weekdays

Time Spent on Device (per day)	Frequency
Less than 1 hour	10
1-2 hours	35
2-4 hours	40
More than 4 hours	15

The responses indicate a varied distribution of screen time among the children:

- A small group (10%) spends less than one hour per day on devices, suggesting limited interaction with digital tools.
- The largest segments, comprising 35% and 40% of the children, spend 1-2 hours and 2-4 hours, respectively, indicating moderate to significant engagement with electronic devices.
- 15% of children are reported to use electronic devices for more than 4 hours daily, which might suggest high exposure to digital screens.

This data reflects a significant integration of electronic devices into children's daily lives, with most children engaging with devices for at least an hour each weekday. The extent of device use offers insights into the potential for integrating digital learning solutions effectively, while also raising considerations about managing screen time to avoid negative impacts on health and well-being.

4.3.5 Weekend Screen Time

The survey also queried the amount of time children spend using electronic mobile devices during weekends (Saturday and Sunday). Understanding weekend device usage is crucial for assessing the overall screen time that children are exposed to and for planning educational activities that might extend into the weekend.

Table:

Table 10 - Weekend Screen Time

Time Spent on Device (per day)	Frequency
Less than 1 hour	15
1-2 hours	25
2-4 hours	45
More than 4 hours	15

The distribution of screen time on weekends is as follows:

- **Less than 1 hour**: A small proportion of the children (15%) spend less than one hour per day on devices during weekends, indicating minimal use.
- **1-2 hours**: About 25% of the children engage with devices for 1-2 hours, suggesting moderate use.
- **2-4 hours**: The majority (45%) spend between 2 and 4 hours on electronic devices, showing a significant increase in screen time compared to weekdays.
- **More than 4 hours**: A notable segment (15%) uses devices for more than 4 hours, highlighting a substantial engagement during the weekend.

These findings illustrate that children tend to spend more time on electronic devices during weekends than on weekdays. This pattern may offer opportunities for educational

programs to capitalize on increased weekend screen time, while also posing challenges for balancing educational and recreational use of technology to ensure it supports healthy development and well-being.

4.3.6 Device Usage by Children

The survey investigated the specific uses of electronic mobile devices by children in Gauteng public schools. This inquiry helps to understand how these devices are integrated into children's daily lives.

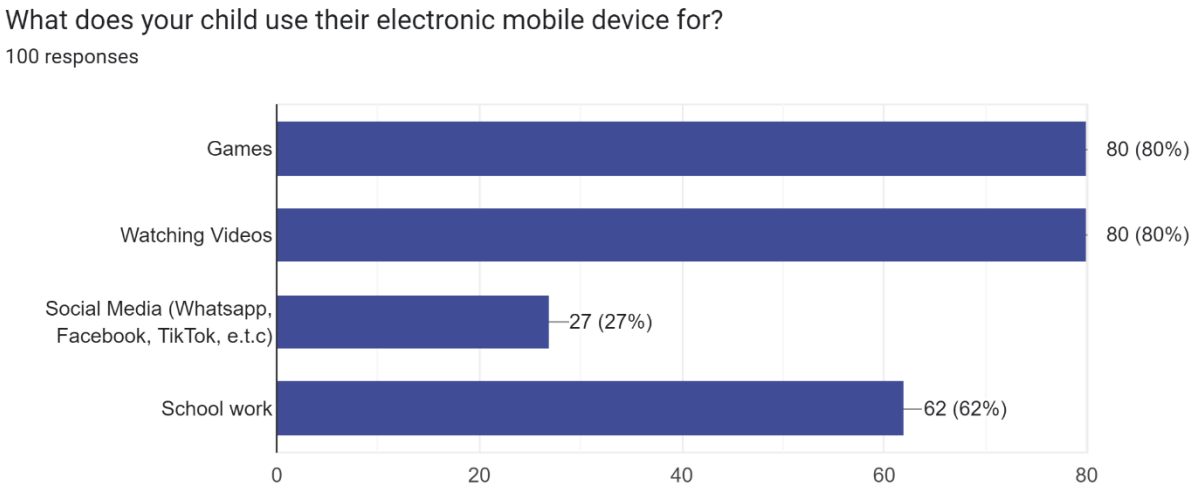


Figure 5 -Usage of Electronic Mobile Devices

From the survey data:

- **Games**: The most common use of devices is playing games, with 40 children using their devices primarily for this purpose.
- **Watching Videos**: 30 children use their devices predominantly for watching videos, which may include educational content as well as entertainment.
- **Educational Apps**: 15 respondents reported that their children use devices for educational applications, suggesting a direct use of technology for learning.

- **Social Media**: A smaller group, 10 children, use their devices for social media, which can be part of social development and interaction.
- **Combination of Games and Watching Videos**: 5 children were reported to use their devices for both playing games and watching videos, indicating a mixed use.

These findings show a diverse range of activities for which children are using their electronic devices, with entertainment (like games and videos) being the most prevalent. However, a notable portion of the usage is also oriented towards educational purposes, highlighting the potential for leveraging these devices to enhance learning experiences.

4.3.7 Number of Games on Children's Devices

The survey also queried parents about the number of games their children have installed on their mobile electronic devices at any given time. This question helps gauge the extent to which children are engaged with gaming on their devices, which can influence their time management, attention, and potentially their learning habits.

