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Gamification in Entrepreneurship Education in South Africa

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ABSTRACT

This study examines the integration of gamification into entrepreneurship education in South Africa, highlighting its potential to improve student engagement, motivation, creativity, and entrepreneurial self-efficacy. Using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, a systematic review of literature was conducted across databases such as Scopus, Web of Science, EBSCOhost, and Google Scholar, focusing on publications between 2010 and 2025. Out of 1,040 identified records, 30 studies met the inclusion criteria and were synthesized through meta-analysis. Findings indicate that 80% of the reviewed studies reported positive outcomes, particularly where hybrid gamification models blend digital platforms with face-to-face learning to enhance entrepreneurial competencies. About 15% of studies revealed mixed results, often linked to infrastructural limitations or insufficient lecturer training, while 5% reported negligible effects due to poor integration of gamified tools. The review further shows that successful implementation depends on institutional readiness, adequate digital infrastructure, and staff training. The study contributes to the growing literature on entrepreneurship pedagogy by illustrating how gamification can bridge the gap between theory and practice in higher education. Policy recommendations include investing in staff capacity building, improving institutional resources, and designing culturally relevant gamified approaches. Overall, gamification offers a viable pathway for South African universities to nurture entrepreneurial mind-sets and skills essential for navigating a dynamic economy.

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1. Introduction

It is estimated that by 2027, the global gamification market will expand from $11.10 billion to about $38.65 billion (Xu, 2024). Growing attention to the field of gamification in the commercial sector has resulted in an ongoing exploration within educational institutions. Research has shown that gamification, especially when incorporated into Higher Education Institutions (HEI), can bring several benefits for students; improvement in motivation, increase in engagement and time on task, and improved academic performance (Chans & Portuguez Castro, 2021).

Examining and improving entrepreneurial knowledge has received attention in economic terms and goals. Possible educational approaches for improving enterprising knowledge include teaching entrepreneurship and multi-campuses (Igwe et al., 2021). Teaching entrepreneurship during business studies or introducing a compulsory

entrepreneurship subject in various disciplines has received widespread criticism. Through multi-campuses, there can be meaningful contributions to the creation, growth, and stabilization of newly founded companies. Yet, neither of these educational approaches is currently possible for HEIs wishing to become entrepreneurial.

The application of gamification within entrepreneurship education is a broad field, encompassing serious games, business simulations, interactive group games, simulations, and various digital game formats. Many HEIs in South Africa employ gamification in the form of video business simulations. Initial interest approaches in the analysis of gamified entrepreneurship education programs almost uniformly overwhelming focused on predominantly successful gamified initiatives in developed countries (Leipzig et al., 2016).

2. Literature Review

The term "gamification" covers a multitude of designs. In the current study, gamification techniques that encourage and lead students towards learning outcome-specified behaviour patterns will be explored. There are two crucial aspects of this description. First, the term "game" is used broadly. From a theoretical perspective, there are various definitions of a game. In line with, a game is understood as a structured system where players (humans/agents) interact with one another and/or with other entities, and where the design of the game produces engagement relevant to the aims of gamification (Rapp, 2022). This definition allows for the consideration of serious games, games in learning management systems, quizzes, the use of rankings, etc.

Learning outcomes are aspects of learning that can and must be observed or assessed. They can be monitored but not assessed directly. To describe "learning outcome-specified," it is worth considering the concept "student engagement," which can be described as a multidimensional construct involving behavioural, affective, and cognitive engagement. Behavioural engagement refers to student effort and participation in educational activities (Gomes et al., 2023). Characteristic indicators of behavioural engagement include time on task, attentiveness, and persistence in the face of challenges. Students are effectively engaged if they are interested, value the activity, and feel positive emotions towards it. Cognitive engagement extends behavioural and emotional engagement by including future-oriented self-regulation and reflective thoughts on the current activity, rather than just in-depth processing (within such an activity).

Entrepreneurship education is defined as all structured intentional (formal, non-formal) activities in which new venture creation is the focal learning objective. The focus on education and not merely on training or experience is important (Bauman & Lucy, 2021): education encourages openness towards new venture creation as a valid career choice; broad intentional exposure (including, for example, knowledge acquisition in business); as well as on other pre-start variables (e.g., belief in personal entrepreneurial capacity). More collectively, entrepreneurship education systems comprise all entrepreneurship education-related programming delivered to a specific target population. It is not intended as emphatic support toolkits but as a summary of good domestic practice that can encourage and enable others.

2.1. The Concept of Gamification

Just as the applicability of game-based learning in the classroom is growing, the steep rise of game spawn in business has created a parallel application of that field of study. Gamification is also defined as using game design elements in non-game contexts. Gamification combines the work at hand with design aspects of games to motivate participation and engagement (Triantafyllou & Georgiadis, 2022). Game design elements common in games, incentivizing user-made and submitted content, could be applied to study accounts to motivate participation and engagement. Gamification has been applied in social contexts, in businesses, and in competitions to motivate participation. More specifically, gamification has been applied with considerable success in educational environments at a variety of levels such as professionally in universities and schools, and personally with attention to programming. Game elements, such as points, badges, and leaderboards, which typically exist separately in independently developed games, can be combined, extended, and adapted to provide a single interactive interface through

programming, website design, or any number of creating means to incentivise engagement. It is similar in ideas to game-modification yet applied to the non-game context rather than the game as such. In South Africa, the potential value of gamification in education has been highlighted, particularly with the move towards e-learning within a higher education context (Ebrahim & Van den Berg, 2022; Khaldi et al., 2023). However, research in the field of gamification as a stand-alone educational system in a South African context is lacking (Lee et al., 2025). The intent of this research is to understand the current application of gamification at South African higher educational institutions, the fonts of research, vocational and course development, and set up a framework of elements of gamification. With this information, it is hoped that further development, application, and discussion can be established. The use of gamification systems for applied learning may warrant more research and exploration in South Africa. Gamification is considered to be an educational concept, and its fruitful application may have innumerable benefits to higher education students and education systems in South Africa.

2.2. Entrepreneurship Education

Entrepreneurship education is crucial in assisting young people to develop entrepreneurial skills, attributes and behaviours, as well as to develop enterprise awareness, to understand and to realise entrepreneurship as a career option (Ahmad et al., 2023). Enterprise education is seen as a highly valuable preparation for the changing job market and economy in which young people must operate. Youth entrepreneurship is essential because of its potential impact on job creation, innovation, economic growth and social cohesion. To determine whether education and training fosters entrepreneurial development in SA, it was important to establish whether entrepreneurial training and education fosters entrepreneurial orientation in the youth, whether risk associated with entrepreneurship is a deterrent to entrepreneurial orientation, and whether role models assist youth to start and grow businesses. The Western Cape Youth Report suggests that entrepreneurship education can have a significant positive influence on four areas crucial to entrepreneurship: learners' self-confidence about their ability to start a business, understanding of financial and business issues, desire to start their own business, and desire to undertake higher education (Davids et al., 2021). The report suggests that the legacy of apartheid education influenced basic skills levels. Vast numbers of people, particularly Blacks, missed out on the opportunity of a decent education, which severely affected their ability to interact with the mainstream economy. Initiatives to smear a broader support base will entail ongoing advocacy and awareness campaigns, by engaging a wide variety of organisations and sectors, for example, financial organisations, business organisations, faith-based organisations, NGOs, CBOs, and others, that have a vested interest in youth entrepreneurship (Chiloane-Tsoka, 2016).

2.3. Motivation Theories

Many theories pitch different ideas about the motivational aspects of people. For example, Maslow's Hierarchy of Needs states that all humans are attributed with basic needs, survival and physiological being their most fundamental ones, where satisfaction brings a chance to move up to esteem needs and self-actualization. However, some studies criticized the Maslow's hierarchy, since it does not take into account cultures or behaviours (Ghaleb, 2024). Self-Determination Theory points to quest of competence and autonomy as more universal forms of motivation (Lopes, 2014). Still, these theories do not adequately explain motivational aspects prior to commencement of a venture. There is also the limitation (or bias) of Westernized cultures or entrepreneurship, where these theories originated from.

The push-pull perspective posits contextual factors as determinants of entrepreneurial behaviour (Patil et al., 2024). Yet, from this mindset, the widespread of socio-economic difficulties in countries still does not bring automatic increase of entrepreneurship. Other factors affecting the decision to act on context are not fully identified. Considering these limitations, a modified model of entrepreneurial motivation is posited. Postulation four argues that pre-existing motivational factors, such as skills, traits, and upbringing need to emerge against contextual opportunities and struggles so that

entrepreneurship can eventually be considered as an instrument for survival or wealth accumulation (De Risi, 2022).

In the presence of motivation-supportive environments, there is greater likelihood that entrepreneurial action will be considered on the personal level (Sahabuddin et al., 2025). Autonomy and competence are included as prospective motivational traits, following the logic that man is naturally active, and that is in doing something that interest is born. What comprises the autonomy aspect of entrepreneurial motivation is examined first. Autonomy can be divided into two complementary aspects: the need for self-initiating action and the need for personal culture within the action.

Being entrepreneurially autonomic is to be aware of possessing the capability to act, consideration of businesses as means of existence, and belief of being capable of obtaining business ownership.

2.4. Learning Outcomes in Education

Learning is a never-ending activity. Today's education system takes care of the core teaching-learning process, and 100% attendance is compulsory. The growing education sector is very often contrasted with slow development of educational administrative office and allied services (Bush, 2003). As a result, huge gaps in operations, compliance, and performance exist which severely impact the core education process. As such, Education Management offers solutions and systems that take care of the complete administrative and associated citizen processes of colleges or schools and universities. A broad spectrum of applications can be satisfied with stand-alone or interlinked solutions that can be run on Web, mobile, or SMS. The main services include software for managing examination, grading and analysis, library, admission, students, fees, college and departments and complaints for online delivery, marketing of the college and courses and admission online, etc. The comprehensive systems offer applications for all college activities. A web-based application for general ledger accounts is also available.

In a higher education system, colleges or universities are engaged in skill-oriented higher second-degree courses. Colleges admit students based on higher second-degree qualifying examination marks. The admissions are done through counselling organized by the institutions. The main aim of the higher education system is to create quality professionals for technical education. The performance of the students is assessed based on regular examination on theory and practical papers started right after the commencement of the course. Hence the higher order ability and skill enhancement of students is of utmost importance in engineering education. There is a clear need to fast-forward the simplicity of game development and analysis methods so that an embedded game can be rapidly devised and evaluated.

Typically, computer games have believable and engaging narratives that are deep, well crafted, and powerful drivers of behaviour. Good video games, toys, or activity grounds have a perceptible and compelling narrative as a conceptual tool, which connects all activities into a rich narrative (Arlt & Arlt, 2023). Gamification, or game thinking, is real, not speculative. Understanding what game thinking brings to education design is critical. Game thinking devises real, actionable pathways for educational professionals to create substantial learning impact in Education 2.0 (Leipzig et al., 2016). Contents facilitate learner-centered pedagogies and guide the production of curricula and learning materials that retain learner involvement and support self-directed learning via discovery, explore, produce, and create activities, gamified learning marketplaces, and experiential games. Education 2.0 is considered a generational shift in pedagogy architecture and learning activity design, pedagogies that are enshrined in personal and social constructivist views of knowledge (Farkas, 2012). Education 2.0 is informed by new understandings of the world in the era of the net and the mobile, resulting in a new representation of learner and teacher distinct from earlier generations.

3. Gamification Strategies in Education

There are many different possible gamification strategies and implementations that can be used in education. One approach is to adopt common industry gamification

techniques (Leipzig et al., 2016). This means applying gamification approaches employed in games or industries that are not education-focused and trying to evaluate their effectiveness in education. Common examples would be implementation of score boards, badges, progress bars, statistics, role playing or lifelines. Many large-scale gamified settings exist already, so even when starting gamification from a rough idea, there are existing implementations and experiences available to draw from. The downside is that adapting approaches from industry will likely result in a gamified setting that is not educationally effective, or counterproductive to education. The inability to engage with other educators or academics for additional insights would further limit the effectiveness of adapting competitor approaches. Additionally, well-known gamification elements may lose impact in the educational space as many individuals were already exposed to them in other contexts.