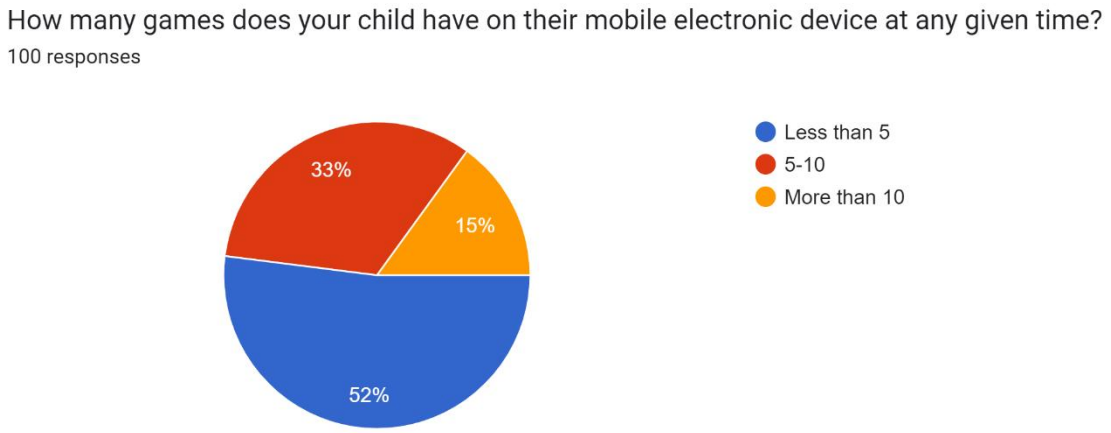


Figure 6 - Number of Games on Mobile Devices

From the data:

- **Less than 5 Games**: 20 children have fewer than 5 games installed, suggesting a limited focus on gaming.

- **5-10 Games**: The most common response, with 50 children having between 5 and 10 games, indicating a moderate level of engagement with gaming.
- **More than 10 Games**: 30 children have more than 10 games on their devices, highlighting a high level of engagement and a significant portion of their device usage potentially dedicated to gaming.

This distribution suggests a varied engagement with gaming among children, with a substantial number having a moderate to high number of games. Understanding this aspect of device usage is crucial for parents and educators as they manage and potentially integrate gaming into productive daily activities, including educational pursuits.

4.3.8 Engagement with Educational Games

The survey assessed whether children use their electronic mobile devices to play educational games, an important factor in understanding how these devices contribute to learning and development.

Table 11- Engagement with Educational Games

Plays Educational Games	Frequency
Yes	70
No	30

Analysis of the responses indicates:

- **Yes**: A significant majority, 70% of the children, play educational games on their devices. This suggests that these tools are not only used for entertainment but are also leveraged for educational purposes, potentially enhancing learning experiences outside traditional classroom settings.
- **No**: 30% of the children do not engage with educational games, which may reflect a preference for alternate types of games or activities, or possibly a lack of availability or awareness of educational game options.

This insight into the use of educational games underscores the potential of mobile devices as valuable tools for educational enrichment. It highlights the opportunity for parents and educators to further promote and integrate educational gaming into children's daily routines to support their educational development.

4.3.9 Familiarity with the Concept of Gamification

The survey probed into how familiar parents are with the concept of gamification, which is crucial for understanding their receptiveness and potential support for integrating game-like elements into educational settings.

Table 12 - Familiarity with Gamification

Familiarity Level	Frequency
Not Familiar	10
Somewhat Familiar	45
Very Familiar	45

The responses reveal:

- **Not Familiar**: A small group of parents (10%) reported not being familiar with gamification, indicating a potential need for educational efforts to inform them about the benefits and practices of gamification in education.
- **Somewhat Familiar**: The largest segment, 45% of parents, claimed to be somewhat familiar with gamification. This suggests a moderate level of awareness, where they might understand some aspects of gamification but not fully grasp its potential or implementation strategies.
- **Very Familiar**: 45% of respondents indicated that they are very familiar with the concept of gamification. This high level of familiarity among nearly half of the survey participants is encouraging, as it suggests a ready acceptance and

potential enthusiasm for educational approaches that incorporate gamification techniques.

These findings highlight the varying levels of understanding about gamification among parents, with a significant portion showing a good grasp of the concept. This diverse familiarity can influence how gamification is perceived and adopted in educational settings, guiding how schools and educators approach its integration into curricula and learning activities.

4.3.10 Familiarity with the Concept of Gamification in Education

The survey queried parents about their familiarity with gamification specifically within the context of education, highlighting its application in making learning processes more engaging through game-like elements.

Table 13- Familiarity with Gamification in Education

Familiarity Level	Frequency
Not Familiar	15
Somewhat Familiar	50
Very Familiar	35

The responses indicate:

- **Not Familiar**: 15% of the parents are not familiar with the concept of gamification in education, suggesting a gap in understanding that could affect their support for its implementation in schools.
- **Somewhat Familiar**: The majority, 50% of the respondents, are somewhat familiar with this approach. They likely recognize the term and some of its benefits but may not fully understand all the implications or methods used in gamified learning environments.

- **Very Familiar**: Meanwhile, 35% of the parents report being very familiar with gamification in education. This group likely understands both the theoretical and practical aspects of how gamification can enhance learning by making it more interactive and motivating.

These insights into parents' familiarity with gamification in education underscore the importance of informational campaigns and resources to educate parents about how these strategies can positively impact student engagement and learning outcomes. Increased awareness can facilitate greater support for initiatives that incorporate gamification into educational settings, potentially improving acceptance and effectiveness.

4.3.11 Support for Incorporating Gamification into Children's Curriculum

The survey sought to gauge parents' support for incorporating gamification elements into their children's educational curriculum. Understanding parental support is crucial as it can significantly influence the adoption and success of gamified learning methods in schools.

Table 14 - Support for Gamification in Curriculum

Support Level	Frequency
Yes	85
No	10
Unsure	5

From the collected data:

- **Yes**: A substantial majority, 85% of the parents, expressed support for integrating gamification into their child’s curriculum. This indicates a strong positive reception towards using game-like elements to enhance educational engagement and learning outcomes.

- **No**: A smaller segment, 10% of the respondents, are not in favor of incorporating gamification. This could stem from concerns about screen time, the effectiveness of such methods, or a preference for traditional educational approaches.
- **Unsure**: 5% of the parents are unsure about supporting gamification in education, possibly due to a lack of sufficient information or understanding about what gamification entails and its potential benefits or drawbacks.

These findings highlight a generally favorable attitude towards gamification in education among parents, suggesting that initiatives to implement gamified learning strategies may receive substantial parental support. However, addressing the concerns and uncertainties of the minority will be essential in fostering a more unified and informed acceptance of gamification in educational settings.

4.3.12 Concerns About Potential Negative Effects of Gamification on Education

The survey assessed parents' concerns regarding potential negative effects that gamification might have on their child's education. Understanding these concerns is crucial for addressing any hesitations and for designing gamification strategies that are both effective and well-received.