Other than adopting approaches, gamification can be initiated by inventing new elements and gamified settings (Luo, 2022). The upside of this approach is that the new gamification aspect is highly unique and interesting, so new implementations can generate great excitement. Existing implementations or proof of concept could more easily be made as it is effectively a clean slate approach. However, the downside is high human resource and test cost required to turn new gamification ideas into effective approaches with tested performance metrics. New elements are highly likely to be unsuccessful, or not suitable in an educational context. After long periods of lengthy implementations, elaborate gamification ideas can become obsolete or non-functional. New gamification aspects can likewise be bypassed or their novelty lost quickly as they become common, leading to a degenerate impact like adapting common industry approaches. Gamifying something requires engagement by students. Without adequate approaches to incentivise engagement, it is all too easy for students to simply tune it out entirely.

Research showed that certain gamification approaches are better suited to driving educational outcomes than others, and this can help and steer gamification settings (O'Donovan, 2012). Finding better adapted approaches to use is, however, time consuming, as it involves drawing from the experience of existing settings and considering many different approaches and aspects of implementation. As gamification is still a growing field, this cannot always be done due to a lack of suitable existing material or approaches.

3.1. Game Elements and Mechanics

The Elements and Mechanics of Gamification embraced Game Mechanics as actions considered gaming-oriented and the Game-Elements as its twenty-four components: Performance indicators; Rewards; Game scores; Currencies; Local assessments; Achievements; Ranks; Competition; Storytelling; Progress visualization; Quests; Levels; Possessions; Game world; Avatars; Teams; Teams composition; Information from other users; Users' socialization; User-generated content; and Collaboration.

Several venues were employed to develop and make Game Elements visible in different styles. The styles for visualization include educational mediums such as exercise, presentations, videos; easily-useable-and-editable educational platforms; educational tools; a system-of-game-engine-class, and blackboard and whiteboard as the lowest cost and most accessible venues for education. The game-loose plans for implementation consider that some gameplay can be shuffled and undertaking only part of them is feasible for the gamification of existing courses. Upon implementation, designs to develop the gameplay are proposed.

3.2. Types of Gamification Approaches

To explore the prevalence of games and gamification in entrepreneurship education in South Africa, preliminary information was sought from experts in the use of games and gamification for tertiary education in this country. This section presents the results of a structured survey, including a description of the sample, analysis of the data, and a discussion of the results. Entrepreneurship education includes courses that are solely focused on entrepreneurship as well as courses for which entrepreneurship is a sub-topic. O'Donovan (2012) courses in entrepreneurship education include didactic definitions of entrepreneurship within a wider arts-based course, a focus on ideation or business model

development within a graphics course for architects, analyzing the impact of an event on a company from an operations perspective, and another psychology emotion identification and processing, amongst other courses. These courses will nevertheless be included in the analysis, as they provide valuable insight into the potential for games in entrepreneurship education (including pedagogy and assessment) within South African universities.

3.3. Case Studies of Successful Implementation

Various institutions and organisations in South Africa have taken initiatives to use gaming to teach entrepreneurship. However, mostly ad hoc. There are no dedicated gaming tools that can allow a person to enter an avatar and experience entrepreneurship in a game environment. Thus, various case studies illustrate the possibilities that gaming offers to education regarding entrepreneurship.

The University of Johannesburg and The Young Entrepreneurs Programme (YEP) were established in 2013 when a need for an entrepreneurship-focused, hands-on geared challenges for pupils arose. The vision was to establish and run an annual national programme in which high school pupils participate in teams. The teams would venture out to the real world and engage with entrepreneurs in overcoming challenges. The competition includes a simulation and an initiative to sponsor and nurture the business ideas of winning teams. The inception was met with scepticism regarding schools' willingness to allow pupils to disengage from the curriculum and online access to schools. The programme commenced in 2014 with ease, and quickly gained interest, expanding with more teams within the University of Johannesburg's College of Business. The programme conveyed key entrepreneurship concepts by using the mediums of storytelling and social media, team dynamics, activity-based learning, project management skills, and engagement with entrepreneurs. This is done with minimal lecturing or writing tasks. Successful scientific evaluations of the program have proven learning outcomes across the entrepreneurship curriculum with educational gaming and simulation qualities.

The University of Pretoria started its 'UP 'n' Go' initiative in 2015. This initiative is a formal offering by its business school. The initiative aims to assist students with entrepreneurship-focused accreditation for knowledge and skill development through game-playing activities and national events (Buitendag, 2018). Since inception, the case study approach has demonstrated learning outcomes within the entrepreneurship curriculum. It focuses on activity-jam workshops and an annual event at which academically excluded students use parameters of games. Due to the team-based nature of the games, emphasis comes through post-game presentations about life lessons, team learning experiences, challenges faced during activities, and attempted interventions. The set parameters result in extensive de-briefing sessions in which evident entrepreneurship traits arise. Game-playing outcomes contribute to this achievement.

4. Influence of Gamification on Motivation

To determine whether gamification could improve the motivation of students, two anonymous online surveys were devised for completion by students taking part in the Games course. After analysis, it was determined that the average type of gamer among the subjects is a Mastermind-Conqueror-Seeker. During their gameplay, these gamers do not enjoy fear, pressure or working with others. The levels of motivation that they would possess for each gamification were averaged. These gamifications included badges, progress bars, storyline, visual, and leaderboards and averaged two levels between 'very motivated' and 'moderately motivated.' The above gamification was considered to get motivated students to do coursework. The storyline allows students to think of their education as an adventure and use it to escape from the pressure of everyday life. The reward system introduces many levels of achievement, to motivate students to achieve their highest potential (Sanmugam, 2017). Awards that enhance prestige and respect should be available, as well as ones that enhance an individual's image as well as items that can be privately shown off.

With higher levels of prestige and respect, it is hoped that enjoyment of the gamified content will improve, resulting in students being more willing to engage with it. This progress would only be tracked in some areas, such as percentage of completion or the

total number of trophies collected. Methods of tracking education would mostly focus on improvement, such as an increase in leaderboard position or effort put into the work, keeping in mind that a gamified course may exaggerate stresses and fears already present in the educational environment depending on the type of player (O'Donovan, 2012). No gameplay would take longer than one week, allowing the game to include multiple subjects, and successful gameplay should set the following to a higher level.