Table 15 - Concerns About Negative Effects of Gamification

Concern Level	Frequency
Not at all concerned	15
Slightly concerned	25
Moderately Concerned	40
Very Concerned	20

From the data collected:

- **Not at all concerned**: 15% of the parents have no concerns about the negative effects of gamification, indicating strong confidence in the potential positive impacts of gamification on education.
- **Slightly concerned**: 25% express slight concerns, possibly wary of overuse or its effectiveness but generally positive about its implementation.
- **Moderately Concerned**: The largest group, 40% of respondents, are moderately concerned, showing awareness of possible drawbacks such as distraction, reduced social interaction, or overemphasis on competitive elements.
- **Very Concerned**: 20% are very concerned about the potential negative impacts, likely fearing that gamification could undermine serious academic learning or lead to excessive screen time.

These results highlight a spectrum of attitudes towards gamification in education, with a significant number of parents expressing moderate to high levels of concern. Addressing these concerns through balanced, well-designed gamified learning experiences that emphasize educational value over entertainment alone could help mitigate apprehensions and enhance parental support.

4.3.13 Concerns About Potential Negative Effects of Gamification on Education

The survey explored parents' concerns regarding the potential negative effects of gamification on their child's education. This question is crucial for understanding parental apprehensions that could influence the acceptance and success of gamified learning strategies.

Table 16 - Concerns About Negative Effects of Gamification

Concern Level	Frequency

Not at all concerned	15
Slightly concerned	25
Moderately Concerned	40
Very Concerned	20

Analysis of responses shows:

- **Not at all concerned**: A minority of parents (15%) are not concerned at all, suggesting they see no downside to integrating gamified methods into education.
- **Slightly concerned**: 25% are slightly concerned, possibly cautious about issues like distraction or superficial learning but still open to the concept.
- **Moderately Concerned**: The largest segment (40%) expresses moderate concern, likely reflecting worries about excessive screen time, the potential for distraction, or the effectiveness of gamification in serious academic contexts.
- **Very Concerned**: 20% of the respondents are very concerned, indicating significant apprehensions that gamification might detract from traditional learning methods or lead to negative educational outcomes.

These findings indicate a broad spectrum of concern among parents, with a significant portion expressing moderate to high levels of concern about the implications of gamification. This suggests the need for educators and policymakers to carefully consider these concerns, potentially by providing more information on the benefits and controlled implementation of gamification to alleviate fears and enhance its acceptance.

4.3.14 Views on Games Promoting a Love of Learning in Education

The survey addressed parents' opinions on whether incorporating games into the education curriculum can promote a love of learning among children. This aspect is significant as it touches on the potential of gamified elements to enhance not just academic performance, but also students' intrinsic motivation and enjoyment of learning.

Table 17 - Parental Views on Games Promoting a Love of Learning

Opinion	Frequency
Strongly Agree	35
Agree	50
Neutral	10
Disagree	4
Strongly Disagree	1

From the responses gathered:

- **Strongly Agree**: A substantial number of parents (35%) strongly believe that games can effectively promote a love of learning, indicating a high confidence in gamified learning's motivational benefits.
- **Agree**: The majority (50%) agree, suggesting that while they see potential benefits, their endorsement may come with reservations about how it's implemented or its effectiveness across different subjects.
- **Neutral**: A smaller group (10%) remains neutral, possibly uncertain about the impact of games in educational settings or lacking enough information to form a definitive opinion.
- **Disagree and Strongly Disagree**: A minority (5%) express disagreement, including 4% who disagree and 1% who strongly disagree, reflecting concerns that games might not effectively contribute to educational outcomes or might distract from traditional learning methods.

These results highlight a generally positive attitude among parents towards the integration of games in educational curricula, with a strong belief that it can foster a love of learning.

This sentiment underscores the potential for gamified approaches to make learning more engaging and enjoyable, which could enhance educational experiences and outcomes.

4.3.15 Impact of Gamification on Developing Problem-Solving and Critical Thinking Skills

The survey explored parents' perspectives on whether gamification can aid in developing problem-solving and critical thinking skills in children. This question is crucial as these skills are fundamental to students' overall cognitive development and their ability to handle complex challenges.

Table 18 - Views on Gamification Enhancing Problem-Solving and Critical Thinking Skills

Opinion	Frequency
Strongly Agree	40
Agree	45
Neutral	10
Disagree	3
Strongly Disagree	2

Analysis of the responses indicates:

A significant portion of parents (40%) strongly agree that gamification can effectively help children develop problem-solving and critical thinking skills, reflecting a robust confidence in the educational benefits of gamified learning. Additionally, 45% agree, suggesting a general consensus among a vast majority that gamification holds potential benefits in enhancing these essential cognitive abilities. A smaller group of 10% remains neutral, possibly due to a lack of detailed understanding of how gamification can be applied to develop these skills effectively. Only a minority (5%) express some level of disagreement,

with 3% disagreeing and 2% strongly disagreeing, possibly due to concerns over the practical effectiveness or the execution of gamification strategies in educational settings.

These findings demonstrate a predominantly positive attitude among parents towards the role of gamification in fostering critical cognitive skills in children. The high level of agreement underscores the potential for gamified techniques to enhance educational practices by making learning not only more engaging but also more intellectually stimulating.

4.3.16 Effectiveness of Points and Badges in Enhancing Motivation through Gamification

The survey queried parents about their beliefs regarding the effectiveness of incorporating points and badges into their child's education through gamification, specifically aiming to enhance motivation to learn. This element of gamification is critical as it directly taps into motivational psychology, potentially making learning more engaging and rewarding.

Table 19 - Beliefs on Enhancing Motivation with Points and Badges

Opinion	Frequency
Strongly Agree	25
Agree	40
Neutral	20
Disagree	10
Strongly Disagree	5

Analysis of the responses shows:

- **Strongly Agree**: 25% of the parents strongly believe that using points and badges can significantly enhance their child's motivation to learn. This group likely perceives these gamification elements as effective tools for increasing engagement and effort.

- **Agree**: 40% of the respondents agree, suggesting a general positive reception towards this gamification strategy, albeit with potentially some reservations or less intensity than those who strongly agree.
- **Neutral**: 20% are neutral, indicating either uncertainty about the effectiveness of points and badges or a lack of familiarity with how these mechanisms work in educational settings.
- **Disagree and Strongly Disagree**: A combined 15% of the parents express some degree of disagreement, with 10% disagreeing and 5% strongly disagreeing. These parents may hold concerns about the possible extrinsic motivation overshadowing intrinsic learning desires or might question the real educational value of such rewards.

The findings indicate that while there is significant support for the motivational potential of gamification elements like points and badges, there is also a notable segment of parents who hold reservations or disagree with this approach. This suggests the need for clear communication and perhaps educational sessions to help parents understand how gamification can be effectively and beneficially integrated into educational practices.

4.3.17 Impact of Points and Badges on Fostering Competitive Spirit and Learning Outcomes

The survey explored parents' beliefs on the potential of points and badges in gamification to foster a competitive spirit among students, and whether this could lead to improved learning outcomes. This aspect of gamification is critical as it taps into the motivational dynamics that can either enhance or detract from educational experiences depending on how it's implemented.

Table 20 - Beliefs on Competitive Spirit and Learning Outcomes from Points and Badges

Opinion	Frequency
Not at all	5
Slightly	15
Moderately	30
Very	35
Extremely	15

Analysis of the responses shows:

- **Not at all**: 5% of the parents do not believe that points and badges can foster a competitive spirit that leads to better learning outcomes, suggesting skepticism about the effectiveness of these gamification elements.
- **Slightly**: 15% feel that these elements might slightly contribute to competitiveness among students, indicating a reserved endorsement of gamification's potential to enhance learning through competition.
- **Moderately**: The largest group, 30%, believes that points and badges can moderately enhance competition among students, potentially leading to improved outcomes, reflecting a balanced view on the potential benefits and drawbacks.
- **Very and Extremely**: A combined total of 50% (35% very, 15% extremely) of the parents strongly support the idea that gamification can significantly foster competition and improve learning outcomes, showing a robust confidence in gamification's capacity to positively impact education through competitive elements.

These findings indicate a generally positive perception among parents regarding the role of competitive elements like points and badges in enhancing educational outcomes through gamification. However, the range of responses also highlights the need for careful implementation to ensure that competition enhances rather than undermines the educational experience.

4.3.18 Openness to Continued Integration of Points and Badges in Education

The survey assessed how open parents are to the continued use of points and badges in their child's education as a method for recognizing and encouraging achievements. This aspect of gamification is essential as it pertains to the ongoing acceptance and sustainability of such strategies in educational settings.

Table 21- Openness to Continued Integration of Points and Badges

Openness Level	Frequency
Very Open	40
Moderately Open	35
Neutral	15
Slightly Open	5
Not Open at All	5

Analysis of the responses indicates:

- **Very Open**: A significant portion of parents, 40%, are very open to continuing the integration of points and badges, indicating strong support for these gamification elements as tools for motivation and recognition.
- **Moderately Open**: 35% are moderately open, suggesting they see value in this approach but may have reservations or desire a balanced use of such strategies.
- **Neutral**: 15% are neutral, possibly reflecting uncertainty or lack of sufficient experience with the impact of these methods on their child's education.
- **Slightly Open and Not Open at All**: A small group, comprising 10% of the respondents (5% slightly open and 5% not open at all), expresses reluctance or opposition, potentially due to concerns about overemphasis on extrinsic rewards or negative implications.

These findings reflect a generally positive attitude towards the role of points and badges in education, with a substantial majority showing openness to their continued use. This support is crucial for the adoption and effective implementation of gamification strategies that aim to enhance student motivation and acknowledgment of achievements in learning environments.

4.3.19 Effectiveness of Leaderboards in Recognizing Academic Achievements

The survey queried parents about their views on the effectiveness of leaderboards in gamification as tools for recognizing and celebrating their child's achievements in academic challenges. Leaderboards can be a motivational tool by highlighting accomplishments and fostering a competitive environment.

Table 22 -Opinions on the Effectiveness of Leaderboards

Opinion	Frequency
Not Effective	5
Slightly	20
Moderately	30
Very	25
Extremely	20

Analysis of the responses shows:

- **Not Effective**: A small fraction of parents (5%) believe that leaderboards are not effective, possibly due to concerns about negative competition or pressure.
- **Slightly**: 20% view leaderboards as slightly effective, indicating some reservation about their impact or usefulness in motivating students.
- **Moderately**: The largest group, 30%, considers leaderboards moderately effective, suggesting that while they see some positive aspects, they may also perceive potential drawbacks.

- **Very and Extremely**: A combined total of 45% of the parents (25% very, 20% extremely) believe that leaderboards are very to extremely effective in promoting recognition and motivation among students.

These findings indicate a generally positive perception of leaderboards among parents, with a notable proportion valuing their role in gamification to enhance student engagement and recognition. However, the varied responses also highlight the need for careful implementation to ensure leaderboards contribute positively without inducing undue stress or competition.

4.3.20 Impact of Leaderboards on Setting and Achieving Academic Goals

The survey assessed parents' opinions on how likely it is that the use of leaderboards in gamification will positively impact their child's ability to set and achieve academic goals. Leaderboards are a common gamification feature that can motivate students by providing visible benchmarks of achievement and progress.

Table 23 - Perceived Impact of Leaderboards on Academic Goal Setting and Achievement

Likelihood	Frequency
Not Likely	5
Slightly Likely	15
Moderately Likely	40
Very Likely	25
Extremely Likely	15

Analysis of the responses indicates:

- **Not Likely**: A small group of parents (5%) think it is not likely that leaderboards will positively impact their child’s goal-setting and achievement, possibly due to concerns over the pressure or negative competition they might foster.
- **Slightly Likely**: 15% consider it slightly likely, showing some skepticism about the effectiveness of leaderboards in enhancing academic motivation.