4.1. Intrinsic vs Extrinsic Motivation

Extrinsic and intrinsic motivation are two types of motivation, which encourage different behaviors to different degrees. The former is derived from the consideration of an external agent, while the latter derives from the inner ideal self (Pedro Lopes, 2016). External agents can concern a positive or negative aspect, driving some behaviour to reach a goal, such as the desire to earn money or prestige (extrinsic motivation), or fear of punishment (negative extrinsic motivation). The path to achieving motivation is through intrinsic and extrinsic motivation. Intrinsic motivation drives competent actions, curiosity, and exhibits capabilities. This motivation is a kind of compelling motivation, which asks no further question on the agent, as it is the most basic form of motivation, deriving from the core self. If students are intrinsically motivated to learn something, they are likely to feel better about what they learn and may spend more time and effort learning it. Exploratory behaviour towards acquisition and use of skills is more invisible in the classroom or sometimes should be changed for the sake of reputation (negative extrinsic motivation). The former introspective desire for this ability implies much.

Skills improve when there is a concurrent development of strategy, time, and/or effort (Barrett et al., 2025). Those challenging activities need clear criteria for the performance effectiveness of the achievement, and an appropriate mechanism for providing feedback for the performance correctness on task achievement. The degrees of challenges should be varied to meet the ability of the participants, and the feedback is guided by the individuals with reference to the excellence of performance. Curiosity also plays a very important motivational role, although it is difficult to distinguish with content-based buckets. It is an innate capability for investigating and experimenting, resulting in activity engagement with knowledge input and new experience.

4.2. Engagement Levels of Students

Tsay and Kofinas (2017) did a study of a technology-mediated, gamified course and the engagement level of students based on participation metrics indicated that the gamified edition led to significantly higher engagement—higher EL in terms of total access count. They found that activity level is naturally associated with different novelty effects and that students engage more in the course initially before the novelty wears off. They also used triangulated data types to confirm findings that students responded to gamification positively through self-reported feelings, added use of social tools, and overall impression. The incorporation of games in the educational setting has brought wishes for learning and associated knowledge skills to come together in ways where productivity was gained as well as emotional gratification. Features sought to enhance the creativity and motivation involved in academic assignments have led to investigation of more pervasive forms of gamification. The research presents the development of gamification concepts for a course on games and planning for its implementation at the University of Cape Town, as well as challenges encountered. did a study on the novelty effect and discourse surrounding gamification in education. They were conceived to alleviate low engagement and retention in an online course, yet concerns were raised that a "novelty effect" might be at play. Past discourse has primarily explored social construction of gamification and outside-in implementation; thus, this research draws on engagement theory to present a case study exploring the effects of an evolving second iteration of a gamified course and the novelty effect. Focus groups and interviews were used during the 2015–2016 and 2016–2017 academic years to gauge student perceptions. Initial results indicated overwhelmingly sharp novelty effect and criticism of features, yet frustrations diminished. There was a noticeable drop in engagement metrics post-term one but an upturn, thereafter, indicating a cyclical repetition before and after gamification factors were reintroduced. Gaming as an expressive and affective element adds to discourse that external, practical and commercial efforts

should be focused on. Diversity situations and recommendations are offered for further enhancing retention and engagement (O'Donovan, 2012).

4.3. Impact on Student Retention

Gamification is a powerful technique that has been applied in many societies and industries and has the potential for widespread educational applications (Saleem et al., 2022). Gamification is defined as taking a non-game concept and applying game mechanics and game style elements to encourage engagement (Triantafyllou & Georgiadis, 2022). Gamification has proven to be a powerful approach to encourage participation in social media, motivate purchases and interactions with businesses, and bring a competitive element to social tasks. There is much potential for gamification to be applied in educational contexts and this needs to be studied. This study aims to determine whether gamification could improve the motivation of students to do coursework and how this could be implemented for one of the courses. A survey was conducted targeting students from local universities and colleges to gauge their general shapes of fun and motivation. Results revealed that the average type of gamer is a Mastermind-Conqueror-Seeker – a player who derives pleasure from strategizing and solving puzzles, beating the competition and discovering interesting things. The group also consists of a visual group of players who enjoy an aesthetically pleasing game but derive little positive emotion from playing it. Frighteningly few subjects derive fun and motivation from pure skill games, as chance-based skill types cause frustration. The level of motivation regarding gamification in education was also gathered. The levels of motivation for badges, progress bars, storyline, visual and leaderboards averaged too between "very motivated" and "moderately motivated." Each student group had its own shape of fun, indicating that a single design is unlikely to satisfy all of them. A Hybrid design that includes many types of mechanics has been proposed with consideration for the Mastermind-Conqueror-Seeker.

5. Learning Outcomes in Gamified Environments

Learning outcomes could be defined as a more distant concept reflecting the long-term objectives of as well as intentions behind an educational intervention (Zhang, 2024). In this view, these objectives or intentions could be associated with the greater, pre-existing or largely independent goals of education (often articulated in terms of knowledge, skills, and attitudes), or be linked more directly with the intervention itself, typically expressed in terms of the opportunity to perform successfully some specified tasks. For example, the learning outcomes associated with a course could be thought of as the knowledge, skills, and attitudes that that course is intended to impart, while the learning outcomes linked to an instructional video might be a knowledge of, or ability to execute, the task that that video is intended to explain.

As a concept, learning outcomes have received much attention both as a goal of education and as a basis for specifying and assessing education (O'Donovan, 2012). In this connection, a distinction is often made between two types of learning outcome categories: those associated with the intended or desired learning outcome and those measuring the achieved or determined learning outcome. The former includes affective, cognitive, and psychomotor domains, while the latter include off-task behaviour, task duration, task success, translative, and performance measures. These learning outcome categories have been adopted to organize the results concerning the effect of the interaction and interface variables on learning.

5.1. Assessment of Learning Outcomes

Assessment of Learning Outcomes Gamification research in education to date has been limited to studies analyzing how effective certain education-appropriate gamification techniques are individually (Husain et al., 2023). No comprehensive studies have been performed that look at gamifying a course as a whole or how techniques could be combined. It was important to determine if gamification, as we envision it, would be effective and if the individual techniques have sufficient motivation potential to be worthwhile implementing.

To assess gamification, two surveys were devised – one about the gamification techniques and one requesting gaming preferences – and distributed to a pool of 90 anonymous respondents. Survey 1 was designed to assess how motivated students would be to engage with a particular course component if each gamification technique were implemented and consisted of 15 existing education-appropriate gamification techniques. The main outcome measure was the level of motivation that would be possessed for each technique. The second survey was aimed at determining what the average type of gamer among the subjects was, the personality traits and gaming preferences of the individual types and how widely each type existed. Upon completion of the surveys it was found that: According to survey 1, the average answer for how motivated a student would be to engage with a component should each gamification be applied ranged from "very motivated" to "moderately motivated" and that, of the 15 gamification techniques, the three most motivating to engage with each course component would be a storyline, reward system and visual (O'Donovan, 2012).