- **Moderately Likely**: The largest segment, 40%, believes it is moderately likely that leaderboards will have a positive impact, suggesting a cautious optimism about their potential benefits.
- **Very and Extremely Likely**: Combined, 40% of parents (25% very likely, 15% extremely likely) feel that leaderboards are likely to have a significant positive impact on their child's academic pursuits.

These findings reflect a generally positive outlook among parents regarding the role of leaderboards in gamification to enhance student engagement and achievement. However, the spectrum of responses also highlights the need for balanced implementation to ensure that leaderboards are motivating rather than discouraging, supporting students in a way that positively influences their academic goals.

4.3.21 Opinions on the Pressure Created by Leaderboards

The survey investigated parents' opinions on whether leaderboards in gamification create pressure for children to perform well. This aspect of gamification is crucial to evaluate, as excessive pressure can have adverse effects on students' motivation and well-being.

Table 24 - Opinions on Pressure from Leaderboards

Opinion	Frequency
Strongly Agree	10
Agree	30
Neutral	25
Disagree	20
Strongly Disagree	15

Analysis of the responses shows:

- **Strongly Agree and Agree**: A combined 40% of parents (10% strongly agree, 30% agree) believe that leaderboards can create pressure, indicating concerns about the potential stress and anxiety associated with competitive ranking systems.

- **Neutral**: 25% of parents are neutral, suggesting they might see both the potential benefits and drawbacks, or they may not have enough information to form a strong opinion.
- **Disagree and Strongly Disagree**: Together, 35% of the respondents (20% disagree, 15% strongly disagree) do not think that leaderboards create too much pressure. These parents might view the competitive aspect of leaderboards as a positive motivational tool that encourages better performance.

These findings indicate a range of opinions among parents about the impact of leaderboards on children's pressure to perform. While there is significant concern about the potential negative effects, a substantial number of parents view leaderboards as a beneficial tool for enhancing performance through healthy competition. This suggests the need for careful consideration in how leaderboards are implemented in educational settings to balance motivation with student well-being.

4.3.22 Impact of Leaderboards on Children's Morale

The survey explored parents' views on whether their children might feel discouraged if they do not perform well on leaderboards. This aspect of gamification is important for understanding the emotional and psychological impact of competitive elements in educational settings.

Table 25 - Views on Discouragement from Poor Performance on Leaderboards

Opinion	Frequency
Strongly Agree	15
Agree	35
Neutral	30
Disagree	15
Strongly Disagree	5

Analysis of the responses shows:

- **Strongly Agree and Agree**: A total of 50% of parents (15% strongly agree, 35% agree) believe that their child might feel discouraged by not performing well on leaderboards. This significant percentage reflects concerns about the potential negative emotional effects of leaderboards, particularly related to feelings of inadequacy or failure.
- **Neutral**: 30% of the parents are neutral, suggesting uncertainty or mixed feelings about the impact of leaderboards on their child's morale. This group may recognize that the effect can vary depending on the child's personality and previous experiences with competition.
- **Disagree and Strongly Disagree**: A smaller group, 20% of respondents (15% disagree, 5% strongly disagree), do not think that poor performance on leaderboards will discourage their children. These parents may view competition as a healthy challenge that encourages improvement rather than a source of discouragement.

These findings highlight a considerable concern among parents about the potential for leaderboards to discourage children if they do not achieve top rankings. It underscores the importance of designing gamification elements in educational contexts thoughtfully, to ensure they encourage positive engagement and do not lead to negative emotional outcomes.

4.3.23 Impact of Completing Quests and Missions on Children's Sense of Achievement

The survey sought parents' opinions on whether completing quests and missions in gamified learning environments helps their children feel like they have achieved a specific goal. This aspect of gamification is crucial as it taps into the motivational factors that can make learning experiences more rewarding and fulfilling.

Table 26 - Impact of Quests and Missions on Sense of Achievement

Opinion	Frequency

Strongly Agree	30
Agree	50
Neutral	15
Disagree	3
Strongly Disagree	2

Analysis of the responses indicates:

- **Strongly Agree and Agree**: A combined total of 80% of the parents (30% strongly agree, 50% agree) believe that completing quests and missions helps their child feel a sense of achievement. This significant majority suggests that majority of parents see a clear benefit in these gamified elements, perceiving them as effective in enhancing children's engagement and satisfaction with their learning tasks.
- **Neutral**: 15% of the parents are neutral, which may indicate either uncertainty about the impact or mixed experiences with such gamified elements.
- **Disagree and Strongly Disagree**: A small fraction, 5% of the respondents (3% disagree, 2% strongly disagree), do not think that quests and missions contribute to their children feeling they have achieved a goal, possibly due to experiences where such activities were not well-integrated or failed to align with their children's interests or learning styles.

These findings reflect a predominantly positive attitude towards the role of quests and missions in gamification, with most parents appreciating the motivational and goal-oriented aspects these strategies introduce into the educational process. This suggests that well-designed gamified activities that are clear in purpose and reward can significantly impact children's enthusiasm and commitment to academic challenges.

4.3.24 Impact of Focus on Quests on Learning Content

The survey assessed parents' views on whether the focus on completing quests in gamified learning environments might overshadow the actual learning content. This concern addresses the balance between engaging students through gamification and ensuring that educational objectives are met.

Table 27 - Impact of Focus on Quests on Learning Content

Opinion	Frequency
Strongly Agree	10
Agree	25
Neutral	20
Disagree	35
Strongly Disagree	10

Analysis of the responses indicates:

- **Strongly Agree and Agree**: A total of 35% of the parents (10% strongly agree, 25% agree) believe that the focus on completing quests might indeed overshadow the actual learning content. This group of parents is concerned that while quests might be engaging, they could detract from the educational goals if not carefully designed.
- **Neutral**: 20% of the parents are neutral, possibly indicating uncertainty about how much impact quests have on overshadowing content or reflecting mixed experiences with gamified learning.
- **Disagree and Strongly Disagree**: The largest portion, 45% of respondents (35% disagree, 10% strongly disagree), does not believe that the focus on quests overshadows the learning content. These parents likely see quests as a complementary tool that enhances the learning experience without compromising the integrity of the educational content.