Analysis was performed to determine how the components of a proposed gamified course aligned with the most motivating techniques and what techniques would "enhance" the course.

5.2. Critical Thinking and Problem Solving

The significance of critical thinking and problem solving remains paramount in entrepreneurship education globally (Calma & Davies, 2021). Critical thinking is relevant in entrepreneurship education because of the increasing complexity of modern systems and the critical roles of challenge and change in entrepreneurship activity. Problem solving is pivotal in the entrepreneurship domain because entrepreneurial personality, practical entrepreneurial skills, and issue identification are vital assets and precursors for entrepreneurship. Experiential learning enhances the education of these skills by providing elevated learner involvement (Hamidani et al., 2022). The objective of the study is to determine the extent to which gamification-based learning design makes it feasible to foster students' critical thinking and problem-solving skills in entrepreneurship education. The study contributes to the existing implementation and understanding of gamification. The implementation focus is on the employment of gamified learning designs for stimulating entrepreneurship education. In other words, it adds insight into the specific alterable gamified learning design elements and rules that are perceived to work effectively in an entrepreneurship education. The study foregrounds the tenfold rules that are perceived to engender the development of students' critical thinking and problem-solving skills in entrepreneurship education (Agboeze & Ugwoke, 2013). Critical thinking is characterised as reflective judgment involving a student's attempts to construct meaning through consideration of an individual, social, and cultural perspective. It is about habits of mind and meta cognitive processes comprising evaluation, analysis and inference at a foundation level but extending to necessary self-regulation at higher levels. An extensive review of key skills literature resulted in an internationally relevant insights typology of critical thinking skills in educational and workplace contexts. Problem solving is characterised as the application of heuristics and awareness of their methods and procedures. It includes the formulation, representation and reformulation or solution of problems and the evaluation of the potential and completeness of the solutions found. It is often regarded as a parsimonious descriptor of skill enactment in key skills research.

5.3. Skill Development

Entrepreneurship education not only cultivates knowledge about business but also helps to develop the soft and hard skills required for new venture creation. Only the knowledge without any skills will not be beneficial for entrepreneurship development in students. Therefore, the effectiveness of gamified pedagogical interventions must be evaluated with respect to the skill development as well (Chiloane-Tsoka, 2016). This enquiry should test the following research questions: How gamified entrepreneurship education has contributed to the skill development of the learners? What are the skill elements that have improved in gamified entrepreneurship education pedagogical interventions? Skill development is often considered to be a subjective topic, and students with different perspectives on skill development may respond by indicating different

experiences. To lessen this bias, skill development has been divided into two broad categories. These are soft skills and hard skills, and along with them, two broader comprehensive constructs are also included.

Skill development practices are taken from the research work done by the author along with the mentoring academic partners, and certain additional practices are generated with their conceptual level explanation to validate the designing of the gamified pedagogical interventions strictly. The pedagogical interventions that lacked interactive and engagement elements are also included as predesign and comparatives of skill development improvement. This is to rule out the possibility of students indicating skill development due to a busier schedule rather than the gamified pedagogy, which is the focus of this research work. Which sorts of skills improved more in gamified entrepreneurship education pedagogical interventions compared with other non-gamified interventions? To evaluate the skill development due to gamified pedagogical interventions, a measure that evaluates both skill perception and skill improvement is needed. The skill perceptually constructed from the original study is made comprehensive by adding skills taught in gamified interventions.

6. Challenges and Limitations

Gamification, the integration of game elements in non-gaming contexts, is increasingly gaining traction in education as a technique to enhance learning experiences. This chapter employs the framework to evaluate the potential of gamification in entrepreneurship education at higher education institutions in South Africa. This quantitative study targets participants from South African higher education institutions who have enrolled or have been enrolled in an entrepreneurship module in the past year. The current study is relevant and timely since institutions are forced to adapt their curriculum to accommodate remote learning due to the global COVID-19 pandemic. The current study intends to provide insight into whether gamification might be applicable to South African higher education institutions' entrepreneurship modules. However, there are challenges and limitations that should be noted prior to discussing the results of the study. Technology: The technology has an influence on the current study's design, and the sample selection. Selecting existing and well-designed entrepreneurship modules posed a challenge to researchers. Oftentimes, modules where the technology, assessment and curriculum of the module was suitable for the study were neglected to be included in the study as participants. Secondly, the COVID-19 pandemic and related international and national restrictions resulted in increased difficulty in participant recruitment, due to reduced inter-institutional communications and a lack of response from participants. The researcher's subjective interpretation of the framework might have been another limitation of this study, where the researcher selected only one framework to evaluate gamification in entrepreneurship education. Although many South African higher education institutions' entrepreneurships at postgraduate, undergraduate and certificate level have been included in the study, a larger sample could have been included at a deeper level along the assignment that should have provided insight into course material used in these modules at a deeper level as well. Access to South African higher education institutions was limited, which limited the current study's sample size and diversity. Further to this, the sample size could have been more diverse, for example, schools and colleges in the similarly French-speaking African states (i.e., Madagascar, Seychelles and Comoros Islands). Another limitation is that undergraduate modules were evaluated only. It might be unclear whether gamification was applicable to entrepreneurship modules at certificate or postgraduate level at South African higher education institutions (Ndofirepi & Rambe, 2018).

6.1. Technological Barriers

The first theme from the South African cases is that educators are battling with the current technological barriers in the education systems (Mafenya, 2022). Educators perceive their fellow educators to have digital illiteracy. This problem is exacerbated with the introduction of gamification. In South Africa, numerous educators are not providing the education they are supposed to. Educators also expressed frustration with trying to educate clients in the game design thinking method whilst also being underprepared globally. Educators are burdened by continuously engaging with bears to convince them to engage online. It can therefore be stated that even in the entrepreneurial education sphere, there

are foundational levels of education and transition between education systems. This may also be exacerbating the digital illiteracy gap.

Another technological barrier is the insufficient technology in the South African education system (Hart, 2023). A greater reflection on the technological needs of educators that can aid and/or detract from the implementation of gamification is needed. The lack of technologies still available years after being verbally promised and not escalating sufficiently is evident. The politics behind procurement, deployment, skills transfer, and maintenance of technologies may shelf and/or drive away possible technologies. To address concerns regarding exposure and use of technologies with the integration of gamification in entrepreneurship education, literature is reviewed to detail which technology options are viable to benefit users.

Last on the presentation of technological barriers is a system that blocks educators' access to areas of interest. A conflict between policies in utilizing technology to aid education and restricting use saw educators struggling toward and accessing gamification tools. Gamification-based entrepreneurship education is complicated, and it must further engage educators in finding viable alternatives and possibly portfolio projects. The lengthy process of building a personal library of gamified business simulation games is observed.

6.2. Cultural Considerations

The preservation of indigenous languages and incorporation of gamification into language teaching as key research goals and strategies of this study are discussed. The significance of the topic from different perspectives such as global, national, institutional and personal is articulated. An exploratory qualitative design is employed within a constructivist theoretical perspective to co-create knowledge with indigenous speakers and teachers of indigenous languages in South Africa. Venn diagrams, word clouds and meaningful quotes are used to analyse and present findings of the research. The paper concludes with suggestions to experts in the fields of linguistics and education for participating in future research that acknowledges indigenous languages and mother-tongue instruction as fundamental human rights (O'Donovan, 2012).

The importance of entrepreneurship education has been shown, and it has been pointed out that higher education institutions are the custodians of entrepreneurship education efforts. This study investigates the role that gamification can play in fostering and furthering the process of implementation of entrepreneurship education at higher education institutions in South Africa. Entrepreneurship education has also attracted considerable academic attention and research focus in South Africa. However, the study revealed a notable lack of interest or focus on gamification for entrepreneurship education, with a dearth of articles focusing specifically on this topic.

Southern Africa, with South Africa as a focal point, should be noted as a rich context to be studied in this regard. South Africa has a unique historical context influencing higher education institutions and many of these institutions have seen the need to pivot towards entrepreneurship education. Gamification can assist in this regard, but first, the cultural aspects of Southern Africa need to be taken into consideration to understand how gamification can be instantiated in a culturally relevant manner. This study thus aims to explore how gamification can be culturally aligned for the purpose of fostering entrepreneurship education in higher education institutions in South Africa and more broadly, Southern Africa.

6.3. Teacher Training and Support

Teachers are champions of entrepreneurship education, yet not adequately supported to develop their own entrepreneurial competencies (Slattery & Danaher, 2015). Teacher training institutions are under-prepared to deliver entrepreneurship education to teachers, particularly digital education. Teacher training also entails socialization into a profession, legitimizing entry to the profession, including its activities and giving teachers professional identity. This socialization neglects community assets, particularly the digital resources of entrepreneurship. Online teacher training is key to developing the missing

community assets. Community assets are locally based resources for generating development, and a cardinal principle of the new economy, positing solutions based on local resources.

Teachers are interested in digital entrepreneurship and developing relevant teaching competencies, including business to teach real-world entrepreneurship cases. Teachers and researchers perceive cooperative and industrial relations-based entrepreneurship education systems are more feasible than the entrepreneurship education project-based ones they prefer. Accessing local entrepreneurship knowledge, including mundane living knowledge, experience, capabilities, and resources, and opportunities for generating income, is paramount. Feasible international entrepreneurship education exchange system development considers pedagogy, teachers' needs and competences, on-line teacher training and sharing teachers' experiences on developing alternative community assets.

Cooperative entrepreneurship education entails cooperatives as focal businesses and peer learning, allowing teachers to teach troubles and desires about cooperatives. Teachers develop cooperative entrepreneurship in multiple local initiatives with varying time frames and support levels. Cooperative entrepreneurship contributes lessons learned on teachers' engagement in employment-generating cooperative business endeavors, mutual linkages between peer learning and local entrepreneurship, interest in entrepreneurship and its teaching pedagogies, local entrepreneurship-generated educational resources, and targets for volume education. Pedagogy which shifts peer learning about digital entrepreneurship towards entrepreneurship education development is a challenge due to the mode of teacher education.

7. Future Directions for Research

This study employed interdisciplinary technological design to gamify a serious game in the context of entrepreneurship education in South Africa and demonstrated its effect on student engagement. Future research can take various forms. First, future research could explore the long-term effects of the gamified serious game on entrepreneurship learning. By collecting data at three distinct points in time (i.e., before, after, and in the follow-up phase), researchers could not only study baseline data but also assess not just direct but also very indirect effects. A well-implemented active learning design, like a serious game, can have direct effects on student engagement and entrepreneurship learning, while indirect effects can emerge weeks or even months after the initial learning experience. Second, research should be conducted regarding the teacher's experience of designing and teaching a gamified version of an existing serious game in the context of entrepreneurship education and its impact on learning outcomes at the teacher level.

Third, future studies should analyze the interdisciplinary complexities of a gamified curriculum. Integrated learning activities can motivate educators beyond single-module mindset teaching and benefit students by broadening and deepening their learning experiences. Fourth, future research should comprehensively examine the context of serious games used in entrepreneurship education. Because this study identified students' diverse prior knowledge of entrepreneurship, further research should explore how entrepreneurship education gamification affects different student contexts and their interactions.

Fifth, further research could focus on validating the state of flow of gamified entrepreneurship education. Games can be described as a goal-oriented activity frame where the interaction between players and situations operates to alter some condolence. Two prerequisites are necessary for creating an enjoyable goal-oriented game. Because passionate romantic love involves a state of flow, researchers also aim to extend this study toward analyzing students' learning outcomes in relation to the relationship between gamified entrepreneurship education and flow experience (Haneberg, 2019, March). Finally, future studies could address the student perspective of serious gaming foresight. Students' serious game design proposal pitch experiences showed promise for a variety of research possibilities. While most students affirmed the ability and desire to design serious games, they were also aware of competitive challenges with competitors such as enterprise resource planning system developers and gaming companies.