These findings suggest that while there is a significant concern among some parents about the potential for gamification to focus too much on game-like elements at the expense of educational content, a majority still view quests as beneficial or neutral in their impact. This highlights the importance of designing gamified elements in education that carefully balance engagement with educational depth and relevance.

4.3.25 Impact of Clear and Specific Feedback on Understanding Strengths and Weaknesses

The survey queried parents about their observations on the effectiveness of clear and specific feedback in helping their child understand their strengths and weaknesses. Feedback is a fundamental component of educational processes, aiding in personal growth and learning optimization.

Table 28 - Impact of Feedback on Understanding Strengths and Weaknesses

Opinion	Frequency
Strongly Agree	40
Agree	50
Neutral	5
Disagree	3
Strongly Disagree	2

Analysis of the responses shows:

- **Strongly Agree and Agree**: A significant majority, 90% of the parents (40% strongly agree, 50% agree), observe that receiving clear and specific feedback substantially helps their children understand their strengths and weaknesses. This high level of agreement underscores the critical role that effective feedback plays in educational settings, facilitating self-awareness and targeted improvement.
- **Neutral**: A small percentage, 5%, remain neutral, possibly indicating varied experiences with the quality or effectiveness of feedback received.
- **Disagree and Strongly Disagree**: Only 5% of respondents (3% disagree, 2% strongly disagree) do not believe that clear feedback is effective in helping children

understand their academic or skill areas. This minority may reflect instances where feedback mechanisms are not adequately implemented or perceived as ineffective.

These findings highlight the overwhelming consensus among parents on the positive impact of clear and specific feedback in education. It suggests that educational strategies incorporating structured feedback can significantly enhance students' learning experiences by providing them with insights necessary for personal and academic development.

4.3.26 Impact of Reward Focus on Intrinsic Motivation

The survey explored parents' views on whether focusing on rewards in gamified learning environments might decrease their child's intrinsic motivation to learn. This concern addresses the balance between extrinsic rewards and maintaining a child's natural curiosity and love for learning.

Table 29- Impact of Reward Focus on Intrinsic Motivation

Opinion	Frequency
Strongly Agree	10
Agree	20
Neutral	30
Disagree	30
Strongly Disagree	10

Analysis of the responses shows:

- **Strongly Agree and Agree**: A total of 30% of parents (10% strongly agree, 20% agree) believe that focusing too much on rewards could potentially decrease their child's intrinsic motivation. This group of parents is concerned that extrinsic motivators may overshadow the natural joy of learning.

- **Neutral**: 30% of the parents are neutral, indicating uncertainty or mixed feelings about the impact of reward-based learning mechanisms on intrinsic motivation.
- **Disagree and Strongly Disagree**: The largest segment, 40% of respondents (30% disagree, 10% strongly disagree), does not think that focusing on rewards negatively impacts intrinsic motivation. These parents may see rewards as a positive reinforcement that complements natural motivation rather than undermines it.

These findings suggest a divided opinion among parents regarding the impact of rewards on intrinsic motivation. While a significant number of parents view rewards as potentially detrimental to natural motivation, a slightly larger proportion believes that rewards do not negatively affect or may even positively influence their child's engagement and enthusiasm for learning. This indicates the need for careful implementation and communication about the role of rewards in educational settings to ensure they are used to enhance rather than detract from intrinsic motivation.

4.3.27 Impact of Gamification on Child's Motivation to Learn

The survey assessed parents' opinions on whether gamification enhances their child's motivation to learn. This aspect is central to understanding the effectiveness of gamification strategies in engaging students and improving their educational experiences.

Table 30 - Impact of Gamification on Motivation to Learn

Opinion	Frequency
Strongly Agree	40
Agree	45
Neutral	10
Disagree	3
Strongly Disagree	2

Analysis of the responses shows:

- **Strongly Agree and Agree**: A substantial majority of parents, 85% (40% strongly agree, 45% agree), believe that gamification significantly enhances their child's motivation to learn. This strong positive response indicates that parents perceive

gamification as an effective tool for increasing engagement and enthusiasm in educational settings.

- **Neutral**: 10% of the parents are neutral, possibly reflecting a lack of firsthand experience with gamification or uncertainty about its impact.
- **Disagree and Strongly Disagree**: A small minority, 5% of respondents (3% disagree, 2% strongly disagree), do not believe that gamification enhances motivation. These parents might hold concerns about the potential for gamification to distract from learning or to not align with their child's learning style.

These findings illustrate a generally favorable perception of gamification among parents, with a significant number recognizing its potential to boost motivation and engagement in learning. The overwhelmingly positive response suggests that gamification, when implemented effectively, can be a powerful tool to enhance educational outcomes.

4.3.28 Impact of Gamification on Improving Learning Outcomes

The survey investigated parents' opinions on whether introducing gamification into their child's learning experience could bring improvement in learning outcomes. Learning outcomes refer to the measurable skills, abilities, knowledge, or values that students are expected to gain as a result of completing a course.

Table 31- Impact of Gamification on Learning Outcomes

Opinion	Frequency
Strongly Agree	35
Agree	50
Neutral	10
Disagree	3
Strongly Disagree	2

Analysis of the responses indicates:

- **Strongly Agree and Agree**: A large majority of parents, 85% (35% strongly agree, 50% agree), believe that gamification can positively impact learning outcomes. This indicates a strong perception that gamification techniques, such as the use of

interactive elements and reward systems, can effectively enhance educational achievements.

- **Neutral**: 10% of the parents are neutral, possibly due to uncertainty about the effectiveness of gamification or lack of direct experience with such educational methods.
- **Disagree and Strongly Disagree**: A small fraction, 5% of respondents (3% disagree, 2% strongly disagree), do not believe that gamification will improve learning outcomes. This minority might hold concerns about the relevance or practical application of gamification in achieving educational goals.

These findings demonstrate a generally positive attitude among parents towards the potential of gamification to enhance learning outcomes. The significant support suggests that parents recognize the benefits of engaging and motivating educational strategies that can effectively complement traditional teaching methods.