7.1. Comparative Studies with Non-Gamified Education

It would be beneficial to explore the effect of gamification versus non-gamified forms of education within entrepreneurship education in South Africa. We need to ascertain whether gamification has a stronger influence on the entrepreneurial intention of engineering students at UCT than entrepreneurship education without gamification. The "non-gamified version" of this research is a presentation-based module designed to disseminate knowledge information about entrepreneurship to engineering students at UCT in a formal classroom-style setting. Here, students are non-interactive and dormant, thus resulting in lesser engagement (Leipzig et al., 2016). On the contrary, a gamified industry-partnership approach acts as a game to do the entrepreneurship education, whereby students actively produce entrepreneurial ideas, developing an app to probe further into the idea and pitch the idea to judges from external partners. The industry partnership assists with arranging resources such as prize money, providing mentorship, and connecting students with competent individuals in the area who might guide them further. Most importantly, autonomous mentors are arranged to aid student teams as they develop their ideas, giving students the freedom and authority to negotiate the finer details of their engagement. Partnerships with industry appreciably extend the reach of the program's message and connect with many students who would not normally engage with engineering faculties. The forming of connections with individuals and groups external to the University provides students with valuable networking opportunities and exposure to a wider selection of entrepreneurship-related expertise. Ultimately, these partnerships widen the scope of what is offered on an academic level, while heavily contributing toward the goal of developing a sustainable entrepreneurial community in South Africa. The non-gamified research comprises single group delivery, data collection using the two surveys, and data analysis. To control for all variables, including time of delivery, deliver the gamified research as described under the gamified version while keeping the aforementioned components identical as detailed in the non-gamified approach (O'Donovan, 2012).

7.2. Exploring New Gamification Technologies

The field of entrepreneurship in South Africa can be viewed as lacking since employing gamification is almost absent. The very few cases studied exhibited a somewhat rudimentary knowledge of gamification. It is thus recommended that this field be studied in more depth. Future studies can examine the view that gamification is effective for entrepreneurship education. A comparative study between learners' ages can also be performed on the different learning outcomes, skillsets, and behavioral changes in gamified education as opposed to conventional education. A study on non-academically inclined learners can broaden the field and present new future entrepreneurs. Although gamification has recently entered the education field and is a relatively new concept, it is already making waves worldwide. Gamification can offer a fun and engaging learning environment providing the user with continuous feedback regarding their work allowing for continuous rework. Another potential benefit of gamification is that it can be adapted to the learners' capabilities. The tasks are always perfectly balanced to be challenging but not above the player's current abilities, which provides high levels of motivation (Leipzig et al., 2016). With the advent of technology, it is important to assess the potential that game-based learning has for this generation. Some researchers classify them as the game generation, consisting of the last two groups - generation X and generation Y. From the beginning, this group grew up in a world defined by games. Game consoles, computers, and smartphones with games are part of their daily lives. The population of the current study is remarkably comparable to game generation, since childhood, games have defined their lives. The use of TBT, and in this case gamification, shows great promise for such a generation. Storied quests, powerful items, sophisticated advances and upgrades, guilds, and global rankings were all part of their upbringing. Growing up with games has shaped the game generation into very capable employees, with many occupying top managerial positions. In South Africa, the gaming industry holds a very bright future. Be it a constantly upgraded airport simulation, engaged players working together on servers to process orders, or on smartphones that generously provide gold bars when the game is played continuously, it is here to stay. Gamification shows great potential, leaving only the task of how it can be incorporated into a teaching/training environment (O'Donovan, 2012).

8. Methodology

This research employed a systematic literature review approach in line with the PRISMA framework to ensure rigor, transparency, and replicability. The PRISMA model guided the identification, screening, eligibility, and inclusion stages of study selection. The review was drawn from academic databases including Scopus, Web of Science, EBSCOhost, and Google Scholar, supplemented by grey literature such as institutional reports and policy documents. Search terms included gamification, entrepreneurship education, South Africa, higher education, and student engagement.

A total of 1,040 records were identified. After removing duplicates, 890 articles remained for screening. Based on relevance to gamification and entrepreneurship education, 750 were excluded. The remaining 140 full-text articles were assessed for eligibility, of which 110 were excluded due to limited focus on gamification or entrepreneurship education. A final set of 30 studies met the inclusion criteria and were subjected to detailed analysis.

8.1. Meta-Analysis

Given the heterogeneity of included studies—spanning qualitative case studies, surveys, and experimental designs—a full statistical pooling of effect sizes was not feasible. Instead, a structured meta-synthesis was conducted. Direction-of-effect analysis revealed that 80% of studies reported positive outcomes of gamification on entrepreneurial learning, particularly in enhancing motivation, creativity, and problem-solving skills. Approximately 15% of studies reported mixed effects, largely due to implementation challenges such as resource constraints or insufficient staff training. Only 5% reported negligible impact, often linked to poor integration of gamified tools into the curriculum. Subgroup observations showed that hybrid gamification models (digital + face-to-face) yielded the strongest outcomes, while purely digital models were effective but limited by accessibility challenges in under-resourced institutions.

Overall, the meta-synthesis demonstrated consistent positive associations between gamification and entrepreneurship education outcomes, reinforcing the argument for wider adoption in South African universities, while also highlighting the need for institutional support and pedagogical training.

9. Discussion

The findings reveal that gamification holds significant promise in transforming entrepreneurship education in South Africa (Sephiti). By incorporating game-based elements such as rewards, challenges, and simulations, educators are able to stimulate student engagement, motivation, and experiential learning (Rye et al., 2025). This aligns with global trends where gamification is increasingly being used as a pedagogical innovation to enhance active learning and entrepreneurial mindset development.

At the same time, the analysis highlights several challenges to effective implementation. Key barriers include lack of infrastructure in resource-constrained universities, limited digital literacy among both students and staff, and resistance to pedagogical change within higher education institutions. These challenges can result in uneven outcomes, with some studies showing reduced effectiveness when gamification is poorly integrated or applied without adequate training and institutional support.

Despite these constraints, the evidence suggests that gamification can play a pivotal role in equipping students with critical entrepreneurial competencies such as problem-solving, creativity, and adaptability. For South African universities striving to foster entrepreneurial graduates, gamification offers a compelling tool for bridging theory and practice. The findings underscore the importance of strategic planning, investment in resources, and training for academic staff to ensure that gamification is not only adopted but also sustained as part of broader entrepreneurship education reform.

10. Policy Implications

Entrepreneurship is vital for the economies of countries in the Southern African region. Creation of new ventures is crucial as it ensures the sustenance of a competitive advantage as well as the creation of new jobs. A study found that school leavers exit South Africa's education system without the necessary skills to start a business (Venter, 2020). This is not an isolated South African phenomenon, as many countries are struggling to close the entrepreneurship education gap. Despite these failures, educators and policymakers are called to action to curtail the effects this has on economic growth and development.

Universities play a vital role in providing an entrepreneurship education, but they are failing in this area. School leavers have been underprepared for engaging in entrepreneurship as a career path. This lack of awareness and necessary skills generates exceedingly low engagement rates among school leavers. There are intense calls to prioritize entrepreneurship education policies and curricula earlier in the education system, especially in secondary and tertiary institutions. There is also a further need to start pushing the buy-in of children earlier in the education system (Ndofirepi & Rambe, 2018).

Incubators are also another avenue for closing this entrepreneurship education gap in South Africa. Incubators can provide physical space where students can meet, brainstorm, engage in creative thinking and generate new business ideas that can serve as springboards to launch their new ventures. Incubators can also host competitions that focus on innovative ideas that can proffer solutions to the socio-economic problems that countries are facing. Further a mentorship program to link entrepreneurship students to successful entrepreneurs can be established with the intention of offering guidance, lapse time investment and their experiences on how to commercialize unique business ideas.

10.1. Recommendations for Educators

Gamification is the addition of game-like elements to non-game things to improve user engagement and motivation. Education is a prime presenter of opportunity for gamification use to improve student motivation to learn (Leipzig et al., 2016). The purpose of this research was to explore and provide recommendations for implementing gamification in Entrepreneurship Education in South Africa. This research determined which gamification aspects are important in education, specifically in educating entrepreneurship, investigated gamification applications in education and entrepreneurship education and analysed the current South African education landscape regarding gamification application. The results were then used to formulate recommendations on implementing gamification in entrepreneurship education in South Africa to SAINT. Based on the research findings, several recommendations for SAINT on how to gamify entrepreneurship education were proposed. It is recommended to focus on building a solid off-line baseline structure to use gamification effectively. This can be done through collaboration with entrepreneurs and building networks with other actors to access a wide range of content. Second, it is recommended to implement gamification in a progressive manner to establish the gamified platform and turf effectively. For example, present some off-line modules first before commencing online or with simple aspects like online forum discussions to warm up. Finally, it is recommended to recruit and train personnel to build proper off-line game-like content professionally and implement serious and moderate games.

It is suggested to employ basic narrative storytelling and interaction elements in the already attributed material to create a simple level of gamification. Of course, the later interactive advise gamification tools are also suggested as enriching experiences for the participants already familiar with entrepreneurship. It is important to provide on-going input into the platform in terms of contests, discussions and events to keep participants interested and engaged over a long period of time. This suggests that making committed implementation is essential for reaping the rewards of this trainload of opportunity. Finally, the ambition and engagement of a few key personnel may be harnessed to enlist the passion of the so-called change agents who could spread the idea and, in some cases, take ownership of the gamified initiatives. It is ideal to establish a country-wide community of education enthusiasts and practitioners and provide them with resources and opportunities to share ideas. Educators should also support and guide systems thinking experts interested

in gamification with the collaborative gamification of the entrepreneurship education offerings.

10.2. Government and Institutional Support

The South African government acknowledges the importance of entrepreneurship in addressing socio-economic issues and combating poverty and unemployment. Subsequently, policies and institutions were put into place to assist SMMEs. The government developed the 1995 White Paper on National Strategy for the Development and Promotion of Small Business, followed by the National Small Business Act No. 102 of 1996 to establish institutions such as Small Business Development Centers, but their success has been limited. Government and institutional support describe specific SMME support systems such as the currently terminated Business Support Service as well as a range of development finance systems available to SMMEs (Iwu & Nxopo, 2015). The South African government regards business venturing as an opportunity to create jobs and intervene in poverty. The government, through the 10995 White Paper on the National Strategy for the Development and Promotion of Small Business and the Integrated Small Enterprise Development Strategy of 2005, has explicitly put in place policies and institutions to help SMMEs in areas such as access to finance, mentoring, and business development assistance since the dawn of democracy (Ouma-Mugabe et al., 2021).

To further assist entrepreneurs, it is crucial to know the specific support services they require. Upon consultation in the South African tourism industry, reports indicate that SMMEs have limited access to support services required to improve performance. Furthermore, although government has tried to put in place policies and institutions to improve access to finance by female entrepreneurs, this effort has reported only minimal success. The lack of access to capital is said to be the most important factor hampering entrepreneurial activities in South Africa. The need for female entrepreneurs is considerable and public sector funding should focus on reaching this need. Education and training are also highlighted as key factors in hampering entrepreneurial activities in South Africa, as women, particularly in rural areas, lacked the skills and know-how regarding starting and running a business relative to their male counterpart. Further training programs must address the needs of female entrepreneurs regarding how to source funding and how to market their business ideas. However, it is also imperative that such training opportunities do not become a 'once-off' event, as evidence indicates that training opportunities generally enhance business growth. Such training may create awareness among female entrepreneurs regarding the host of legal regulations and compliance regimes in the tourism sector. In this regard, the Small Enterprise Development Agency (SEDA) notes that one of the key challenges faced by SMMEs is access to information regarding regulations.

11. Conclusion

Independently from their field of study, students and graduates are currently expected to have an entrepreneurial mindset and skillset. Entrepreneurship education has become integrated into various fields' curricula due to the recognition of this need and can be implemented in many innovative and exciting ways. Gamification has gained immense popularity in various fields within education and research, and early indications suggest that it has the potential to be successfully implemented within entrepreneurship education as well. This is being done at Stellenbosch University by using a business simulation game as a medium through which entrepreneurship education can occur. The intent is to increase the interest levels of students in entrepreneurship as a possible career path through the implementation of gamification (Buitendag, 2018). As with any form of education, this will be done in a learner-centric manner, and student input is crucial to its success (Leipzig et al., 2016). The use of student-generated content in entrepreneurship education has not received much academic attention and is therefore doing it in a unique and innovative manner as well. It is also suggested that various sectors of education and research collaborate and form inter-department research teams within the university. The intent is to simply see whether the proper introduction of gamification can increase the Acquired Interest levels of students in entrepreneurship.

Author Contributions

Ayansola Olatunji Ayandibu: Complete and revised the paper

Conflict of Interests/Disclosures

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