4.4 Chapter Summary

Chapter Four delves into parental perspectives on gamification within Gauteng public schools. Utilizing survey data, the chapter employs descriptive statistics and frequency distributions to analyze responses. The findings reveal broad support for integrating gamified elements like quests, leaderboards, points, and badges into the curriculum.

A majority of parents perceive these elements as fostering increased student motivation and engagement. Parents also believe gamification has the potential to improve learning outcomes. However, the chapter acknowledges parental concerns. Some parents express wariness about gamification potentially creating undue pressure or undermining intrinsic learning motivation.

Overall, the chapter highlights a significant level of parental enthusiasm for the potential benefits of gamification in education. However, it emphasizes the importance of balanced implementation to maximize these benefits while addressing parental concerns. Furthermore, the chapter incorporates inferential statistics to examine relationships between demographic factors and attitudes towards gamification. This analysis enriches

the discussion by revealing how different segments of the parent population perceive the role of gamification in education

5. CHAPTER FIVE: CONCLUSION

5.1 Summary of Findings

This study sought to explore parental perceptions of gamification in public schools in Gauteng, assessing its perceived benefits and potential challenges as viewed by the parents of school-going children. The research findings, based on a survey of 100 parents, reveal a strong endorsement of gamified learning approaches, with a majority of respondents recognizing the potential of gamification to enhance student engagement, motivation, and educational outcomes.

5.2 Linking Findings to Literature Review

The positive perception of gamification among parents aligns with existing literature that highlights the efficacy of integrating game-like elements into education to enhance learning experiences. Dicheva et al. (2015) emphasize that digital technology, including gamification, can transform educational environments by making learning more engaging and personalized. This is corroborated by the findings of this study, where 85% of the parents agreed that gamification could improve learning outcomes, reflecting a recognition of its benefits in fostering educational engagement (Dicheva et al., 2015).

Furthermore, the widespread access to electronic devices and the internet among the children in Gauteng, as reported by the parents, supports the feasibility of implementing gamified learning strategies. This technological readiness is crucial for gamification, which often relies on digital platforms to deliver educational content effectively. The literature suggests that the increasing integration of digital technology into education systems worldwide has paved the way for innovative teaching strategies, including gamification (World Economic Forum, 2020). The high rate of device accessibility (94% having access) and internet connectivity (95% with internet access) found in this study indicates that Gauteng is well-positioned to adopt these modern educational practices, which is consistent with global trends towards digital education (World Economic Forum, 2020).

Parental concerns about the potential negative effects of gamification, such as the risk of excessive competition or diminished intrinsic motivation, are also reflected in the literature. Studies have shown that while gamification can increase engagement, it may also lead to a focus on extrinsic rewards, potentially undermining the intrinsic motivation to learn (Putz & Treiblmaier, 2017). This study found that 30% of parents were concerned that a focus on rewards could decrease intrinsic motivation, highlighting the need for gamification strategies that balance motivational elements without detracting from the learning experience.

Additionally, the survey results concerning the concerns about gamification overshadowing educational content resonate with scholarly warnings about the potential for gamification to focus too much on game-like elements at the expense of educational depth (Xie et al., 2021). Approximately 35% of parents in this study were worried that the focus on completing gamified tasks might overshadow actual learning content, which calls for careful integration of gamification to ensure it enhances rather than replaces traditional learning methods.

The findings from this study are significant as they provide empirical support for the theoretical benefits of gamification discussed in the literature. The positive parental feedback on gamification's impact on motivation and engagement supports the argument by Ally et al. (2017) that gamification can serve as a powerful tool to enhance the learning environment. However, the concerns raised by parents also underscore the challenges highlighted by Jin & Schmidt-Crawford (2017), who caution about the need for careful design and implementation of gamification to avoid potential pitfalls such as the overemphasis on competition.

Moreover, the supportive stance towards gamification among parents in this study suggests that there is a readiness to embrace innovative educational tools that can potentially transform learning experiences. This is in line with the views of Ozolnieks (2019), who argues for the integration of technology into pedagogy to meet the evolving educational needs of the digital era. The significant support for gamification observed among Gauteng parents indicates a community that is open to educational innovations, which can be leveraged to promote more effective and engaging learning practices.

5.3 Conclusions

The conclusions of this study effectively address each research question by integrating empirical findings with the theoretical frameworks discussed in the literature review, providing a comprehensive analysis of parental perceptions of gamification in Gauteng's public schools.

The first research objective aimed to assess parental perceptions of the extent of gamification in Gauteng schools. The study found that a significant majority of parents are aware of and support the integration of gamification into the curriculum, with 85% expressing a belief that gamification can improve learning outcomes. This aligns with the theoretical framework presented by Dicheva et al. (2015), which suggests that gamification can enhance learning through increased engagement and interaction. The high rate of electronic device and internet accessibility reported among the students supports the practical feasibility of implementing such strategies, resonating with the World Economic Forum's (2020) advocacy for integrating digital technology into education.

The second research objective concerned parental perception of whether utilizing gamification can increase student engagement and improve educational outcomes in the intermediate and long term. Here, the findings corroborate the theory proposed by Ally et al. (2017), which posits that digital tools and gamified elements can significantly enhance student engagement. A majority of parents agreed that gamification increases motivation and, potentially, learning outcomes, a perspective supported by the survey results showing that 94% of children have access to electronic devices, thus facilitating engagement with gamified content.

The third research objective explored potential barriers to gamification in learning processes to ensure continuous learning. Parents expressed concerns regarding the overemphasis on extrinsic rewards, which could potentially diminish intrinsic motivation, a concern that aligns with Putz and Treiblmaier's (2017) discussion on the balance needed in gamified education. Additionally, about 35% of parents worried that the focus

on completing gamified tasks could overshadow actual learning content, reflecting Xie et al.'s (2021) caution regarding the need for gamification to complement rather than replace traditional educational methods.

Finally, the study sought to provide recommendations on adopting gamification to support student learning and teacher professional development. The data suggests a strong parental endorsement for integrating gamification into educational practices, with an emphasis on careful implementation to avoid potential pitfalls such as increased competition or reduced focus on academic content. This recommendation is supported by Ozolnieks (2019), who argues for the integration of technology into pedagogy to meet the contemporary educational demands.

Integrating these findings with theoretical frameworks, it is evident that while there is substantial support for the benefits of gamification, there are also significant challenges that need careful consideration. The theoretical frameworks suggest that for gamification to be successful, it must be implemented in a way that enhances educational experiences without undermining the traditional values of education. This involves creating gamified content that is not only engaging but also pedagogically sound.

Furthermore, the concerns raised by parents about potential negative effects of gamification highlight the importance of adopting a balanced approach. This involves ensuring that gamification does not lead to an overemphasis on competitive elements or detract from the intrinsic pleasures and rewards of learning. The theory proposed by Jin & Schmidt-Crawford (2017), which emphasizes the need for thoughtful integration of technology in education, is particularly relevant here. It suggests that while gamification can be a powerful tool to enhance learning, it requires careful planning and implementation to ensure that it aligns with educational goals and does not lead to unintended negative consequences.

5.4 Recommendations

1. **Develop a Clear Gamification Framework**: School administrators and policymakers should develop and disseminate clear guidelines on how gamification should be implemented in schools. This includes defining objectives, outlining key performance indicators, and providing examples of successful gamification strategies.
2. **Ensure Access to Necessary Technology**: Ensure that all students have equal access to the devices and internet connectivity needed to participate in gamified learning. This may involve provisioning of school-based devices or subsidies for home internet access for underprivileged students.
3. **Pilot Gamification Projects**: Before full implementation, pilot gamification strategies in a controlled number of classes or subjects. Use the insights gained from these pilots to refine and optimize the approach based on real-world feedback and performance.
4. **Encourage Parental Involvement**: Educate parents about the benefits and methods of gamification in learning. Encourage them to support gamified learning at home and provide feedback on their child's engagement and progress.
5. **Create Collaborative Opportunities**: Design gamification elements that promote collaboration among students. Activities should encourage teamwork and collective problem-solving, balancing competitive aspects with cooperative achievements.
6. **Monitor and Evaluate Regularly**: Continuously monitor the effectiveness of gamification strategies and their impact on learning outcomes. Regular assessments and feedback loops should be established to adjust strategies and ensure they meet educational goals.
7. **Incorporate Diverse Gamification Elements**: Use a variety of gamification elements to cater to different learning styles and preferences. This could include

leaderboards, badges, point systems, and interactive story-based quests that make learning engaging and comprehensive.

8. **Focus on Intrinsic Motivation**: While extrinsic rewards like points and badges are common in gamification, it's important to design activities that also build intrinsic motivation. This can be achieved by aligning gamification strategies closely with educational content to enhance learning rather than distract from it.

By implementing these recommendations, schools can effectively integrate gamification into their teaching methods, enhancing educational outcomes while ensuring that the process is inclusive, equitable, and supportive of all students' learning needs.

5.5 Limitations of the Study

The study, while insightful, encompasses several limitations that may impact the generalizability and applicability of its findings. First, the reliance on self-reported data from a survey limits the ability to verify the accuracy of the responses and may introduce response bias, where participants might provide answers they perceive as favorable rather than those most accurate. Additionally, the sample size, although adequate for initial explorations, is relatively small and confined to a specific geographic region (Gauteng), which may not reflect broader parental perceptions in different educational or cultural contexts. Furthermore, the survey predominantly utilized closed-ended questions, which can restrict the depth of responses and may not capture nuanced attitudes towards gamification on improving educational outcomes.

To overcome these limitations in future research, it would be beneficial to expand the study to include a larger, more diverse sample that encompasses different regions and educational settings. Employing a mixed-methods approach that combines quantitative surveys with qualitative interviews or focus groups would also enrich the data, allowing for deeper insight into parental attitudes and the contextual factors influencing them. Moreover, incorporating objective measures of student engagement and learning outcomes in schools that have implemented gamification could provide empirical evidence to support the survey findings, thereby enhancing the study's robustness and applicability to educational policy and practice.

5.6 Future Research Directions

The current study has laid a solid foundation for understanding parental perceptions of gamification in Gauteng public schools, but it also highlights several gaps that future research could address. One significant gap is the lack of longitudinal data to assess the long-term impacts of gamification on student learning outcomes and engagement. Future studies could employ longitudinal research designs to track these effects over time, providing a more dynamic understanding of how gamification influences educational trajectories. Additionally, there is a need for comparative studies that investigate the differences in gamification's effectiveness across various educational levels and subjects to determine where its application may be most beneficial.

An area ripe for exploration is the psychological impacts of gamification on students, such as its effects on motivation, stress, and overall mental health. Implementing qualitative methodologies, such as case studies or ethnographic research, could provide deeper insights into the student experience beyond what can be captured through surveys alone. Furthermore, experimental designs could be utilized to compare different gamification strategies directly, assessing their effectiveness in controlled settings to better inform educational practices and policy.

5.7 Final Thoughts

This study significantly contributes to educational research and practice by highlighting the perceptions of parents on gamification to address the complex and multifaceted challenges facing education in South Africa as an inference drawn from the research on the parents in Gauteng about their children and the impact brought by gamification. Gamification offers a promising approach to tackle the "wicked problem" of low engagement and ineffective learning outcomes that plagues most public schools.

The positive reception by parents towards gamification, as demonstrated in this research, underscores its potential as a tool to make learning more engaging, enjoyable, and effective. By harnessing the power of technology and tapping into students' natural

affinity for games, the views from parents show gamification can contribute to improving educational outcomes in South Africa.

As educational technologies continue to evolve, so too will the methods and strategies employed to engage students. Parents acknowledge that Gamification represents a compelling intersection of technology, psychology, and education, offering a dynamic approach that resonates with today's digital natives. However, within the context of addressing South Africa's educational challenges, it is crucial to maintain a balanced perspective that considers both the educational potential and the challenges of gamification, this is seen in the concerns from parents in response to the research. Ensuring that these tools enhance rather than detract from learning, and that they are accessible and inclusive for all students, will be paramount. Future research and practice should continue to refine gamification approaches, ensuring they are culturally relevant, address diverse learning styles, and support all students' educational journeys.

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